

Technology challenge brief

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The Made Smarter Innovation | Digital Supply Chain Hub is a digital innovation ecosystem that empowers individuals and organisations to work together to make supply chains smarter. The Hub will transform UK manufacturing by accelerating digital innovation – making supply chains more efficient, resilient and sustainable.

The programme seeks applications from UK startups, scaleups and SME technology innovators capable of developing technology proof of value solutions that address three supply chain challenges:

- Sustainable supply chains
- Supply chain mapping
- Supply demand imbalances

The purpose of this document is to act as a reference for technology innovators to learn more about the three technology proof of value challenges.

The information contained in this document is a replica of the challenge briefs on the hub [here](#). Please refer to our website for the:

- [Company requirements](#)
- [Selection criteria](#)
- [Programme benefits](#)
- [Competition terms](#)

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Sustainable supply chain challenge brief

Challenge Background

Meeting the UK government's ambition to achieve a net-zero economy by 2050, calls for urgent actions for all organisations. Given that 80% of the carbon footprint of supply chains is from scope 3 emissions, establishing effective means to measure, visualise and counter these should be of the highest importance but remains elusive to most companies due to the poor availability of high quality data and competing methodologies for its collection.

The GHG protocol outlines a methodology for the measurement of scope 3 activities through the collection and assessment of both primary and secondary data. However, primary data is often both expensive and low quality and secondary data is complex to access, generic, and out of date and is holding back the market in unlocking transformational new business models to prevent climate change,

This presents a significant opportunity for innovative technology companies to improve the quality, availability, and visualisation of data, to open up the market for the creation of new incentives to improve performance and accelerate decarbonisation.

Challenge Description

Scope 3 emissions represent scope 1 and 2 emissions of all of the other participants in a supply chain. Whilst there remains a growing amount of activity in developing solutions for combining scopes 1 and 2 to create Scope 3 emissions data maps, we are far from seeing these being broadly adopted. Many of these difficulties can be traced back to the diverse methodologies used in the collection and analysis of data and the lack of interoperability.

For this challenge, the focus is on upstream and downstream transportation and distribution using data from across the value chain from the source of energy through to the end user. The work will be aligned to the GHG protocol and work within the WBCSD's pathfinder framework and network.

In this challenge we want to work with technology innovators with a viable



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mechanism that facilitates companies to collect scope 1 and 2 emissions. The proof of value will seek to enable suppliers/buyers to access that data in a permissioned form and to be able to more quickly map out their scope 3 emissions for the selected products.

Expected outcomes of this challenge

The following outcomes are expected from this challenge

- A proof of value digital solution for collecting and sharing scope 1 and 2 emissions in accordance with the GHG and Pathfinder methodologies
- The proof of value has been tested to build a map of upstream and downstream scope 3 emissions for each of the participants validated against known data from the industry
- Working demonstration of how the tool can work at scale

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Supply chain mapping challenge brief

Challenge background

End-to-end supply chain visibility is seen as critical to managing the extended supply chain and responding quickly to changes in supply chain demand or supply chain risks. It is also critical to fully understand the carbon footprint of the supply chain and so-called "scope 3" emissions.

Most original equipment manufacturers (OEMs) only have visibility to tier 1 suppliers and above that they have limited knowledge of who is in their supply chain.

The first step in building visibility is to understand who is in the supply network. Typically companies at lower tiers in the supply chain often don't know who is in the higher tiers of their supply network and vice versa.

The problem can be typically split into two parts; who are the supply chain participants, for example, the nodes in the network, and what connections are there between these nodes. For the visibility and connectivity to be fully appreciated these connections need to be understood and mapped.

Supply chain mapping is not new but the ability to map a supply chain through the tiers is often extremely time consuming and a manual process. Once done it needs to be maintained or becomes immediately out of date.

For simple products it is possible to manually map or work through suppliers to find the higher tier suppliers. For more complex products however and bill of materials (BoM's) this is difficult and time consuming, (it took an aerospace company five years to map the supply chain for one of their aircraft).

Mapping supply chains is both a data challenge, for example discovery of the nodes and the connections between nodes in the network, and a technology challenge where automation and intelligence should be able to reduce time and cost significantly.

New digital technology solutions are emerging that have the capability to address this challenge but often are not at the granularity needed to significantly reduce the time required to deliver a solution.



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Technology challenge brief

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Challenge Description

For this challenge the aim is to use digital technologies to accelerate and map the supply chain enabling better risk management.

Using data on one product bill of materials, automatically map the supply chain from available data (public, company or other). The mapping activity will seek to identify all the nodes in the supply chain and the connections between the nodes. This challenge requires a tech innovator to build a product supply chain network map based on the modelling undertaken, working with the challenge sponsor you'll validate this model against specific supply chains and known data points to assess the accuracy. Alternative innovative approaches to achieving the outcome can be considered but any supply chain map developed needs to be able to be updated on a regular basis as the supply chain evolves.

Expected outcomes of this challenge

The following outcomes are expected from this challenge

- A proof of value technology solution for supply chain mapping to tier N
- The proof of value has been tested to build a map of a supply chain and validated against known data from the industry
- A working demonstration of how the automated mapping approach works

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Supply demand imbalances challenge brief

Challenge background

Supply chain disruptions accompanied by sudden surges in demand have caught many businesses off guard. Especially with growing uncertainty as the UK economy deals with the pandemic aftershocks, businesses are now being compelled to find new ways to accurately determine supply and demand.

Traditional forecasting methods rely on historical data to estimate future performance. Whereas in the past this approach may have been sufficient, given the shocks that the global economy has endured and continues to face (from climate change, leaving the EU and war in Ukraine) the past is no longer an accurate prediction for the future. Too much reliance on historical data for predicting future planning now means that businesses cannot respond to supply chain changes in an agile manner. Nor can they quickly facilitate production and delivery across the supply chain tiers to meet their needs.

Furthermore, with increased resource scarcity due to the increase in climate change, natural resource depletion, the crossing of planetary boundaries and increased conflict and social upheaval, increased complexity for the balancing of supply and demand is the new normal. Unless companies are able to respond, they will therefore be plagued by raw material shortages, late deliveries, machine breakdown, and cyber threats.

Sensing models have already been adopted by a range of businesses across specific sectors, such as FMCG, to improve their response to varying demand in the short-term. However, traditional manufacturing original equipment manufacturers (OEMs) and SMEs are not currently benefiting from the exploitation of such digital technologies. These sectors still rely on traditional forecasting methods.

To combat the arising challenges and impact, there is a need for intelligent supply and demand sensing which can use a broader range of signals and mathematical models to factor in real-world events. Not only to create more accurate demand forecasts but at the same time predict supply shortages and mitigate the risks of supply-demand imbalance.



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Technology challenge brief

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Challenge description

The overall objective of this challenge is to develop a proof of value (PoV) which uses real-time data including variabilities in supply and demand to predict the likelihood of shortages and optimise inventory levels over time to improve performance in today's volatile supply chains.

This should include:

- Capturing multiple real-time demand signals to improve the overall demand forecast accuracy
- Sensing tools should capture the impact of external variables such as economic conditions, weather forecast, market shifts, oil price or similar causal factors
- Real-time data analytics to provide visibility into potential supply shortfalls during specific periods
- Predict and provide early warning related to service and inventory risks based on the state of the demand and supply conditions
- Applying the supply and demand sensing to specific end-to-end supply chain dataset, demonstrating how this will provide a better solution than is currently available for manufacturing supply chains
- Ensuring the solution is suitable for the SME market

Expected outcomes of this challenge

The following outcomes are expected from this challenge

- A proof of value digital solution using real-time and heuristics data points to predict demand and supply conditions
- The proof of value should clearly demonstrate improvements over traditional planning techniques.
- Working demonstration of how the demand and supply predictions can bring Service and Inventory level improvements