We Are
Staffordshire

DRAFT
INNOVATION FRAMEWORK

STOKE-ON-TRENT AND STAFFORDSHIRE
2026-2033

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Foreword

Stoke-on-Trent and Staffordshire is changing. New innovation-led activity is emerging alongside long-standing strengths in manufacturing, health, services and the everyday economy. Businesses are adopting new materials, digital tools, life sciences applications and energy systems, while our universities, colleges, NHS and local authorities are working more closely with industry than ever before. Together, these developments are shaping a more resilient and future-focused local economy.

This Innovation Framework brings together evidence and insight to build a clearer picture of where the area has genuine strengths, where opportunities for growth are emerging, and where barriers remain. It recognises that innovation happens across places and sectors, through collaboration as well as discovery, and focuses on how research, skills, adoption and deployment can work better together.

Grounded in evidence but open to refinement, the Framework sets out emerging propositions for discussion. It will support engagement with businesses, investors and partners as we shape the next phase of work to grow the innovation economy in ways that strengthen resilience, productivity and opportunity across Stoke-on-Trent and Staffordshire.

It is supported by a more comprehensive evidence base in the form of a ‘Long Read’.

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Executive Summary

This Innovation Framework provides an evidence-informed overview of Stoke-on-Trent and Staffordshire's innovation economy.

The innovation economy includes businesses and institutions developing and applying new ideas, advanced manufacturing capability, digital tools and scientific expertise to improve productivity, resilience and long-term growth. Growing this part of the economy matters for national competitiveness and supply chain strength — and for local jobs, skills and opportunity.

The document is not a final strategy, but a diagnostic tool bringing together analysis and insight to inform future priorities and investment.

It aims to:

- Clarify the strengths of the local innovation base;
- Identify where research, advanced manufacturing, skills and infrastructure can drive growth;
- Explore economic impact and everyday economy implications;
- Highlight gaps and constraints;
- Begin shaping realistic, evidence-led investment priorities.

The Framework is exploratory and intended to support engagement and refinement.

1.1 Why place-based innovation?

Innovation is central to UK policy as a driver of:

- productivity and wages;
- competitiveness and resilience;
- reduced regional disparities.

National programmes increasingly recognise that innovation succeeds when rooted in local strengths and collaboration. Evidence highlights common features of effective place-based systems:

- business–university–public sector collaboration;
- strong translation and adoption capability;
- aligned skills and infrastructure;
- clear civic coordination.

Stoke-on-Trent and Staffordshire are at a pivotal moment:

- Innovation capability has strengthened significantly.
- High-value activity is emerging across priority areas.
- Devolution increases the need for investable clarity.

- National policy expects credible local delivery capacity.

This Framework provides a shared evidence base to inform that next phase.

1.2 A systems view of local strengths

The Framework identifies four overlapping cluster groupings:

- Materials Innovation
- Digital Economy
- Life Sciences
- Advanced Manufacturing & Energy Systems Innovation

These are interconnected systems with shared skills, markets and infrastructure. Their overlap — particularly between materials, digital and advanced manufacturing — is a strategic advantage.

1. Materials Innovation

- Anchored in advanced ceramics and specialist materials.
- Strong links to advanced manufacturing, Net Zero and MedTech.
- Combines discovery capability, validation and applied systems integration.
- Clear scaling opportunities in critical ceramics and biomaterials.

Key insight:

Materials capability is strategically aligned with UK priorities in energy transition, defence, healthcare and high-value manufacturing.

2. Digital Economy

- The largest contributor to local productivity.
- Two linked components:
- digital solutions (software, data, creative);
- digital hardware and embedded systems.
- Increasingly embedded across manufacturing, life sciences and energy.
- Uneven SME diffusion remains a constraint.

Key insight:

Digital is both a high-value sector and essential production infrastructure. The major opportunity lies in accelerating adoption and systems integration across the wider economy.

3. Life Sciences (health and non-health)

- Spans clinical innovation, MedTech and biosciences.
- Strong alignment with NHS priorities and prevention.
- Connected to materials and data-driven innovation.
- Opportunity lies in translation and deployment rather than new discovery infrastructure.

Key insight:

Local health and civic assets provide strong platforms for scalable adoption and evaluation.

4. Advanced Manufacturing & Energy Systems Innovation

A cross-cutting applied manufacturing and systems economy.

- Strength in specialist, high-value production embedded in energy and logistics supply chains.
- Focused on systems adoption, integration and replication.
- Less about large-scale generation; more about making complex systems work in real environments.

Key insight:

Comparative advantage lies in combining advanced manufacturing capability with applied systems innovation in hard, real-world settings.

1.3 Skills: strength with structural gaps

Across clusters:

- Strong higher-level university capability.
- Strong technician base in FE.

Persistent Level 3–5 gaps where:

- digital meets hardware,
- biology meets data,
- energy meets construction,
- manufacturing meets automation.

Implication:

The priority is clearer progression pathways aligned to live innovation and scaling activity.

1.4 Infrastructure: a place-based portfolio

- Different innovation types require different environments:
- Strategic industrial sites for deployment and manufacturing;
- University-linked space for R&D and pilot production;
- Town and city centres for digital and professional services.
- A portfolio approach with clear progression routes is essential.

1.5 Innovation and the Everyday Economy

Innovation impacts everyday sectors first — construction, logistics, manufacturing, care and public services.

It improves:

- productivity,
- resilience,
- job quality,
- progression opportunities.

Without coordination, impacts can be uneven.

Just outcomes require deliberate alignment between innovation, skills and business adoption.

1.6 A system — and an investment case

The challenge is coordination and targeted investment, not lack of assets.

Effective interventions are:

- problem-led;
- focused on translation and scale-up;
- aligned with realistic funding routes;
- designed to crowd-in private investment.

Public resources should prioritise areas that unlock scaling and reduce coordination risk — particularly materials translation, digital adoption, life sciences deployment, and applied manufacturing and energy systems integration.

1.7 The role of place-based governance

Future governance could add value by:

- stewarding the system;

- maintaining shared evidence and priorities;
- aligning national funding with local strengths;
- convening partners where markets alone cannot coordinate;
- making credible investment cases grounded in logic chains.

The role is orchestration, with direct intervention focused on clear areas of opportunity and market failure.

1.8 Emerging headline propositions

Early directions include:

- An integrated materials partnership with targeted scaling investment.
- A digital enablement and systems integration model.
- Strengthened life sciences adoption pathways.
- A place-based advanced manufacturing and energy systems integration offer.
- Cross-cutting innovation leadership and management capability.

These are starting points, aligned to realistic funding routes.

1.9 Economic impact potential

While not yet quantified, impact is expected through:

- productivity and resilience gains;
- scaling of high-value manufacturing and digital capability;
- improved job quality and progression;
- stronger supply chains;
- public value in health and energy affordability.

1.10 What happens next

The next phase will:

- engage businesses, investors and partners;
- test and refine priority areas;
- use logic chains to shape investable programmes.

Work will continue through Spring and Summer 2026.

In short, this Framework is a shared starting point, enabling informed decisions about how innovation can support inclusive, sustainable growth across Stoke-on-Trent & Staffordshire.

2. Purpose and Strategic Context

2.1 Why this Framework exists

Stoke-on-Trent and Staffordshire face a long-standing productivity gap relative to national and regional averages, shaped by industrial legacy, skills constraints, infrastructure limitations and uneven exposure to high-value growth sectors. At the same time, the area possesses a distinctive portfolio of industrial, research and applied innovation capability that is not well captured by conventional sector narratives or inward investment propositions.

This Framework has been developed to provide a coherent, evidence-led basis for accelerating innovation-led growth across the sub-region, grounded in realistic delivery conditions rather than aspirational sector branding. It is explicitly place-based: it starts from the area's actual industrial structure, institutional assets, skills pipelines and governance environment, and asks how these can be aligned more effectively with national missions and funding regimes.

The purpose of the Framework is threefold:

- Strategic alignment – to articulate a small number of priority innovation clusters where Stoke-on-Trent and Staffordshire can demonstrate comparative advantage and credible potential for economic impact, aligned with UK Industrial Strategy priorities and DSIT emerging sectors.
- Delivery realism – to distinguish clearly between areas where frontier research, large-scale capital investment or inward investment attraction are realistic, and areas where the primary opportunity lies in applied innovation, translation, adoption and systems integration.
- Place-based coordination – to identify where market failures, coordination gaps and skills constraints are limiting innovation-led growth, and where a future Strategic Combined Authority and its civic partners could add value as system stewards rather than delivery bodies.

This is not a bid document, nor a closed investment proposition. It is intended as a strategic foundation for engagement with local partners, national funders, and future devolution negotiations, and as a working framework that can evolve as evidence, governance arrangements and funding conditions change.

2.2 National policy alignment

The Framework is explicitly aligned to:

- The **UK Modern Industrial Strategy**, particularly the eight priority sectors (IS8): Advanced Manufacturing; Clean Energy; Creative; Defence; Digital & Tech; Financial Services; Life Sciences; Professional & Business Services.

- DSIT's emerging **sectors of strategic importance:** Advanced Materials; Artificial Intelligence; Cybersecurity; Engineering Biology; Materials Innovation; Quantum Technologies; Robotics and Autonomous Systems; Semiconductors; Space Economy; Advanced Connectivity; Digital Economy.
- **Net Zero innovation priorities,** including: energy storage and flexibility; hydrogen; nuclear advanced modular reactors; carbon capture, usage and storage; industrial decarbonisation; low-carbon construction; homes and buildings innovation; and energy systems integration.
- **UKRI**'s emphasis on: place-based innovation; translational research; adoption and diffusion; challenge-led R&D; and the role of anchor institutions in delivery.

2.3 The local opportunity in context

The distinctive feature of Stoke-on-Trent and Staffordshire's innovation economy is not the presence of a single dominant high-growth sector, but the emergence of four overlapping cluster groupings:

1. Materials Innovation
2. Digital Economy (with strong applied and industrial interfaces)
3. Life Sciences (health and non-health)
4. Advanced Manufacturing and Energy Systems Innovation

These clusters are cross-cutting systems of industrial, research and service activity that intersect with advanced manufacturing, logistics, construction, health, environmental services, data infrastructure and professional services.

Their economic significance lies less in headline employment volumes today, and more in their potential to drive:

- productivity growth across existing industries;
- higher-value service and manufacturing activity;
- more resilient supply chains;
- inward investment aligned to applied innovation; and
- exportable systems capability.

Crucially, the area's innovation strengths are deployment-led and system-oriented, not discovery-led. This has important implications for skills strategy, inward investment targeting, infrastructure planning and the design of public interventions.

2.4 A place-based innovation lens

The Framework adopts a place-based innovation lens grounded in three core principles:

- Coordination over duplication. Economic impact depends less on the number of institutions or programmes, and more on how effectively they are aligned around shared priorities, intelligence and delivery pathways.
- Translation and adoption as economic drivers. In this context, the primary growth opportunity lies not in frontier R&D alone, but in the ability to:
  - validate technologies;
  - integrate them into real-world systems;
  - manage regulatory and assurance processes; and
  - scale deployment across multiple sites.

2.5 Evidence base and data sources

The analytical foundation of the Framework draws on:

- Real Time Industrial Classifications (RTICs), to identify emerging and innovation-active business activity not captured by Standard Industrial Classification codes.
- R&D capability mapping, across Keele University, The University of Staffordshire, relevant FE institutions, and national assets (e.g. Energy Research Accelerator, Lucideon/AMRICC).
- Skills pipeline analysis, spanning Levels 2–3, Levels 4–6, and Levels 7–8.
- National strategy and funding priorities, across UKRI, DSIT, Innovate UK and Net Zero portfolios.
- Local intelligence, on industrial structure, infrastructure constraints, inward investment viability and civic asset development.

RTIC analysis has been used not as a definitive classification system, but as an exploratory tool to surface areas of comparative advantage and overlap. Known data gaps — notably the absence of an advanced ceramics RTIC — have been addressed through triangulation with local industrial knowledge.

3. Clusters, Agglomeration and Productivity

3.1 Rethinking clusters

Policy discussions about innovation and productivity often emphasise clusters and agglomeration, implying that economic impact depends on dense geographic concentration of firms, talent and capital. While proximity can matter — particularly for labour markets, shared infrastructure and informal knowledge exchange — the evidence points to a more nuanced picture.

Contemporary research on regional innovation shows that clusters operate through different logics, not all of which rely on density. Many function as networked systems, where innovation is driven by relationships, institutional coordination and access to specialist capability rather than co-location alone. In these contexts, knowledge flows, translation pathways and system governance matter more than physical concentration.

Recent synthesis work by the Innovation Caucus reinforces this view, showing that innovation performance is often shaped by how well systems are organised, rather than how tightly activity is clustered. Distributed innovation systems can perform strongly where they provide clear access to expertise, facilities and markets, and where public and private actors are aligned around shared priorities.

3.2 Implications for Stoke-on-Trent and Staffordshire

This perspective is particularly relevant for Stoke-on-Trent and Staffordshire.

Rather than replicating large metropolitan agglomerations, the area's economic advantage is more likely to come from:

- specialised industrial and research capability;
- strong anchor institutions;
- applied innovation and translation assets; and
- effective connection into national and international sectoral systems.

In this context, clusters are best understood as fields of related activity, often spanning multiple towns, campuses and industrial sites. What matters is not whether activity is concentrated in a single location, but whether the system supports:

- collaboration between firms and institutions;
- access to specialist capability;
- credible routes from research to deployment; and
- replication of solutions across similar sites nationally.

This approach aligns closely with national frameworks such as the Royce Institute model, which emphasises access over ownership, coordination over duplication, and distributed capability over spatial concentration.

Accordingly, this Framework uses the language of clusters pragmatically — as a way of organising evidence and identifying opportunity — rather than as an endorsement of agglomeration as an end in itself.

3.3 Clusters as systems, not sectors

Traditionally associated with closed science and technology communities, today's successful innovation systems are increasingly embedded in their local communities and civic institutions. They draw value from:

- local authorities and public services;
- education and research institutions;
- community partners and end users; and
- infrastructure providers.

Crucially, they are also connected to wider regional and national assets and expertise.

Parts of these connected ecosystems can form organically. But they rarely achieve their full economic potential without public sector support, strong institutional relationships and deliberate coordination with the local science base.

When they work well, these models support a stronger focus on the translation and diffusion of ideas and knowledge, alongside discovery research. This translation function is increasingly central to reconnecting innovation to productivity growth.

A useful working definition of clusters or fields of related activity therefore includes:

- Interaction and collaboration between actors (firms, knowledge producers, industrial and support organisations, local authorities);
- Engagement in related activities (e.g. within the same value chain or producing similar products); and
- Some degree of spatial co-location — while recognising that the UK hosts several large clusters where collaboration occurs across dispersed geographies.

3.4 Four overlapping innovation clusters

The analysis underpinning this Framework identifies four overlapping innovation cluster groupings with credible potential to drive productivity, resilience and long-term economic growth in Stoke-on-Trent and Staffordshire:

1. Materials Innovation
2. Digital Economy
3. Life Sciences (health and non-health)
4. Advanced Manufacturing and Energy Systems Innovation

Summary of key innovation clusters in Stoke-on-Trent and Staffordshire

	Life Sciences	Digital Economy	Materials Innovation	Advanced Manufacturing & Energy Systems
IS8 Sectors with SOTS presence	Life Sciences Advanced Manufacturing, Digital & technologies	Digital & Technologies, Advanced Manufacturing, Life Sciences	Advanced Manufacturing, Digital & technologies, Life Sciences	Advanced Manufacturing; Digital & Technologies; Energy & Net Zero systems; Life Sciences manufacturing interfaces
DSIT Emerging Sectors with SOTS presence	Engineering Biology, Materials Innovation	Engineering Biology, Space Economy	Engineering Biology, Space Economy, Materials Innovation	Engineering Biology, Materials InnovationNet Zero technologies; Battery and systems supply chains
Scope of RTIC cluster	Life Sciences (excl human health), Pharma, Medtech, Engineering biology, Omics, Land remediation, Rehabilitation, Sports & Physical activity, Traditional & Precision breading, Food safety	Full scope of digital services, software development and related manufacturing	Selective RTIC verticles across full scope of manufacturing innovation, related Physical Sciences consultancy and digital services	Battery and power electronics supply chains; Energy generation, storage & distribution systems; Net Zero deployment; Modular & offsite construction; Supply chain logistics; Electronics manufacturing; Semiconductors; Sensors; Robotics & autonomous systems; IoT-enabled industrial systems
Top areas of comparative advantage	Omics, Engineering Biology (for employment in NuL)	Omics, Creative digital (when combined), Computer Hardware, Electronics Manufacturing	Advanced Ceramics (keyword analysis). Engineering Biology. Omics	Net Zero systems integration; Supply chain logistics; Energy–manufacturing integration; Power electronics; Sensors & embedded systems; Industrial systems optimisation
Scale of RTIC Cluster	870 businesses, 10,300 employees	975 companies, 13,700 employees	287 companies, 5037 employees	818 companies, 13,339 employees
Financials	Turnover £5,075.121,766, GVA £51,526 per employee. Investment £527,090,000 (10.4% of turnover)	Turnover £4,083,330,750, GVA £115,799 per employee. Investment £56,090,000 (1.4% of turnover)	Turnover £1,280,395,613, GVA £66,021 per employee. Investment £1,200,000 (0,1% of turnover)	Turnover £5,496,830,302, GVA £63,026. Investment 72,830,000 (1.3% of turnover)
Growth trends	Current growth +4.1%. 18% likely to grow by 20% or more in next year,	Current growth +4.4%. 18% likely to grow by 20% or more in next year	Current growth +6.2% North Staffs, +4.3% SOTS. 25% likely to grow by 20% or more in next year	Current growth +3.2%. 24% likely to grow by 20% or more in next year
R&D Assets	Centre for Science and Technology in Medicine. Centre for Applied Entomology, Parasites and Pathogens. Centre for Glycoscience Research and Training.Welcome to the Centre for Musculoskeletal Health Research (Keele). Centre for Health Innovation. Centre for Health and Development (Staffordshire)	Centre for Smart Systems AI and Cybersecurity, Centre for Research in the Digital Entertainment and Media Industries (Staffordshire), Digital Society Institute, Centre for Science and Technology in Medicine, Astrophysics Research Centre (Keele)	AMRICC Centre, Keele Centre for Advanced Materials Engineering, Staffordshire Advanced Materials Incubation and Accelerator Centre (SAMIAC), Centre for Science and Technology in Medicine (Keele)	Centre for Renewable and Sustainable Engineering (Staffordshire).Centre for Smart Systems, AI and Cybersecurity (Staffordshire) Institute for Sustainable Futures, Smart Energy Network Demonstrator, e (Keele). Centre for Advanced Materials Engineering (Keele), Energy Research Accelerator (Midlands Innovation Universities)

These are not narrow sectors. They are fields of related activity spanning research, manufacturing, services, logistics, construction, digital systems and public infrastructure.

Their strategic significance lies in four shared features:

- Comparative advantage. Each cluster exhibits concentrations of innovation-active firms, applied research capability and translational assets that are distinctive within the Midlands and nationally.
- Cross-cutting impact. Each cluster supports productivity and competitiveness across multiple downstream industries, rather than operating as a self-contained growth sector.
- Alignment with national missions. Collectively, they map strongly onto UK Industrial Strategy sectors, DSIT emerging technologies, and Net Zero innovation priorities.

- Delivery realism. Their strongest growth pathways lie in deployment, integration, adoption and systems optimisation rather than in frontier discovery research or large-scale asset ownership.

Most North Staffordshire clusters incorporate parts of Cheshire East, particularly Congleton and, in some cases, Crewe. Several form part of much larger North West cluster systems. Clusters in the southern fringes of the County are more likely to be integrated into the Greater Birmingham innovation geography.

This reinforces the importance of treating Stoke-on-Trent and Staffordshire not as a closed innovation economy, but as a node within wider national systems. Taken together, these clusters form a coherent place-based innovation portfolio.

1. Materials Innovation

Materials Innovation is the sub-region's strongest and most distinctive innovation cluster.

It spans advanced ceramics, functional materials, surface technologies, composites, power electronics materials, biomaterials, structural materials, sustainable construction materials and materials for energy systems.

Its defining features include:

- a deep industrial legacy in ceramics and materials processing;
- strong applied research capability at Keele University and University of Staffordshire;
- specialist translational and testing infrastructure through Lucideon/AMRICC;
- strong alignment with national materials strategy priorities; and
- clear downstream demand from medtech, energy, defence, infrastructure and advanced manufacturing supply chains.

The growth opportunity lies not in generic materials research, but in:

- scale-up, validation and industrial translation;
- harsh-environment materials testing;
- regulatory and quality assurance capability;
- integration of digital and AI tools into materials development; and
- specialist production for demanding applications.

Materials Innovation also provides a critical enabling platform for the other three clusters.

2. Digital Economy

The Digital Economy cluster spans:

- applied software and services;
- embedded and industrial digital systems;
- data infrastructure and analytics;

- cybersecurity and digital assurance;
- automation, robotics and AI in real-world environments.

It is characterised by:

- strong applied computing and digital capability at University of Staffordshire;
- complementary analytical and data capability at Keele University;
- a diverse SME base operating across multiple RTICs;
- deep integration with manufacturing, logistics, health, energy and materials.

Its growth constraints are shaped less by technology availability and more by:

- adoption and diffusion barriers;
- skills and confidence gaps;
- organisational change and integration challenges;
- regulatory and assurance requirements.

This makes the Digital Economy a critical enabling cluster for productivity across the entire local economy.

3. Life Sciences (health and non-health)

The Life Sciences cluster encompasses both health-related activity (medtech, diagnostics, precision medicine, clinical technologies) and non-health biosciences (environmental biotechnology, engineering biology, agri-tech, waste and water innovation).

Its distinctive strengths lie in:

- translational bioscience capability at Keele University;
- strong clinical partnerships with UHNM;
- applied health innovation infrastructure;
- non-health bioscience capability in environmental and industrial systems;
- emerging engineering biology interfaces with materials and energy systems.

The cluster is not characterised by large-scale pharmaceutical discovery or biomanufacturing. Instead, its growth opportunity lies in:

- adoption, evaluation and pathway integration;
- clinical validation and real-world testing;
- diagnostics and medtech scale-up;
- environmental and industrial biosciences; and
- engineering biology as a cross-cutting enabling technology.

Life Sciences intersects strongly with Materials Innovation, Energy Systems and Digital, particularly around devices, diagnostics, data-enabled health systems and sustainability.

4. Advanced Manufacturing and Energy Systems Innovation

Advanced Manufacturing and Energy Systems Innovation operates as a cross-cutting energy–manufacturing–systems economy, embedded within the region's industrial base and shaped by real-world deployment challenges.

It encompasses activity linked to:

- advanced manufacturing of energy-relevant components (power electronics, control systems, sensors, materials and specialist equipment);
- energy generation, storage, distribution and management;
- deployment and systems integration within manufacturing, logistics, construction and civic infrastructure;
- energy-intensive production environments (including ceramics, precision manufacturing and process industries);
- supply-chain logistics, professional services and technical assurance; and
- data-enabled optimisation, diagnostics and operational management.

A defining feature of the cluster is the tight coupling between advanced manufacturing and energy systems adoption. Firms do not simply produce components; they operate within complex energy-dependent environments where cost, resilience, compliance and performance are critical. Value is therefore created through integration capability — making technologies work reliably in demanding real-world settings.

The area's comparative advantage lies not in frontier energy science or large-scale generation assets, but in:

- applied energy systems capability aligned to industrial settings;
- multi-vector integration (electricity, heat, storage and demand);
- digital optimisation and control of energy-intensive operations;
- deployment within live manufacturing, logistics and public-sector environments; and
- translation and replication across similar sites nationally.

Advanced manufacturing is central to this trajectory — both as producer of enabling technologies and as a sophisticated end-user environment. The strategic opportunity lies in strengthening systems adoption, de-risking deployment, and improving productivity in existing industries as energy constraints intensify.

Keele University's Smart Energy Network Demonstrator (SEND), Place-Based Energy Futures work, civic energy assets and regional access to the Energy Research Accelerator provide a strong foundation for this applied, systems-led cluster. Together, they support learning-by-doing, whole-system analysis and replication science — capabilities that are nationally relevant without requiring large-scale generation assets locally.

Hydrogen is present within this wider systems context as an enabling and learning technology. It is positioned realistically — nested within hybrid industrial systems and specific applications — rather than as a dominant sector narrative.

3.5 Interdependencies and portfolio logic

These four clusters are tightly interlinked:

- Materials underpin energy systems, medtech, diagnostics and advanced manufacturing.
- Life sciences depend on materials, data systems and digital assurance.
- Energy systems depend on materials, power electronics, sensors and data.
- The digital economy, as well as playing a key role in its own right, drives adoption, optimisation and integration across all clusters.

This interdependence reinforces the case for a portfolio-based innovation strategy, rather than a sequence of sector-specific interventions.

4. Cross-Cutting Enabling Environment

4.1 Governance and system stewardship

Effective innovation-led growth depends not only on sectoral capability, but on governance arrangements that can coordinate evidence, align priorities and steward system development over time.

The analysis in this Framework points to a recurring challenge:

while Stoke-on-Trent and Staffordshire possess strong institutional assets, there is no single forum with a clear remit to:

- align innovation, skills, infrastructure and investment priorities;
- act as a neutral convenor across public, private and academic actors;
- maintain a shared evidence base on cluster development; and
- articulate a coherent place-based proposition to national partners and funders.

This creates fragmentation, duplication and missed opportunities for coordination.

A proposed Stoke-on-Trent and Staffordshire Innovation Board is therefore included (Terms of Reference at Appendix 1) as a draft governance mechanism for consideration by partners.

Its intended role is not operational delivery, but system stewardship.

At a high level, its draft functions include:

- Leadership and advocacy for innovation-led growth;
- Strategic coordination of innovation ecosystems;
- Funding strategy and co-investment alignment;
- External connectivity with UKRI, DSIT, Innovate UK and Catapults;
- Strategy, policy and commissioning alignment;
- Oversight of delivery outcomes and evidence;
- Maintenance of a shared intelligence base.

This governance proposition is explicitly framed as iterative and draft, intended to evolve in response to partner feedback, devolution arrangements and national funding conditions.

It is not intended to displace existing institutional roles or employer-led mechanisms such as the LSIP, but to provide a missing layer of cross-cutting strategic coordination.

4.2 Skills as enabling infrastructure

The analysis highlights a set of cross-cutting skills challenges that sit only partially within the scope of the current Local Skills Improvement Plan (LSIP).

While the LSIP provides a strong foundation for employer-led skills delivery — particularly in FE-level provision, responsiveness to labour market demand and engagement with priority sectors — the emerging evidence points to a need for greater alignment between skills, innovation and productivity objectives.

A central issue is the growing importance of hybrid and enabling skills.

Many of the most acute gaps identified across digital, Net Zero, life sciences and advanced manufacturing sit in the "missing middle" (Levels 3–5) and involve combinations of capability:

- digital–hardware integration;
- lab–data interfaces;
- regulatory and quality assurance roles;
- systems integration skills.

These are not easily addressed through sector-specific training alone and require coordinated pathways spanning FE, HE and employers.

A second, closely related issue is the role of skills as enabling infrastructure, not simply workforce supply.

In areas such as digital enablement, engineering biology, precision medicine and energy systems, skills shortages limit the ability of firms and public services to:

- absorb new technologies;
- adopt innovation;
- improve productivity; and
- meet regulatory and assurance requirements.

This extends beyond filling vacancies to include confidence, literacy, ethical understanding and regulatory competence.

These dimensions are critical to trust, assurance and adoption, but are not easily captured within traditional LSIP metrics or governance structures.

4.3 Skills governance and coordination

The LSIP governance model is well suited to its core purpose of employer voice, FE alignment and delivery. In Stoke-on-Trent and Staffordshire it has come into its own in convening across the broader system, including universities, innovation actors and civic institutions around cross-cutting, **longer-term** capability building.

Within this model the LSIP not only remains central to FE delivery and employer-led responsiveness, but also supports:

- Universities to lead on higher-level skills, postgraduate provision and innovation-linked capability.
- Civic institutions align skills strategy with Net Zero transition, digital adoption and life sciences translation.
- A place-based coordinating layer ensures coherence across the system.

This approach preserves employer leadership while addressing systemic skills constraints that cut across sectors and institutional boundaries.

4.4 A future-facing postgraduate landscape

Supporting realistic growth across materials innovation, life sciences, energy systems and enabling digital capability requires a postgraduate landscape that does what undergraduate provision cannot:

- develop deep specialism;
- integrate across disciplines; and
- support the translation and adoption of innovation in complex, regulated environments.

This Framework therefore treats postgraduate education not as an extension of undergraduate pipelines, but as critical economic infrastructure.

Level 8 (Doctoral): underpins the long-term competitiveness of the local innovation economy. It sustains scientific depth, attracts talent and investment, and provides the research credibility required to participate in national and international innovation systems.

Two complementary forms of doctoral activity are required:

Traditional doctoral research: Remains essential in areas where Keele already demonstrates strong national standing: materials science, biosciences, environmental systems, omics, energy materials and systems analysis. The strategic priority is consolidation and focus around fewer, clearer themes aligned to national missions (e.g. materials innovation, engineering biology, Net Zero delivery).

Collaborative and industry-embedded doctoral research: This form of doctoral provision supports innovation by embedding doctoral-scale problem-solving within firms, public systems and applied innovation environments. Its value lies in translation, de-risking and systems integration rather than publication output alone.

The strategic opportunity is to grow collaborative doctoral provision incrementally, starting with anchor organisations and public-system challenges, and scaling as absorptive capacity increases.

If Level 8 underpins depth and credibility, Level 7 provision is the fastest lever for productivity and innovation adoption.

Across all four clusters, demand is growing for specialist roles that:

- sit beyond undergraduate capability;
- combine technical, regulatory and systems knowledge;
- are required to scale and embed innovation rather than invent it

Demand for applied digital skills increasingly cuts across clusters, particularly where digital capability intersects with materials, health, energy and systems integration.

These roles are particularly evident in:

- materials scale-up and validation;
- life sciences regulation and adoption;
- energy systems integration;
- digital assurance in regulated environments.

To support the local innovation economy, Level 7 provision would need to prioritise:

- specialist, interdisciplinary programmes;
- modular and stackable formats;
- strong alignment with real occupational roles;
- clear progression links to collaborative doctoral activity.

Here, the complementary strengths of Keele and University of Staffordshire are especially important.

4.5 Innovation skills and system capability

The Innovation Caucus Skills Framework provides a useful cross-cutting lens on the capabilities required to innovate effectively.

It identifies five interconnected domains:

- Creative and problem-framing skills
- Translation and boundary-spanning skills
- Implementation and change skills
- Collaboration and relationship skills
- Strategic and reflective skills

Crucially, these skills are distributed across systems — not concentrated in a single role or sector.

They are needed in:

- businesses;
- universities;

- colleges;
- local authorities;
- healthcare organisations;
- intermediary bodies.

The relevance of this framework to Stoke-on-Trent and Staffordshire is particularly strong:

- In materials and energy systems, translation and implementation skills are as critical as technical excellence.
- In life sciences, innovation depends on collaboration, trust, evaluation and adoption.
- In the digital economy, productivity gains are constrained by adoption and organisational change rather than technology availability.

From a place-based perspective, this suggests an opportunity to:

- embed innovation skills within existing HE and FE provision;
- strengthen innovation leadership and absorptive capacity within firms;
- integrate innovation skills into collaborative R&D and demonstrator programmes.

4.6 A just transition lens

Innovation-led growth across materials, life sciences, digital and energy systems can improve productivity, resilience and long-term prosperity.

However, it can also produce uneven labour-market impacts, particularly for lower-paid and lower-skilled workers whose roles are most exposed to automation, process change or system reconfiguration.

A just transition in this context should be understood not as a single programme, but as a set of enabling conditions embedded into how innovation is governed and delivered.

The focus is less on predicting job losses and more on:

- anticipating change early;
- supporting progression;
- aligning innovation with workforce planning;
- ensuring that costs and benefits are more evenly shared.

This lens is particularly relevant to:

- Net Zero transition;
- digital adoption;
- life sciences translation;
- automation and robotics.

Embedding just-transition principles strengthens the credibility and maturity of a future Strategic Combined Authority’s innovation agenda.

5. Materials Innovation

5.1 The Local Cluster

Materials innovation is one of Stoke-on-Trent and Staffordshire’s most distinctive and credible areas of comparative advantage. It reflects both long-standing industrial heritage — notably in ceramics, advanced manufacturing and materials processing — and a rapidly evolving research and innovation base linked to energy systems, healthcare, sustainability and digital manufacturing.

The local cluster is broad rather than monolithic. It spans advanced ceramics, composites, metallic materials, surface technologies, polymers, biomaterials and functional electronic materials, alongside applied activities in testing, validation, scale-up, modelling and manufacturing systems. It is therefore best understood as a materials innovation economy, rather than a narrow “advanced materials” sector.

At its core, the cluster is anchored by:

- world-class ceramic science and industrial testing capability (Lucideon and associated partners);
- strong university research capability in materials science, chemistry, physics, biosciences and engineering;
- applied translational activity connecting materials to healthcare, energy systems, digital technologies and low-carbon construction; and
- a dense base of SME manufacturers, suppliers and specialist services embedded across the region’s industrial estates.

A defining feature of the cluster is its applied and translational orientation. Unlike frontier materials science hubs that focus primarily on discovery research, Stoke-on-Trent and Staffordshire’s strengths lie in:

- materials testing, validation and certification;
- manufacturability and scale-up;
- performance in harsh or regulated environments;
- systems integration with energy, health and digital technologies; and
- industry-embedded applied research.

This makes the cluster highly relevant to productivity, industrial resilience and Net Zero delivery, but also shapes the nature of growth. Expansion is driven less by speculative discovery and more by adoption, translation, manufacturability and downstream market integration.

Rather than positioning itself as a centre for a single materials sub-discipline, the area’s opportunity lies in becoming a national hub for applied materials translation, focused on:

- integration of materials into regulated sectors (health, energy, defence, infrastructure)

- validation, certification and scale-up
- low-carbon materials and circular economy applications
- linking materials innovation to deployment and adoption pathways

5.2 Research and Innovation Capability

Taken together, Keele University, the University of Staffordshire, Lucideon and AMRICC form a complementary, system-level materials innovation capability.

This is not a single centre of excellence, nor should it be. Instead, it is a distributed, applied ecosystem, aligned closely to the Royce Institute model of shared access, translational focus and national connectivity.

Keele University provides scientific depth and interdisciplinary research capability across:

- energy materials, electrochemistry, catalysis and hydrogen systems;
- biomaterials, tissue engineering and medical interfaces;
- ceramics, composites and surface engineering;
- materials modelling and data-led materials science (Materials 4.0);
- sustainability, circular economy and lifecycle analysis.

The University of Staffordshire contributes applied research strength focused on:

- translation and manufacturing systems;
- digital manufacturing, AI, IoT and cyber-physical systems;
- electronics, sensing and digital prototyping;
- sustainable product design and applied materials use;
- low-carbon construction and thermal systems.

Lucideon and AMRICC provide globally distinctive industrial capability in:

- advanced ceramics testing and certification;
- materials performance in extreme environments;
- scale-up, validation and industrial readiness;
- applied R&D linked directly to market needs.

The value of this combined capability lies in coordination rather than duplication. No single institution offers end-to-end materials R&D, nor should it. Instead, the system is well configured for applied innovation, industry-embedded translation, validation and certification, and access to national facilities where specialist or capital-intensive infrastructure is required.

R&D Capability Heatmap – Materials Innovation

Materials Innovation RTIC	Keele University	University of Staffordshire	Lucideon / AMRICC

Advanced Ceramics	🟩	🟧	🟩
Composites & CMCs	🟧	🟧	🟩
Metallic Materials	🟧	🟧	🟧
Polymers & Functional Materials	🟩	🟧	🟧
Biomaterials	🟩	🟧	⬜
Surface Technologies & Tribology	🟩	🟧	🟩
Energy Materials	🟩	🟧	🟧
Electronics & Sensor Materials	🟧	🟧	🟧
Materials Modelling & Materials 4.0	🟩	🟧	⬜
Sustainability & Circular Materials	🟩	🟧	⬜
Translation & Manufacturing Systems	🟧	🟩	🟩
Testing, Validation & Certification	🟧	⬜	🟩

5.3 Skills

The materials innovation skills base across the area is layered and strongly aligned to applied industry demand.

Delivery capacity is anchored by Newcastle & Stafford Colleges Group and Stoke College, providing:

- ceramics technicians and materials processing skills;
- laboratory support roles;
- quality assurance and testing skills;
- low-carbon manufacturing and sustainability roles.

Keele University contributes depth in:

- materials science;
- chemistry and physics;
- biosciences;
- energy materials;
- environmental systems.

The University of Staffordshire provides applied capability in:

- manufacturing systems;
- digital manufacturing and automation;

- electronics and applied engineering;
- product design and sustainability.

Across the system, the key constraint is not volume of provision, but progression and integration, particularly:

- Level 4–5 pathways linking FE technicians into higher-level technical and digital roles;
- progression into validation, QA and regulatory roles;
- materials–digital integration skills.

Skills Capability Heatmap – Materials Innovation

Skills / Workforce Domain	Keele	Staffs	NSCG	Stoke
Materials science graduates	■ (green)	■ (amber)	□	□
Chemistry & physics	■ (green)	■ (amber)	□	□
Biomaterials & life sciences	■ (green)	■ (amber)	□	□
Manufacturing systems & automation	■ (amber)	■ (green)	■ (amber)	□
Digital manufacturing & Materials 4.0	■ (amber)	■ (green)	■ (amber)	□
Ceramics & materials processing	■ (amber)	■ (amber)	■ (green)	■ (green)
QA, testing & validation skills	■ (amber)	■ (amber)	■ (green)	■ (green)
Low-carbon manufacturing skills	■ (amber)	■ (amber)	■ (green)	■ (green)
Laboratory technicians	■ (amber)	■ (amber)	■ (green)	■ (green)
Entry-level materials & manufacturing (L2–3)	□	□	■ (green)	■ (green)
Applied progression routes (L4–5)	■ (amber)	■ (amber)	■ (amber)	□

Level 7 demand is driven by:

- scale-up and validation;
- materials performance in regulated environments;
- sustainability and circular economy integration;
- materials–digital convergence (Materials 4.0);
- translation into healthcare, energy and infrastructure systems.

Keele is best placed to lead advanced scientific and interdisciplinary provision. The University of Staffordshire brings complementary strength in applied delivery, systems integration and employer-aligned formats.

Level 8 (doctoral) provision underpins long-term competitiveness and research credibility. Two forms of doctoral activity are required:

- traditional doctoral research aligned to national missions (materials innovation, energy materials, engineering biology, sustainability);
- collaborative and industry-embedded doctoral activity focused on translation, de-risking and systems integration.

The strategic opportunity is to grow collaborative doctoral provision incrementally, starting with anchor organisations and public-system challenges.

5.4 Firm-Level Investment

Investment dynamics in materials innovation are shaped by long development cycles, high validation costs and investor caution around time-to-market and customer concentration.

Materials firms benefit from strong public R&D funding and industrial demand, but face:

- high scale-up risk;
- complex certification and regulatory requirements;
- capital-intensive manufacturing transitions;
- investor hesitancy around capital efficiency.

The most challenging point occurs at the transition from applied R&D to investable commercial growth.

From an investor perspective, hesitancy reflects stacked risks:

- translation and adoption uncertainty;
- leadership and governance capacity gaps;
- market legibility;
- capital intensity;
- fragmented support environments.

The most effective place-based role is therefore to strengthen translation, validation and adoption pathways, rather than attempting to substitute for private capital.

5.5 Location and Infrastructure

Materials innovation spans R&D, testing, validation, prototyping and specialist manufacturing.

Infrastructure demand aligns with three archetypes:

- **Materials R&D, Prototyping and Validation.** Best fit: KUSIP, university-anchored sites. Role: early-stage R&D, validation, pilot production
- **Scale-up and Specialist Manufacturing.** Best fit: Ceramic Valley EZ, M6/A50/A500 corridors. Role: scale-up, pilot lines, specialist production
- **Materials–Digital Integration.** Best fit: high-spec business parks, university sites. Role: modelling, Materials 4.0, digital twins

University science parks, whilst not substitutes for large scale industrial locations, can play a complementary role in early-stage translation, demonstration/pilot lines and initial scale-up.

Industry Archetypes – Materials Innovation

Industry Archetype	Primary Drivers	Best Fit Locations	Least Fit Locations	Role of KUSIP
Materials R&D, Prototyping & Validation	Research proximity; specialist labs; utilities; collaboration	A (KUSIP), university-anchored sites	D (standard industrial estates)	Anchor for applied R&D, prototyping and validation
Scale-up & Specialist Manufacturing	Floorplate scale; power; logistics; compliance	D (Ceramic Valley EZ; M6/A50/A500)	A, B	Early-stage pilots and pre-commercial demonstrators
Materials–Digital Integration (Materials 4.0)	Digital capability; modelling; secure data; research access	A (KUSIP), C (high-spec parks)	D	Anchor for data-led materials innovation
Materials Consultancy & Systems Integration	Credibility; connectivity; professional space	B (town & city centres), A (research-led)	D	Anchor for technical consultancy and brokerage

5.6 Materials Innovation and the Everyday Economy

Materials innovation is deeply embedded in the everyday economy.

It reshapes how people manufacture, build, heat, transport and maintain infrastructure. Many jobs involved — technicians, machine operators, QA staff, maintenance engineers — are locally rooted and exposed to technological change.

In the short term, innovation improves productivity and job quality by:

- standardising processes;
- improving materials performance;
- reducing failure rates;
- enhancing safety.

Over the medium term, materials innovation creates progression pathways into:

- scale-up roles;

- digital manufacturing;
- sustainability and compliance;
- regulatory and QA functions.

Crucially, these benefits depend on coordination between innovation, skills and deployment.

5.7 Strengthening Economic Impact

Materials innovation delivers economic impact through:

- scale-up and manufacturability;
- performance in regulated environments;
- sustainability and circular economy integration;
- linkage into energy, health and infrastructure systems.

Primary impact mechanisms include:

- productivity gains in existing manufacturing
- reduced scale-up risk
- improved industrial resilience
- exportable applied services capability

Economic value accrues through adoption and translation, not discovery alone.

5.8 The Case for Place-Based Intervention

Logic Chain: Materials Translation and Scale-up

Element	**Description**
Starting conditions	Strong ceramics and materials science base; applied research capability; Lucideon/AMRICC industrial testing; SME manufacturing density
Binding constraints	Scale-up risk; validation costs; certification bottlenecks; leadership and governance gaps; investor hesitancy
Why the market alone doesn’t fix this	High capital intensity; long time-to-market; fragmented translation pathways
Place-based intervention	Positioning the area as a national hub for applied materials translation, validation and scale-up
Primary translation pathways	• Testing and validation services • Scale-up demonstrators • Industry-embedded applied R&D
Economic & system outcomes	Higher productivity; reduced scale-up failure; exportable applied capability; stronger inward investment credibility

5.9 A Credible Capital Priority: CMC Facility

While capital investment is not the primary lever across most clusters, materials innovation presents a credible, ready-to-go exception.

There is already an active UK Government ask for subsidy to address the viability gap associated with a proposed Ceramic Matrix Composites (CMC) facility.

At the more realistic level of subsidy now under discussion, this project is:

- technically credible;
- aligned to national materials, defence and Net Zero priorities;
- anchored in existing local capability;
- supported by industry demand.

Unlike speculative capital proposals, this facility addresses a clear market failure:

- high upfront capital costs;
- long payback periods;
- strategic industrial relevance.

From a place-based perspective, this makes it a priority capital intervention, not a generalised expansion of infrastructure ambition.

Its value lies not only in production capacity, but in:

- strengthening the area's national position in advanced ceramics;
- anchoring scale-up and validation capability;
- supporting defence, energy and aerospace supply chains;
- enhancing inward investment credibility.

This is therefore positioned as:

- a targeted, evidence-led capital ask;
- aligned to national strategy;
- complementary to the broader applied materials ecosystem.

6. Digital Economy

6.1 The Local Cluster

The digital economy in Stoke-on-Trent and Staffordshire is a significant and established growth sector in its own right. It encompasses software and services firms, data and analytics, cyber security, digital design, creative technologies, embedded systems, gaming and applied AI, alongside a substantial volume of digitally enabled activity within manufacturing, logistics, health, professional services and the public sector.

The sector is characterised by strong applied capability. Growth has been driven by deployment in real-world environments. This applied orientation underpins strong productivity in core ICT activities and makes the cluster highly relevant to competitiveness, resilience and job quality across the wider economy.

The area's opportunity is therefore twofold: to continue scaling high-productivity digital firms, and to strengthen its role as a national exemplar of digital adoption and deployment in regulated and industrial contexts. Priority domains include:

- productivity enhancement in SMEs and foundational sectors
- digital transformation of manufacturing, logistics and health
- applied AI, data analytics and cyber security in operational settings
- simulation, modelling and digital twins for complex systems
- ethical, trustworthy and inclusive digital adoption

This positions the area not as a speculative tech hub, but as a credible location for delivery-focused digital innovation at scale.

6.2 R&D Capability Analysis – Digital Economy

Taken together, Keele University and the University of Staffordshire form a complementary digital capability system.

Keele University contributes strength where digital intersects with materials, life sciences, energy systems and health, including data-enabled research, simulation, environmental modelling, digital health, and systems analytics. Its role is strongest in applied digital research embedded within interdisciplinary innovation.

The University of Staffordshire provides the dominant anchor for the digital economy cluster. It holds strong, nationally competitive capability in computing, cyber security, AI, data science, games and creative technologies, applied digital systems, automation, modelling and simulation. Staffordshire's strengths lie in applied innovation, employer-aligned provision, translational digital R&D and deployment into real-world contexts.

This configuration aligns well with the structure of the local digital economy, which is dominated by adoption, integration and service-led activity rather than frontier technology discovery.

R&D Capabilities Heatmap – Digital Economy

Digital RTIC	**Keele University**	**University of Staffordshire**
Data Infrastructure & Analytics	🟧	🟩
AI & Machine Learning	🟧	🟩
Cyber Security	🟧	🟩
IoT & Embedded Systems	🟧	🟩
Digital Simulation & Modelling	🟧	🟩
Digital Health Technologies	🟧	🟩
Creative Technologies & Gaming	🟧	🟩
Digital Manufacturing & Automation	🟧	🟩
Digital Twins & Systems Integration	🟧	🟩
Software Engineering	🟧	🟩

6.3 Skills

Skills Capability Heatmap – Digital Economy

Skills / Workforce Domain	Keele	Staffs	NSCG	Stoke
Digital graduates & data science	🟩	🟩	⬜	⬜
Cyber security skills	🟧	🟩	🟧	⬜
Software development & QA	🟧	🟩	🟧	⬜
Digital design & UX	⬜	🟩	🟧	🟧
IT support & network techs	⬜	🟧	🟩	🟩
Embedded systems & automation	🟧	🟩	🟧	⬜
Digital manufacturing skills	🟧	🟩	🟧	🟧
Entry-level digital skills (L2–3)	⬜	⬜	🟩	🟩
Applied progression routes (L4–5)	🟧	🟧	🟧	⬜

Keele University provides analytical depth and interdisciplinary capability where digital intersects with science, health, environment and materials. The University of Staffordshire provides the dominant anchor for applied digital skills, including computing, cyber security, AI, games, data science, modelling and automation.

NSCG and Stoke College provide essential technician, IT support, network and entry-level digital pathways.

The main structural gap is at Level 4–5, particularly for hybrid roles combining software, data, cyber security and industrial systems capability. These roles underpin digital adoption in manufacturing, logistics and public services but are weakly institutionalised in current provision.

Levels 7 and 8

Level 7 demand is driven by:

- digital adoption in regulated and industrial environments
- secure data infrastructure and digital assurance
- applied AI, analytics and automation in materials, life sciences and energy systems
- cyber-physical systems, digital twins and smart integration

Keele is best placed to lead interdisciplinary, regulated-domain provision (digital health, materials informatics, energy analytics, environmental data systems). Staffordshire brings strength in applied AI, cybersecurity, automation, robotics, simulation and employer-aligned postgraduate formats.

Level 8 (doctoral) provision underpins long-term analytical depth and credibility. Two complementary forms are required:

- traditional doctoral research in applied AI, cyber-physical systems, modelling and secure digital infrastructure;
- collaborative, industry-embedded doctorates focused on adoption, systems integration and assurance.

The strategic opportunity is incremental growth in collaborative doctoral provision linked to anchor organisations and regulated-sector challenges.

6.4 Location and Infrastructure for the Digital Economy

Digital economy activity spans software, data services, cyber security, simulation, automation and applied AI. Infrastructure demand is shaped less by physical assets and more by digital connectivity, secure environments, proximity to skills and applied research capability.

Digital Services, Software and Professional Functions:

Town and city centres are best suited for software, consultancy, cyber security and professional digital functions.

Applied Digital R&D and Simulation:

University-anchored innovation space is best suited for modelling, simulation, AI-enabled systems, and interdisciplinary digital research.

Digital–Industrial Integration:

High-spec business parks and strategic industrial locations are best suited for embedded systems, automation and digital manufacturing.

Industry Location Archetypes – Digital Economy

Industry Archetype	Primary Drivers	Best Fit Locations	Least Fit Locations	Role of KUSIP
Software, Data & Cyber Services	Talent; connectivity; amenity	B (town & city centres)	D	Indirect linkage to research-led activity
Applied Digital R&D & Simulation	Research proximity; secure data; skills	A (KUSIP), C	D	Anchor for applied digital innovation
Digital–Industrial Integration	Testing; utilities; systems access	C, D	B	Support for automation pilots
Creative & Games Technologies	Talent; amenity; collaboration	B, A	D	Support for interdisciplinary activity

6.5 Digital Economy and the Everyday Economy

The digital economy intersects with the everyday economy through productivity, service delivery and job redesign across manufacturing, logistics, health, retail and public services.

In the short term, digital adoption improves job quality by reducing manual data handling, improving workflow visibility and enabling safer, more predictable work.

In the medium term, digital transformation creates progression pathways into data-literate technician, systems coordinator and digital supervisor roles.

Without deliberate coordination, digital adoption risks reinforcing low-paid, low-productivity work. With it, it supports better jobs, clearer progression and more resilient labour markets.

6.6 Strengthening Economic Impact

Primary impact mechanisms include:

- productivity gains in SMEs and foundational sectors
- applied digital services growth
- exportable systems integration capability
- improved resilience in regulated environments

6.7 The Case for Place-Based Intervention

Logic Chain: Digital Adoption and Systems Integration

Element	Description
Starting conditions	Strong applied digital skills; diverse SME base; growing adoption demand
Binding constraints	Skills gaps; weak Level 4–5 pathways; low absorptive capacity
Why the market alone doesn't fix this	Fragmented support; low investment confidence
Place-based intervention	Coordinated adoption support, demonstrators, skills pathways
Primary translation pathways	SME adoption; applied pilots; professional services
Outcomes	Productivity growth; service export; better jobs

7. Life Sciences

7.1 The Combined Life Sciences Cluster

The life sciences cluster in Stoke-on-Trent and Staffordshire is diverse, skills-intensive and strongly anchored in applied and translational activity rather than frontier biomedical discovery.

It spans health-related life sciences, MedTech, diagnostics, rehabilitation technologies, digital health, non-health biosciences, agri-tech, environmental biology and bio-enabled Net Zero.

The cluster is best understood as a dual system:

- health-related life sciences anchored in NHS, clinical research and translational medicine
- non-health life sciences anchored in environmental, agri-tech and bio-enabled Net Zero activity

7.2 R&D Capability – Life Sciences

R&D Capabilities Heatmap – Life Sciences

RTIC	Keele	Staffs
Life Sciences (health core)	🟩	⬜
Rehabilitation	🟩	🟩
MedTech	🟧	🟧
Pharma / Biopharma	🟩	⬜
Omics	🟩	⬜
Sensors (health)	🟧	🟩
AI (health)	🟧	🟩
Data Infrastructure (health)	🟧	🟩
Environmental Bio	🟩	⬜
AgriTech	🟩	⬜

Keele provides the primary research engine for life sciences innovation.

Staffordshire plays a supporting and enabling role, strongest in rehabilitation, digital health, data, modelling and MedTech deployment.

7.3 Skills

The Life Sciences skills base across Stoke-on-Trent and Staffordshire is anchored in healthcare delivery, applied biosciences, diagnostics, data-enabled health roles and regulatory support functions.

Newcastle & Stafford Colleges Group and Stoke College, provide laboratory technicians, healthcare support staff, clinical trial assistants, manufacturing operatives, quality technicians and digital health roles that underpin NHS services, diagnostics, MedTech supply chains and applied bioscience activity.

Keele and Staffordshire Universities contribute analytical, laboratory and applied capability at Levels 5–6, particularly where life sciences intersect with health data, diagnostics, medical technologies, environmental biosciences and regulatory compliance.

The principal constraint is not volume of provision, but progression and integration — especially the gap in Level 4–5 pathways linking FE delivery roles to higher-level laboratory science, regulatory affairs, clinical research coordination, and bioinformatics. Addressing this would materially strengthen productivity, retention and career progression within the local life sciences workforce.

Skills Capabilities Heatmap – Life Sciences

Domain	Keele	Staffs	NSCG	Stoke
Bioscience graduates	🟩	🟧	⬜	⬜
MedTech skills	🟩	🟩	🟧	⬜
Omics & bioinformatics	🟩	🟧	⬜	⬜
Rehabilitation	🟧	🟩	🟧	🟧
Lab technicians	🟧	🟧	🟩	🟩
Environmental technicians	🟧	🟧	🟩	🟩
Entry-level pathways (L2–3)	⬜	⬜	🟩	🟩
Applied progression routes (L4–5)	🟧	🟧	🟧	⬜

Level 7 demand is driven by:

- regulation, assurance and adoption in clinical and bioscience environments;
- diagnostics, MedTech and digital health integration;
- bioinformatics and data-enabled life sciences;
- evaluation, translation and pathway development;
- systems integration across NHS, industry and research settings.

These roles combine scientific, regulatory, data and systems knowledge and are required to embed innovation into practice, rather than to generate frontier bioscience in isolation.

Keele is best placed to lead advanced scientific, clinical and interdisciplinary provision, particularly where life sciences intersect with health, data, engineering biology and environmental systems. Staffordshire brings complementary strength in applied delivery, digital health, simulation, evaluation and employer-aligned formats.

Level 8 (doctoral) provision underpins long-term competitiveness, credibility and translational depth. Two complementary forms are required:

- traditional doctoral research aligned to national missions (engineering biology, precision medicine, diagnostics, environmental biosciences, health data);
- collaborative and industry-embedded doctoral activity focused on translation, evaluation, adoption and systems integration.

The strategic opportunity is to grow collaborative doctoral provision incrementally, starting with anchor organisations (NHS, diagnostics firms, MedTech suppliers, public health systems) and scaling as confidence and absorptive capacity increase.

7.4 Location and Infrastructure for Life Sciences

Life sciences infrastructure demand varies widely by activity type.

- Clinical Research, Diagnostics & Precision Medicine - Hospital-adjacent and university-anchored environments are essential.
- MedTech, Devices & Digital Health - University science parks and applied innovation sites are best suited.
- Engineering Biology & Translational Bioscience - University-anchored environments are best suited at early stages. Engineering Biology Application – dependent on nature of industry.

Industry Location and Facilities Archetypes – Life Sciences

Industry Archetype	Primary Drivers	Best Fit Locations	Role of University-Anchored Sites
Clinical Research & Diagnostics	Clinical access; compliant labs; governance; data security	Hospital-adjacent sites; Science & Innovation Parks	Translational research, spin-outs, clinical–academic interface
MedTech & Devices	Testing environments; regulatory support; prototyping; grow-on space	Science parks; high-spec business parks	Early-stage R&D, prototyping, validation
Digital Health & Data	Secure digital infrastructure; talent access; connectivity	Town/city centres; university-linked sites	Applied demonstrators; research partnerships

Engineering Biology & Translational Bioscience	Specialist labs; interdisciplinary expertise; proximity to research	University science parks; selective high-spec sites	Early R&D, pilot activity, collaboration brokerage
Life Sciences Professional & Corporate Functions	Skilled workforce; amenity; accessibility	Town and city centres	Indirect linkage to research activity

7.5 Life Sciences and the Everyday Economy

The key areas of impact on the Everyday economy are:

- Life sciences innovation reshapes frontline health, care and laboratory roles.
- It creates progression into diagnostics technicians, data-literate support staff and specialist care coordinators, and technical roles in non-health Sectors..
- Developments supported by the Sector in devices, therapeutics, diagnostics and medical procedures support

Without coordination, innovation risks intensifying work. With it, it supports better jobs, clearer progression and stronger frontline services.

7.6 Strengthening Economic Impact

The key areas of Health-related life sciences impact are:

- productivity gains in health systems
- MedTech SME growth
- applied translational activity
- inward investment in evaluation-led firms

Non-health life sciences impact:

- environmental productivity
- Net Zero delivery
- agri-tech growth
- applied SME innovation

7.7 The Case for Place-Based Intervention

Logic Chain: Life Sciences and Engineering Biology

Element	Description
Starting conditions	Strong biosciences and environmental biology at Keele; emerging engineering biology; omics capability; materials–bioscience convergence; applied digital at Staffordshire
Binding constraints	Long development cycles; scale-up and validation costs; lack of pilot-scale access; skills shortages at Levels 6–8
Market failure	High technical and regulatory risk; uncertain routes to market; weak investor confidence outside biotech hubs
Place-based intervention	Focus on applied engineering biology and non-health bioscience translation and scale-up access
Translation pathways	Collaborative R&D; demonstrators; scale-up brokerage; selective spin-outs; industry-embedded PGR
Outcomes	Higher innovation survival; stronger SME competitiveness; bioscience diversification; national supply-chain integration

8. Advanced Manufacturing & Energy Systems Innovation

8.1 The Cluster

The nature of competitive advantage in manufacturing has shifted markedly, with growth is increasingly driven by:

- system performance rather than unit cost,
- integration of materials, electronics and software,
- energy efficiency, resilience and compliance,
- and the ability to adopt and scale new technologies quickly.

The UK Government's Modern Industrial Strategy reflects a shift, with advanced manufacturing intersecting directly with Clean Energy, Digital & Tech, and emerging sectors such as power electronics, sensors, robotics, advanced materials and industrial AI. Policy increasingly recognises it as a system of interdependent capabilities.

For Stoke-on-Trent and Staffordshire this context matters. The strategic opportunity lies in high-value, innovation-intensive manufacturing, tightly linked to energy systems transition and digital adoption.

North Staffordshire and Stoke-on-Trent retain a strong concentration of:

- materials-led manufacturing (notably ceramics and advanced ceramics),
- specialist processing and validation,
- energy-intensive production,
- systems integration activity linked to legacy industries adapting to Net Zero and productivity pressures.

This part of the area is characterised by deep technical capability, long-standing industrial expertise, and growing interaction with university-based research, particularly around materials performance, energy use, and system optimisation.

To the South the cluster is more tightly connected into:

- automotive,
- aerospace,
- energy infrastructure,
- and advanced logistics supply chains aligned with the West Midlands economy.

Here, activity is more likely to involve precision engineering, electronics, control systems, power technologies, and Tier-1/Tier-2 supply chains, often operating across multiple national and international markets.

Taken together, this geography supports a single, integrated advanced manufacturing and energy systems cluster. The North provides depth in materials, testing, and adaptation of legacy industries; the South provides scale, connectivity, and access to fast-moving industrial supply chains. The opportunity lies in strengthening the system that connects these strengths.

The Advanced Manufacturing & Energy Systems Innovation cluster encompasses firms engaged in high-value manufacturing and system-level innovation, including:

- Advanced and specialist manufacturing
- Precision components, ceramics and composites, metals processing, specialist materials and coatings.
- Energy-related manufacturing and deployment
- Equipment, components and systems for energy generation, storage, heat, power electronics and infrastructure.
- Electronics, sensors and control systems
- Embedded systems, instrumentation, automation, robotics and industrial IoT.
- Automotive, aerospace and industrial supply chains
- Manufacturing-adjacent professional and technical services
- Systems design, compliance, performance testing, optimisation and consultancy.

The cluster is not characterised by:

- large-scale vehicle or equipment assembly,
- vertically integrated OEM manufacturing,
- frontier energy science or large-scale generation.

This distinction is important. The area's comparative advantage lies in capability density and systems expertise, not manufacturing scale.

8.2 R&D capability

R&D Capability alignment

RTIC / Capability Area	Keele	Staffs	ERA
Advanced Manufacturing (systems-led)	🟧	🟩	🟧
Energy Systems (integration & deployment)	🟧	🟧	🟩
Power Electronics	🟧	⬜	🟩
Sensors & Instrumentation	🟧	🟧	🟩
Electronics Manufacturing	🟧	🟧	🟧
Robotics & Autonomous Systems	🟧	🟩	⬜
Data Infrastructure & Digital Control	🟩	🟩	🟧

Taken together, Keele University, University of Staffordshire and the Energy Research Accelerator (ERA) form a complementary, system-level capability rather than a single centre of excellence.

Keele University contributes applied research, materials science, energy systems analysis, modelling and translational capability, particularly where manufacturing intersects with energy, materials, environment and health.

The University of Staffordshire provides strength in applied engineering, electronics, robotics, digital manufacturing, control systems and industrial IoT, supporting adoption and deployment.

ERA provides access to specialist energy and power technologies, facilities and networks that are not viable to replicate locally, strengthening regional participation in national energy innovation.

Lucideon AMRICC also play an important role in theses areas, their capabilities set out in the Materials Innovation section. This configuration mirrors national best practice: distributed capability with strong access routes, rather than duplication of large-scale facilities.

8.3 Skills context for Energy Systems and Advanced Manufacturing

The revised Energy Systems and Advanced Manufacturing section highlights a cluster characterised less by frontier technology invention and more by deployment, integration, optimisation and scale. This places particular pressure on skills at the interfaces between disciplines: engineering and digital, manufacturing and energy, hardware and systems operation.

Across the Stoke-on-Trent and Staffordshire area, the most acute skills constraints are not at the level of doctoral research or entry-level labour, but in the mid-pipeline — particularly Levels 3–6 — where firms require technicians, technologists and applied engineers capable of:

- installing, commissioning and maintaining complex systems
- integrating digital control, sensing and data into physical assets
- supporting scale-up, reliability, compliance and operational optimisation
- translating new technologies into existing industrial environments

These constraints are especially evident in energy-related manufacturing, electronics and power systems, logistics automation, retrofit and infrastructure delivery, and industrial digitalisation. Addressing them is critical to productivity, resilience and the ability of local firms to compete in national and international supply chains.

Staffordshire Institute of Technology

In this context, the NSCG-led Institute of Technology represents a strategically important intervention. Thee IoT is explicitly designed to address the technical and applied skills gap that sits between further education, higher education and industry need.

The IoT's focus on advanced engineering, digital technologies and applied manufacturing aligns closely with the requirements of the area's energy systems and advanced manufacturing economy. Its distinctive contribution lies in four areas:

1. Bridging FE–HE–Industry pathways

   The IoT provides coherent progression routes from Level 3 through Levels 4 and 5 into degree-level study or advanced apprenticeships. This is particularly important for firms seeking to upskill existing workforces rather than rely on external recruitment.

2. Applied, employer-informed curricula

   Provision is shaped directly by employer demand in areas such as automation, electronics, control systems, digital manufacturing and industrial data — all core to modern energy and manufacturing systems.

3. Systems-relevant technical capability

   The IoT strengthens skills in areas that are repeatedly identified as bottlenecks:

   - power electronics and electrical systems
   - industrial sensors and instrumentation
   - automation, robotics and control
   - digital integration in manufacturing and energy environments

4. Support for adoption and diffusion

   By focusing on technicians and technologists who work within firms, the IoT supports technology adoption at scale — a key determinant of productivity in applied clusters where innovation is incremental, cumulative and embedded in operations.

Its value is maximised when viewed as part of a distributed skills system, working alongside Keele University, University of Staffordshire and regional assets such as the Energy Research Accelerator.

- Keele University contributes higher-level analytical capability, systems thinking and applied research expertise, particularly where energy, materials, manufacturing and digital systems intersect.
- University of Staffordshire provides applied engineering, digital systems, robotics and deployment-focused skills, supporting system integration and operational innovation.
- The Institute of Technology anchors the technical workforce needed to implement, operate and scale these innovations in real industrial settings.

Together, these institutions form a coherent pipeline from research and system design through to installation, operation and optimisation — addressing a long-standing weakness in many place-based innovation strategies.

Skills Capability Alignment - Energy Systems Innovation & Advanced Manufacturing

Skills Domain	Keele University	University of Staffordshire	NSCG Institute of Technology
Systems integration & applied engineering	🟧	🟩	🟩
Power electronics & electrical systems	🟧	🟧	🟩

Automation, robotics & control	🟧	🟩	🟩
Digital manufacturing & Industry 4.0	🟧	🟩	🟩

Levels 7 and 8

At Levels 7 and 8, demand is less about scale and more about depth, integration and leadership — particularly the ability to translate research and technological capability into deployable industrial practice.

The area’s higher-level skills needs span multiple advanced manufacturing trajectories, including energy systems, ceramics and materials engineering, electronics and embedded systems, precision manufacturing, and digitally enabled production.

Keele’s contribution at Levels 7 and 8 is primarily research-led and integrative. Its strengths lie in advanced materials (including ceramics and composites), energy-related materials and systems integration, and data-enabled analysis and modelling. Keele supports advanced manufacturing through doctoral training, applied research leadership and collaboration with industry partners seeking to de-risk innovation or integrate manufacturing within wider energy, health or environmental systems.

The University of Staffordshire’s higher-level contribution is more strongly translational and practice-focused. Its strengths align with advanced and digital manufacturing systems, robotics and automation, electronics manufacturing and embedded systems, and industry-facing postgraduate education. At Level 7, Staffordshire plays a key role in professional upskilling and manufacturing leadership, supporting firms to modernise production environments and embed advanced manufacturing practices within existing operations.

Taken together, the two universities provide complementary rather than duplicative Level 7–8 capability. Keele anchors research-intensive, interdisciplinary and system-oriented activity, while Staffordshire focuses on applied engineering leadership, digitalisation and industrial deployment.

8.4 Location and infrastructure requirements

Advanced manufacturing and energy systems innovation require differentiated, aligned to stage of development and function:

Industry Location Archetypes – Advanced Manufacturing & Energy Systems

Industry Archetype	Primary Drivers	Best-fit Locations
Energy-intensive & large-scale manufacturing	Land, power, logistics	Strategic industrial sites (M6/A50/A500 corridors)

Advanced manufacturing & systems integration	Research access, utilities	Science & innovation parks; high-spec business parks
Electronics, sensors & control systems	Testing, validation	University-anchored innovation space
Industrial consultancy & design	Connectivity, credibility	Town & city centres

8.5 Economic impact and productivity potential

The economic impact of this cluster is best understood through productivity and resilience, rather than headline job creation alone.

Key impacts include:

- productivity uplift in existing manufacturing firms,
- improved energy cost control and resilience,
- higher-value contracts within national supply chains,
- increased retention of skilled technical roles,
- stronger positioning in regulated and export-oriented markets.

Growth is likely to be incremental but cumulative, compounding over time through adoption and diffusion rather than single large investments.

8.6 Interaction with the everyday and foundational economy

Advanced manufacturing and energy systems innovation have direct implications for the everyday economy, particularly through construction, maintenance, logistics and utilities.

Innovation in systems design, materials and digital control can:

- reduce rework and downtime,
- improve safety and predictability of work,
- support progression from manual to technical roles,
- stabilise employment in energy-intensive sectors.

These benefits are most likely to accrue where innovation is adopted and embedded, rather than remaining at pilot stage.

8.7 The case for place-based intervention

Logic Chain 1: Manufacturing productivity and competitiveness

Element	Description

Starting conditions / assets	Strong base of specialist manufacturers across ceramics, energy supply chains, electronics and precision engineering, supported by applied R&D, materials expertise and growing digital capability.
Binding constraints	Limited internal capacity for systems integration; high cost and risk of upgrading production, digital and energy systems; fragmented support across R&D, finance and skills.
Why the market alone doesn't fix this	Benefits of upgrading (productivity, resilience, reputation) often accrue over time; SMEs struggle to absorb upfront integration risk; coordination across technology providers and supply chains is weak.
Place-based intervention	Structured support for whole-site diagnostics, systems adoption and coordinated upgrade pathways linking R&D, skills and deployment.
Primary translation pathways	Adoption of advanced manufacturing technologies, digital integration, automation and energy optimisation within live production environments.
Economic & system outcomes	Productivity and quality gains; stronger competitiveness and supply-chain upgrading; higher-value contracts; retention and progression of skilled employment.

Logic Chain 2: Energy Systems Integration

Element	Description
Starting conditions / assets	Established applied energy systems capability; live demonstrators (SEND, PFER); civic energy assets; strong manufacturing, logistics and digital base.
Binding constraints	Complexity of multi-vector systems; integration risk; skills gaps in systems engineering; limited viability of hydrogen-led inland models.
Why the market alone doesn't fix this	High coordination costs; weak business cases for complex sites; fragmented supply chains; national models poorly reflect real-world industrial constraints.
Place-based intervention	Position the area as a testbed and analytical hub for integrated energy systems in manufacturing and civic environments.
Primary translation pathways	Whole-site diagnostics; embedded demonstrators; replication support across similar industrial sites.
Economic & system outcomes	Lower cost and risk for firms; improved Net Zero delivery; productivity gains; development of exportable systems expertise.

9. Cross-Cutting Enabling Environment

9.1 Governance and system stewardship

Effective innovation-led growth depends not only on sectoral capability, but on governance arrangements that can coordinate evidence, align priorities and steward system development over time.

The analysis in this Framework points to a recurring challenge:

while Stoke-on-Trent and Staffordshire possess strong institutional assets, there is no single forum with a clear remit to:

- align innovation, skills, infrastructure and investment priorities;
- act as a neutral convenor across public, private and academic actors;
- maintain a shared evidence base on cluster development; and
- articulate a coherent place-based proposition to national partners and funders.

This creates fragmentation, duplication and missed opportunities for coordination.

A proposed Stoke-on-Trent and Staffordshire Innovation Board is therefore included (Terms of Reference at Appendix 1) as a draft governance mechanism for consideration by partners.

Its intended role is not operational delivery, but system stewardship.

At a high level, its draft functions include:

- Leadership and advocacy for innovation-led growth;
- Strategic coordination of innovation ecosystems;
- Funding strategy and co-investment alignment;
- External connectivity with UKRI, DSIT, Innovate UK and Catapults;
- Strategy, policy and commissioning alignment;
- Oversight of delivery outcomes and evidence;
- Maintenance of a shared intelligence base.

This governance proposition is explicitly framed as iterative and draft, intended to evolve in response to partner feedback, devolution arrangements and national funding conditions.

It is not intended to displace existing institutional roles or employer-led mechanisms such as the LSIP, but to provide a missing layer of cross-cutting strategic coordination.

9.2 Skills as enabling infrastructure

The analysis highlights a set of cross-cutting skills challenges that sit only partially within the scope of the current Local Skills Improvement Plan (LSIP).

While the LSIP provides a strong foundation for employer-led skills delivery — particularly in FE-level provision, responsiveness to labour market demand and engagement with priority sectors — the emerging evidence points to a need for greater alignment between skills, innovation and productivity objectives.

A central issue is the growing importance of hybrid and enabling skills.

Many of the most acute gaps identified across digital, Net Zero, life sciences and advanced manufacturing sit in the "missing middle" (Levels 3–5) and involve combinations of capability:

- digital–hardware integration;
- lab–data interfaces;
- regulatory and quality assurance roles;
- systems integration skills.

These are not easily addressed through sector-specific training alone and require coordinated pathways spanning FE, HE and employers.

A second, closely related issue is the role of skills as enabling infrastructure, not simply workforce supply.

In areas such as digital enablement, engineering biology, precision medicine and energy systems, skills shortages limit the ability of firms and public services to:

- absorb new technologies;
- adopt innovation;
- improve productivity; and
- meet regulatory and assurance requirements.

This extends beyond filling vacancies to include confidence, literacy, ethical understanding and regulatory competence.

These dimensions are critical to trust, assurance and adoption, but are not easily captured within traditional LSIP metrics or governance structures.

9.3 Skills governance and coordination

The LSIP governance model is well suited to its core purpose of employer voice, FE alignment and delivery. In Stoke-on-Trent and Staffordshire it has come into its own in convening across the broader system, including universities, innovation actors and civic institutions around cross-cutting, **longer-term** capability building.

Within this model the LSIP not only remains central to FE delivery and employer-led responsiveness, but also supports:

- Universities to lead on higher-level skills, postgraduate provision and innovation-linked capability.
- Civic institutions align skills strategy with Net Zero transition, digital adoption and life sciences translation.
- A place-based coordinating layer ensures coherence across the system.

This approach preserves employer leadership while addressing systemic skills constraints that cut across sectors and institutional boundaries.

9.4 A future-facing postgraduate landscape

Supporting realistic growth across materials innovation, life sciences, energy systems and enabling digital capability requires a postgraduate landscape that does what undergraduate provision cannot:

- develop deep specialism;
- integrate across disciplines; and
- support the translation and adoption of innovation in complex, regulated environments.

This Framework therefore treats postgraduate education not as an extension of undergraduate pipelines, but as critical economic infrastructure.

Level 8 (Doctoral): underpins the long-term competitiveness of the local innovation economy. It sustains scientific depth, attracts talent and investment, and provides the research credibility required to participate in national and international innovation systems.

Two complementary forms of doctoral activity are required:

Traditional doctoral research: Remains essential in areas where Keele already demonstrates strong national standing: materials science, biosciences, environmental systems, omics, energy materials and systems analysis. The strategic priority is consolidation and focus around fewer, clearer themes aligned to national missions (e.g. materials innovation, engineering biology, Net Zero delivery).

Collaborative and industry-embedded doctoral research: This form of doctoral provision supports innovation by embedding doctoral-scale problem-solving within firms, public systems and applied innovation environments. Its value lies in translation, de-risking and systems integration rather than publication output alone.

The strategic opportunity is to grow collaborative doctoral provision incrementally, starting with anchor organisations and public-system challenges, and scaling as absorptive capacity increases.

Level 7: specialism, adoption and system capability

If Level 8 underpins depth and credibility, Level 7 provision is the fastest lever for productivity and innovation adoption.

Across all four clusters, demand is growing for specialist roles that:

- sit beyond undergraduate capability;
- combine technical, regulatory and systems knowledge;
- are required to scale and embed innovation rather than invent it

These roles are particularly evident in:

- materials scale-up and validation;
- life sciences regulation and adoption;
- energy systems integration;
- digital assurance in regulated environments.

To support the local innovation economy, Level 7 provision would need to prioritise:

- specialist, interdisciplinary programmes;
- modular and stackable formats;
- strong alignment with real occupational roles;
- clear progression links to collaborative doctoral activity.

Here, the complementary strengths of Keele University and The University of Staffordshire are especially important.

9.5 Innovation skills and system capability

The Innovation Caucus Skills Framework provides a useful cross-cutting lens on the capabilities required to innovate effectively.

It identifies five interconnected domains:

- Creative and problem-framing skills
- Translation and boundary-spanning skills
- Implementation and change skills
- Collaboration and relationship skills
- Strategic and reflective skills

Crucially, these skills are distributed across systems — not concentrated in a single role or sector.

They are needed in:

- businesses;
- universities;

- colleges;
- local authorities;
- healthcare organisations;
- intermediary bodies.

The relevance of this framework to Stoke-on-Trent and Staffordshire is particularly strong:

- In materials and energy systems, translation and implementation skills are as critical as technical excellence.
- In life sciences, innovation depends on collaboration, trust, evaluation and adoption.
- In the digital economy, productivity gains are constrained by adoption and organisational change rather than technology availability.

From a place-based perspective, this suggests an opportunity to:

- embed innovation skills within existing HE and FE provision;
- strengthen innovation leadership and absorptive capacity within firms;
- integrate innovation skills into collaborative R&D and demonstrator programmes.

9.6 A just transition lens

Innovation-led growth across materials, life sciences, digital and energy systems can improve productivity, resilience and long-term prosperity.

However, it can also produce uneven labour-market impacts, particularly for lower-paid and lower-skilled workers whose roles are most exposed to automation, process change or system reconfiguration.

A just transition in this context should be understood not as a single programme, but as a set of enabling conditions embedded into how innovation is governed and delivered.

The focus is less on predicting job losses and more on:

- anticipating change early;
- supporting progression;
- aligning innovation with workforce planning;
- ensuring that costs and benefits are more evenly shared.

This lens is particularly relevant to:

- Net Zero transition;
- digital adoption;
- life sciences translation;
- automation and robotics.

Embedding just-transition principles strengthens the credibility and maturity of a future Strategic Combined Authority’s innovation agenda.

10. Implementation Priorities and Next Steps

10.1 From Strategy to Action

This framework is not intended as a stand-alone strategy or a fixed programme of delivery. It is a place-based organising framework: a way of aligning existing institutional strengths, emerging cluster opportunities and national policy priorities into a coherent platform for innovation-led growth.

The evidence throughout the report points to a consistent conclusion: the binding constraints on growth in Stoke-on-Trent and Staffordshire's innovation economy are not primarily scientific or technological. They sit instead in translation, adoption, skills, coordination, investment readiness and systems capability.

This has important implications for implementation.

The priority is not to create new delivery bodies, flagship campuses or speculative capital-intensive infrastructure. It is to strengthen the connective tissue of the innovation system: the mechanisms that link research to deployment, skills to adoption, demonstrators to investment, and local capability to national assets.

In practical terms, this means:

- sequencing interventions carefully rather than launching multiple initiatives in parallel;
- prioritising high-leverage, low-regret actions that improve system performance across clusters; and
- focusing early effort on translation, adoption and coordination rather than discovery alone.

10.2 Strategic Priorities for the Next Phase

Based on the analysis across materials innovation, digital economy, life sciences and energy systems innovation, five strategic priorities emerge as the most credible focus for the next phase.

These priorities are deliberately cross-cutting. They reflect common market failures and system constraints that recur across clusters, rather than cluster-specific wish lists.

Priority 1: Strengthen Translation and Adoption Pathways

Across all four clusters, the most consistent constraint is weak mid-stage translation: the point where research, prototypes or early-stage innovations must be validated, evaluated and adopted in real-world settings.

This includes:

- access to demonstrators and testbeds;
- regulatory and standards navigation;
- real-world evaluation environments (e.g. NHS, industrial estates, infrastructure assets);
- adoption brokerage and early customer pathways; and
- validation and assurance capability.

The priority is not to build new infrastructure, but to organise and make visible existing assets — including university demonstrators, NHS pathways, Lucideon/AMRICC, SEND, ERA-linked facilities and public-sector assets — into a coherent translation and adoption offer for firms.

Early actions could include:

- mapping existing demonstrator, validation and testbed capability across clusters;
- creating a shared access and brokerage function; and
- piloting a small number of adoption-led demonstrator projects in each priority cluster.

Priority 2: Build a Coherent Postgraduate and Advanced Skills System

Skills constraints are not uniform shortages, but structural mismatches between innovation demand and existing provision.

The most acute gaps sit at:

- Levels 4–5 (hybrid technical roles);
- Level 7 (specialist, interdisciplinary adoption roles); and
- the interface between Level 7 and collaborative doctoral activity.

The priority is not wholesale curriculum redesign, but incremental alignment.

Early actions could include:

- joint development of 2–3 interdisciplinary Level 7 programmes aligned to cluster priorities (e.g. materials scale-up, life sciences regulation and adoption, energy systems integration);
- modularisation and stackable formats linked to employer demand;
- pilot collaborative doctoral projects embedded in anchor organisations and public-system challenges; and
- tighter alignment between LSIP delivery and higher-level innovation skills priorities.

Priority 3: Improve Firm-Level Investment Readiness

Across clusters, firms face stacked risks around translation, adoption, leadership capacity and market legibility.

The highest-value place-based intervention is not a new fund, but a structured innovation and investment enablement function focused on:

- validation and evaluation support;
- leadership and governance capability;
- articulation of growth pathways;
- investor engagement readiness; and
- adoption-led demand signals.

Early actions could include:

- piloting an investment readiness and leadership support offer for innovation-active SMEs;
- aligning this with demonstrator and adoption activity; and
- strengthening brokerage between firms, universities, national funders and investors.

Priority 4: Develop a Credible Place-Based Innovation Proposition

Inward investment and national funding are increasingly selective and place-sensitive.

The area’s comparative advantage lies not in frontier science or large-scale generation assets, but in:

- applied innovation;
- translation and validation;
- real-world deployment;
- integration of R&D with production, testing and skills; and
- lower-cost, deliverable environments.

The priority is therefore narrative coherence and proposition clarity.

Early actions could include:

- consolidating a single, credible inward investment narrative across clusters;
- mapping priority locations and infrastructure by innovation archetype;
- aligning planning, land and infrastructure decisions to innovation needs; and
- strengthening external visibility with UKRI, DSIT, Innovate UK and sector intermediaries.

Priority 5: Establish Light-Touch System Stewardship

The consistent risk across all clusters is fragmentation: multiple capable actors operating without sustained coordination.

The priority is not to centralise delivery, but to formalise system stewardship through a Stoke-on-Trent and Staffordshire Innovation Board, as set out in Appendix 1.

Early actions could include:

- agreeing Terms of Reference and membership;
- appointing a private-sector Chair;
- establishing a small secretariat function (initially underwritten by anchor institutions); and
- commissioning a rolling programme of evidence, translation and proposition development.

10.3 Capital Investment: Realism and Targeted Intervention

The analysis throughout this framework cautions against capital-heavy intervention as a default response.

Most binding constraints sit in translation, adoption, skills and coordination rather than in the absence of physical infrastructure.

However, this does not imply that capital has no role.

There is already a live and credible capital ask with UK Government for subsidy to address the viability gap for a Continuous Manufacturing Centre (CMC) facility linked to advanced ceramics and materials innovation.

At realistic levels of public subsidy, this proposition is investable, market-tested and aligned with national industrial priorities around advanced manufacturing, defence supply chains and materials innovation.

This should therefore be treated as a priority, targeted capital intervention — not as a speculative flagship project, but as a focused response to a clearly evidenced market failure.

Beyond this, the framework supports a deliberately selective approach to capital:

- prioritising viability-gap funding over full capital replacement;
- focusing on translation, validation and scale-up infrastructure rather than new discovery facilities;
- aligning capital asks to clearly defined adoption and market pathways; and
- avoiding duplication of national assets.

This approach strengthens credibility with government and investors, and reduces the risk of under-utilised infrastructure.

10.4 Governance, Roles and Responsibilities

Implementation depends less on formal structures than on clarity of roles.

The framework implies four complementary system roles:

- Universities: Provide research depth, translation, brokerage, skills pipelines and credibility with national funders.
- Local authorities: Coordinate land, infrastructure, planning and investment priorities; convene public systems; enable place-based delivery.
- Public systems (NHS, energy, infrastructure): Act as adoption platforms, early customers and evaluation environments.
- National assets and intermediaries: Provide specialist facilities, standards, networks and routes to scale.

The Innovation Board would operate as a coordination and stewardship layer across these roles, not as a delivery body.