

EPSRC-Defra Reimagining Circularity Successful to Full Stage Application Summaries

As stated in the Outline Stage, titles of applications that have been invited to full application will be published online along with summary and details of the project lead. These have been published to facilitate engagement with potential additional partners. It will be at your discretion whether to include additional partners in your full stage application.

Please note that your Full Stage Application must closely align with your Outline Stage Application.

Summaries of successful applications to the Textiles Challenge Area

DiT4CiT – Digital Technologies for Circular Textiles

Project Lead: Hubert Shum (Durham University)

About the NetworkPlus

DiT4CiT – Digital Technologies for Circular Textiles is a UK-wide NetworkPlus bringing together researchers, industry, public-sector organisations, charities and other stakeholders interested in the role of digital technologies in supporting a more circular textile economy.

The textile sector is undergoing significant change, with increasing attention on sustainability, resource efficiency and circular business practices. At the same time, digital transformation is creating new opportunities for research, innovation and collaboration across the sector.

DiT4CiT will provide a national platform for connecting communities across different disciplines, sectors and regions. Through its networking, collaboration and funding activities, the NetworkPlus will strengthen links between digital research and the wider textile circularity community, support the development of new partnerships, and create opportunities for future research and innovation across the UK.

Building an Interdisciplinary Community

The NetworkPlus will bring together expertise from a broad range of academic disciplines, including engineering, materials science, computer science, design, business and management, and related areas, alongside organisations working across the textile and circular economy sectors.

A central purpose of DiT4CiT is to create connections between communities that do not always have opportunities to work together. The network will support organisations and researchers in sharing challenges, identifying common interests, developing new partnerships and exploring research and innovation opportunities related to digital technology and textile circularity.

The network will also provide opportunities for researchers to engage with external organisations and with researchers from other disciplines. This will help broaden participation in the area and support the development of new interdisciplinary communities.

Network Activities and Flexible Fund

DiT4CiT will organise a range of activities to bring together researchers and external organisations, including workshops, networking events, community-building activities and forums. These activities will provide opportunities to exchange ideas, identify shared interests, develop new collaborations and strengthen connections across the network.

The NetworkPlus will also operate a flexible funding mechanism to support exploratory, feasibility and demonstrator projects arising from the network. This funding will enable academic and external partners to test emerging ideas, develop new collaborations and investigate opportunities with potential for wider research, innovation or practical impact. The flexible fund will complement the wider networking activities by providing a route for promising collaborations and ideas emerging from the community to be explored further.

Collaboration and Partnership

DiT4CiT welcomes and facilitates engagement from both academic collaborators and project partners. We are particularly interested in connecting with organisations and researchers that would like to contribute expertise, practical challenges, knowledge, facilities, data, networks or other resources relevant to the broad area of digital technology and textile circularity.

The NetworkPlus will help identify complementary interests across its community and facilitate links between academic researchers, businesses, charities, public-sector organisations and other stakeholders. This will provide a mechanism for potential collaborators to find suitable partners and develop new interdisciplinary and cross-sector relationships.

Through these activities, DiT4CiT aims to create a connected UK community in which researchers and external organisations can identify opportunities, build collaborations and contribute to future research and innovation in digital technologies for textile circularity.

Circular Textile Innovation Network: the Forgotten Rs (CTIN-FR)

Project Lead: Stephen Russell (University of Leeds)

The UK's fashion and textile industry, including manufacturing, contributes ca. £62 billion to UK GDP, supports >1 million jobs (UKFT) with applications extending beyond clothing, to technical textiles and products used by other industry sectors. Linear economies still dominate the current textile ecosystem, which is limiting industry's opportunities to reduce negative environmental externalities, not least GHG emissions, dependency on virgin resources and levels of post-consumer textile waste. While textile recycling technologies have seen significant research investment, along with biobased and 'cleaner materials', step-change technical advancements are also required (beyond recycling) in what can be described as the '*forgotten R's*' of textile circularity.

CTIN-FR will carefully pinpoint and address capability gaps in the Forgotten Rs of textile circularity to: (1) minimise virgin resource utilisation; (2) maximise product use and longevity; (3) substantially increase the economic value, and utility of used textile products; and (4) transform potential for UK growth in textile CEs, adding value to the overall UK economy.

CTIN-FR is a collaborative, transdisciplinary Network led by Leeds Institute of Textiles & Colour (LITAC) in partnership with the Manufacturing Technology Centre (MTC), Queen's University Belfast (QUB), University College London (UCL), University of Cambridge, Manchester Metropolitan University (MMU), University of the Arts (UAL) together with UKFT, WRAP, TRA and multiple SMEs, PLCs, NGOs from the UK's textile and waste collection ecosystem. Located within West Yorkshire, a large UK textile manufacturing region, the Network builds on an existing textile R&D network (n=2,500), and harnesses local and national research infrastructure, together with STEM expertise in a range of advanced manufacturing applications. Leveraging this existing expertise/resource CTIN-FR will co-develop enabling new technology interventions, coupled with governance innovation for systems change.

Network objectives are to:

- Target value-adding, Forgotten R interventions that can unlock accelerated growth.
- Co-create a highly collaborative, cross-sector, transdisciplinary research CE community.
- Foster an inclusive research environment to test new ways of working with users.
- Maximise knowledge exchange across the academic-industry-policy ecosystem.
- Initiate new interdisciplinary and inter-sector collaborations with seed-corn funding.
- Facilitate early-stage ideas through demonstrators and pilots (feasibility studies).
- Support research translation for market and maximise the impact of CE textile research in the UK.
- Expand research in the Forgotten Rs to accelerate textile circularity.
- Encourage co-creation by reducing barriers for non-academic groups to collaborate.
- Increase capacity for disseminating good practice and informing CE policy in textiles.

APP97001: Future Textiles Circularity Network+

Project Lead: Nazmul Karim (University of Southampton)

Summary

Context

The global apparel industry is a major economic sector, valued at ~\$1.84 trillion (2025)¹, with UK consumers spending over £62bn annually and supporting ~1.3m jobs (UKFT). However, it is environmentally damaging, responsible for ~8–10% of global CO₂ emissions, ~20% of water pollution, ~35% of microplastic release, and ~92m tonnes of waste annually, while still relying heavily on virgin, non-renewable resources.² The prevailing linear “take→make→dispose” model is increasingly misaligned with Net Zero ambitions, resource efficiency priorities, and emerging regulation including Digital Product Passports (DPP) and Extended Producer Responsibility (EPR).³ Evidence from industry and policy indicates that the greatest opportunity is not recycling alone, but maximising value by extending product life through retrofit, reuse, repair, refurbishment, repurposing and system redesign.⁴

The challenges

To co-develop the proposal, we held an industry engagement morning with 27 partners (Dec 2025). Discussions highlighted persistent barriers to scalable circularity. Circularity is often framed in silos and “recycling-only”, while life-extending solutions (repair/refurbishment) remain fragmented. Key challenges include high labour costs and limited skills for sorting/repair; lack of standard methods to measure durability, condition and lifetime; fragmented supply-chain data limiting visibility of composition and use history; low readiness for DPP compliance and trusted auditing; insufficient infrastructure and investment to scale reuse, upcycling and refurbishment; and consumer behaviours driven by low-cost fashion, returns and rapid trend cycles. Without credible metrics, interoperable data tools and workable business models, textiles are prematurely downcycled, incinerated/exported.

Aims and objectives

We will deliver the EPSRC–Defra ambition to reimagine circularity in textiles by building a nationally coordinated community to accelerate high-value, life-extending solutions across the textile lifecycle (retrofit, reuse, repair, refurbish, repurpose—not just recycling). It will integrate materials and digital manufacturing innovation with AI-enabled decision tools, traceability infrastructure and Living Lab demonstrators, enabled by reciprocal interdisciplinary learning, generating deployable evidence, standards and scalable circular business models for the UK.

Specific objectives (**OB**):

OB1: Establish and grow the 'Future Textiles Circularity Network+', building a national interdisciplinary community and catalysing collaborations with academic and project partners.

OB2: Define and prioritise industry-validated challenges through Advisory Board (AB) engagement, stakeholder workshops, sandpits and distributed horizon scanning.

OB3: Define UK baselines, gaps and indicators for extending textile lifetimes (durability, repairability, reuse/refurbishment), drawing on standards, evidence and stakeholder inputs.

OB4: Validate priority life-extending circular solutions (repair, refurbishment, repurpose, reuse systems) plus targeted recycling via Living Labs and early-stage demonstrators using AI, DPP and operational innovation.

OB5: Build inclusive UK capability by addressing skills gaps through EDI-led engagement, cross-sector mobility, and co-designed training with industry and community repair ecosystems.

OB6: Disseminate tools, evidence and lessons via knowledge exchange, public engagement and policy briefings to secure impact and sustainability beyond the award.

Potential applications and benefits

The NetworkPlus will deliver practical tools to accelerate adoption by industry and policymakers: AI-enabled condition/composition identification to route textiles to the highest-value pathway (reuse/repair/refurbish before recycling), durability and circularity decision tools, scalable repair/refurbishment workflows, and digital traceability solutions, supporting DPP and policy evaluation.

Benefits include reduced waste and emissions through longer product lifetimes, new revenue opportunities and resilience for UK SMEs and manufacturers, stronger evidence for EPR and standards, and skills uplift across repair, digital and advanced manufacturing. Collectively, the NetworkPlus will position the UK as a leader in high-value, life-extending circular textiles with measurable environmental, economic and societal impact.

References:

- 1 - <https://www.uniformmarket.com/statistics/global-apparel-industry-statistics>
- 2 - <https://doi.org/10.1038/s43017-020-0039-9>
- 3 - https://environment.ec.europa.eu/strategy/textiles-strategy_en
- 4 - <https://circulareconomyleaders.ca/resources/closing-the-loop-how-the-circular-economy-powers-climate-action/>

APP99686: ReTexT: Rethinking Textiles Together

Project Lead Janet Godsell (Loughborough University)

Summary

The UK faces a major and growing challenge from textile waste. Each year, millions of tonnes of textiles are discarded, with most sent to landfill or incineration. While public attention often focuses on clothing, around half of this waste comes from non-fashion textiles used in sectors such as sport, defence and healthcare. These textiles underpin everyday life, from artificial sports surfaces and protective uniforms to hospital linens and personal protective equipment, yet they are rarely designed to be reused, repaired or recovered. As a result, high-value materials with significant environmental and economic costs are routinely lost.

Rethinking Textiles Together, known as ReTexT, sets out a clear and ambitious vision: to establish the British Isles as a global leader in circular textiles. The programme aims to demonstrate how textiles can be kept in use at their highest possible value, reducing environmental impact while supporting resilient supply chains, productivity and high-quality jobs.

ReTexT imagines a future in which textiles are treated as long-term assets rather than disposable products, supported by new approaches to design, data, business models and infrastructure that align with net zero and resource security.

ReTexT is founded on the belief that the UK and the wider British Isles already have much of the capability required to lead internationally in circular textiles. World-class research, innovative firms and strong regional ecosystems are already in place. The challenge is that these strengths remain fragmented and too often fail to scale. ReTexT's vision is therefore to connect and align existing capabilities around shared challenges, creating a coordinated system that can deliver impact at scale and provide international leadership through example.

The programme focuses on sport, defence and healthcare because these sectors manage large volumes of high-value textiles through structured procurement and long-term contracts. This creates a unique opportunity to test, prove and scale circular approaches in demanding, accountable environments. By working in sectors where performance, safety and reliability are critical, ReTexT aims to generate solutions that are robust and credible, and that can be transferred to other parts of the economy and shared internationally as models of best practice.

ReTexT is led by a partnership between Loughborough University, the University of Strathclyde and Ulster University, bringing together expertise across engineering, design, data, business and social science, alongside strong regional and sectoral connections. The programme connects researchers, industry, policymakers and practitioners to co-design and test solutions in real-world contexts, ensuring relevance, credibility and uptake. Its British Isles reach supports place-based innovation while enabling learning and capability to scale across regions.

Over three years, ReTexT will support integrated research, innovation and real-world testing through a flexible funding approach, alongside sustained knowledge exchange and skills development. The intention is not only to deliver individual projects, but to build lasting capability, evidence and partnerships that endure beyond the lifetime of the programme. Ultimately, the programme will deliver measurable economic, environmental and societal benefits by reducing waste, retaining material value, strengthening resilience and supporting high-quality jobs.

Summaries of successful applications to the Data and Metrics Challenge Area

APP98672: ReVISE Circularity Network+

Project Lead: Rachael Rothman (University of Sheffield)

The ReVISE Circularity Network+ will drive the UK's transition to a sustainable circular economy by addressing a critical gap: the lack of standardised metrics and robust, interoperable data across sectors. While the principles of reuse, remanufacture, and recycling are essential for sustainability, the UK currently lacks a unified way to measure their success. This network will develop the cross-sectoral tools necessary to evaluate environmental, economic, and social impacts, ensuring that circular interventions do not cause unintended negative consequences.

Strategy and Vision

The network will adopt a whole systems approach, and move beyond isolated efforts to build a comprehensive and coordinated community of communities. By leveraging proven knowledge-exchange models, it will connect researchers, industry leaders, and policymakers. A primary focus will be cross-sectoral integration, exploring how the waste of one industry, such as heat from data centres or ash from steelmaking, can become the feedstock for another. The initiative will initially prioritise the chemicals and plastics sector due to its urgent policy relevance, high potential impact and strong stakeholder engagement, signalling a scalable pathway for adoption across other sectors.

Community and Diversity

The network will be "inclusive-by-design," using demographic heat-mapping to ensure diversity and accessibility across all activities. It will place a strong emphasis on developing the next generation of leaders through a Mentor Cafe and dedicated funding for Early and Mid-Career Researchers (ECRs/MCRs), including hackathons and industrial secondments.

Policy and Outcomes

By partnering with government departments like Defra and DESNZ, the ReVISE Circularity Network+ will produce white papers and roadmaps that directly inform UK regulation. The Network+ will leave an enduring legacy of interoperable metrics and evidence frameworks that embed circularity into the UK economy, strengthen resilience, and protect ecosystems.

APP100003: ORBITAL+: A Network Plus for Data-Driven Metrics and System-Level Governance of Circular Transitions

Project Lead: Taofeeq Ibn-Mohammed (University of Warwick)

While the circular economy (CE) is central to the UK's environmental and industrial resilience, progress has been narrow, stalling at recycling and waste management. The transformative potential of CE, to design out waste at the source and maintain value throughout multiple lifecycles, remains unfulfilled. Bridging this gap is essential to aligning our economic systems with both human wellbeing and ecological limits. **ORBITAL+ (Optimising Resources through Benchmarking, Industrial Traceability, Analytics and Logistics)** is a national Network Plus that responds to this gap by mobilising the UK research and innovation community to re-imagine circularity as a governed, data-driven, and human-centred system of transition.

ORBITAL+ responds to a systemic challenge defined by three interlinked deficits: **governance**, where fragmented metrics and standards hinder coordination and accountability; **value-retention**,

where a lack of trusted data on provenance and quality causes functional, economic and environmental loss; and **adoption**, where viable circular solutions fail to scale due to low engagement by households, organisations and markets. **ORBITAL+** addresses these deficits by integrating macro-level governance and standards, meso-level industrial traceability and value retention, and micro-level behavioural and social dynamics into a coherent, measurable system of change.

Delivering such transformation requires more than isolated projects; it demands an integrated research and innovation ecosystem. **ORBITAL+** already brings together over 30 partners across academia, industry, policy and civil society, co-creating its vision and research agenda around real-world challenges. The Network aligns activity across UK priority sectors, textiles, transport, electrical & electronic equipment, the built environment, agri-food, and chemicals and plastics, while remaining open and adaptive to emerging needs.

ORBITAL+ provides the systems infrastructure required for circular transitions in the UK. It establishes a national research agenda for shared circularity metrics aligned with the 9R framework, prioritising higher-order strategies such as reduction, reuse, repair and remanufacture. It advances digital provenance and traceability to retain value across multiple lifecycles and enable scalable, high-value circular strategies. Crucially, it places people at the centre of circularity by developing robust approaches to measuring behaviour, social norms and wellbeing. These aims are delivered through strategic coordination and flexible funding, including seed-corn support for high-potential ideas, translational research to scale concepts into industrially relevant tools, feasibility studies and real-world demonstrators, de-risking future investment while accelerating learning and impact.

In practice, **ORBITAL+** operates through an intensive programme of engagement, exploration and integration. It will host thematic workshops, webinars and conferences that convene researchers, industry leaders and policymakers to co-develop solutions. Integrative events, including an annual UK CE Data and Metrics Summit, synthesise insights across themes, demonstrating how governance reform, data infrastructure and behavioural insight combine to unlock new business models and policy pathways. Training resources and public engagement activities will be co-created with partners to highlight how circularity supports jobs, affordability and everyday wellbeing. Ongoing seminars and citizen-science initiatives sustain momentum and reinforce individual and collective agency.

The benefits of **ORBITAL+** extend well beyond the research community. Policymakers gain robust, decision-useful evidence to design regulation and track progress. Industry benefits from improved data, reduced risk and new circular business models that enhance competitiveness and resilience. Communities benefit from circular systems that prioritise wellbeing, fairness and long-term value rather than material throughput alone. By transforming circularity from a fragmented set of initiatives into an operational, inclusive and future-ready system, **ORBITAL+** strengthens the UK's leadership in data-driven, system-level circular transitions.

APP96105: METRICS+ (Measures and Environmental Indicators for the Circular-economy at Scale)

Project Lead: Alana James (Northumbria University)

Summary

Global industrial sustainability agendas are focused on moving from a linear (take-make-waste) model of production and consumption, towards operating within circular systems by extending product lifetimes, retaining value within an existing system and implementing reuse strategies where possible. With many sectors now adopting revised practices towards circularity, the ability to measure and assess progress with verifiable data is critical towards acceleration, scalability and to enable indicators of success. However, long, complex and fragmented supply chains, make obtaining relevant data often impossible, coupled with lack of appropriate metrics and standards to measure and provide baselines for impact and circularity. Urgency for these frameworks to be implemented is in part due to mandatory regulations, with schemes such as the EU Ecodesign for Sustainable Products Regulation (ESPR) relying on transparent data systems to implement digital product and material passports, and eco-modulated Extended Producer Responsibility (EPR) charging different fees based on the quality of the data available.

Reflecting the contextual landscape, METRICS+ aims to:

- build diverse, inclusive and interdisciplinary research communities across academia, industry and policymakers
- enable the development and integration of usable circularity data, metrics and indicators that quantify environmental, social, technical, and economic performance

Utilising Textiles and Built Environment as deep testbeds to trial complex ideas and innovations, a closed-loop, whole-systems approach will be adopted where examples of best practice and knowledge can be translated across disciplinary boundaries, adopting an agnostic sector approach and positioning data and metrics at the forefront of the research.

Focusing on data processes and human/institutional practices across the product lifecycle, the network will address the following challenges: 1) missing data and unmeasured impacts; 2) technological integration alignment with legislation and interoperability between data systems; 3) inadequate metrics to measure circularity, user acceptance, adoption, acceleration and scale of circular practices; 4) stakeholder engagement, responsibility and inconsistent implementation; 5) incomparable global standards and ill-defined missing regulations.

These challenges will be addressed through the following objectives:

Obj1 - To identify and address poor quality, unreliable and missing data sets through the exploration of AI and machine learning capabilities to ensure environmental impact data from entry points across the supply chain are robust, reliable and representative.

Obj2 - To recognise critical areas of interoperability across complex data systems, locating intervention points where unified systems can improve comparability and standardisation through structuring and integration of multiple data sources.

Obj3 - To establish, test and scale appropriate standards, metrics and frameworks to measure and assess progress towards circularity (i.e. measuring impacts of repair, reuse, remanufacturing) understanding use and application from multiple stakeholder perspectives.

Obj4 - To explore human and institutional consequences of system constraints, misalignments and failure points in collection, integration and application of data systems, creating two-way feedback loops between data protocols, supply chain practices and stakeholders.

Obj5 - To evaluate the governance and legislative landscape, identifying business and user needs in bridging the communication and knowledge gaps between policymakers and industry.

Benefits generated by the network will include: system level insights into data collation, protocols and applications; improved data accuracy, interoperability and circularity measurement tools; stakeholder and end-user insights; integrated business use of circular economy data and metrics. These insights will be translatable and applicable to a diverse range of sectors and stakeholders from across the supply chain, including brands, manufacturers, industry practitioners, NGO's, local government and industry bodies.

APP96719: CircularMetrics+: The NetworkPlus for Circular Economy Data, Metrics and Policy Innovation

Project Lead: Alejandro Gallego Schmid (University of Manchester)

Summary

The UK is working toward a circular economy, where products last longer, materials are kept in use, and waste is minimised. However, this transition is slowed by weak and fragmented data systems. Data are collected in different ways across sectors and UK nations, using inconsistent definitions and standards. Current measurement focuses mainly on recycling, while higher-value activities such as repair, reuse, refurbishment and remanufacturing are poorly captured. As a result, policymakers, businesses and communities lack the reliable evidence needed to compare options, make informed investments, design effective policies and avoid greenwashing.

CircularMetrics+ will tackle this gap by creating the UK's first unified network dedicated to circular economy data, metrics and policy innovation. It will bring together researchers, industry, government, charities and community organisations across England, Scotland, Wales and Northern Ireland to build a shared and consistent way of measuring circularity and delivering change.

The network will be organised through four subnetworks (one for each of the nations of the UK), supported by a UK-wide coordinating platform. Each nation will focus on its own strengths, for example, legislation in Scotland, community reuse in Wales, agro-manufacturing innovation in Northern Ireland, and infrastructure and policy systems in England, while contributing to a UK-wide framework. This structure allows knowledge to flow between local practice and national policy, ensuring solutions are both practical and scalable.

The main aim of CircularMetrics+ is to develop better ways to measure circular economy performance at the earliest stages of product life. Instead of counting only how much waste is recycled, the project will identify the data necessary and create the indicators and standards to measure aspects like durability, repairability or level of reuse. These metrics will enable circular businesses to track their progress more easily and support the design of more effective circular economy policies.

The project will develop shared digital resources, including open datasets, position papers, policy guidance and long-term roadmaps, through a national online platform called myCircularMetrics+. This will allow users to share evidence, compare approaches and build new tools.

CircularMetrics+ will build skills as well as knowledge. It will support early-career researchers, promote collaboration across disciplines, and give businesses and public authorities practical tools they can use straight away. Workshops, training events, pilot projects and industry placements will enable people to co-design solutions and test ideas in real settings.

The benefits of CircularMetrics+ will be wide-reaching. Policymakers will gain better evidence for national and local strategies. Businesses will reduce risk and strengthen competitiveness by using reliable data and indicators. Communities will benefit through new skills, job opportunities, and improved circular local services. In the longer term, the project will contribute to the UK's goals on net zero, economic growth and resource security.

By building shared standards, reliable evidence and strong partnerships, CircularMetrics+ will help the UK move beyond recycling toward a truly circular economy that is productive, resilient and fair.