

Space Economy Initiative · Cambridge Judge Business School

Position Paper | June 2026

# Making Space Affordable, Inclusive and Sustainable

A Global Policy and Research Agenda

Centre for  
**India & Global  
Business**



UNIVERSITY OF  
CAMBRIDGE  
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**SPACE  
ECONOMY  
INITIATIVE**

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## Executive Summary

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*This paper proposes the creation of a Space Economy Initiative to help the UK and Europe make participation in the space economy more affordable, inclusive, and sustainable*

Space is no longer exclusive to a small number of state agencies. Falling launch costs, satellite miniaturisation and software defined infrastructure have lowered the threshold for participation, but barriers to meaningful and equitable involvement remain high, particularly for institutions in the Global South, smaller enterprises and missions oriented toward public benefit rather than commercial return.

Europe's space trajectory is at an inflection point. Investment is rising but increasingly defence dominated, upstream competitiveness is eroding and governance is being rewritten through instruments such as the European Union (EU) Space Act and the United Kingdom (UK) Space Regulatory Review. Without a deliberate focus on affordability, inclusion and responsible stewardship, the next decade of growth risks deepening concentration rather than widening participation.

A dedicated initiative is warranted because the space economy is expanding but growth remains structurally concentrated, while Europe and the UK continue to face capability, regulatory and coordination gaps that limit broader participation.

The Space Economy Initiative, based at Cambridge Judge Business School, is designed to close that gap. The Initiative's mission is to make space universally accessible to all. It applies the discipline of frugal innovation to space activity: doing more with less, without compromising safety, and creating repeatable pathways that others can adopt, adapt and govern.

The Space Economy Initiative is global in ambition and scope. UK and EU governments, regulators, space agencies and funders are key partners at this stage because their choices can shape standards, finance and regulatory pathways that widen access internationally.

This position paper argues that frugal innovation offers a rigorous, policy relevant framework for widening access to the space economy without compromising safety, reliability or public value.

The Space Economy Initiative proposes a concrete five year agenda: reducing concept to launch costs for Global South startups by 40% or more on selected mission pathways, relative to a benchmark set of comparable missions over the previous decade; establishing frugality benchmarks and model licences used by at least three national regulators; and codifying mission lessons into openly available playbooks and datasets.

Cambridge is well placed to lead this agenda. It is the institutional home of frugal innovation as a rigorous analytical framework, it has published empirical work specifically on space economics and access, and it combines those capabilities with the regional cluster in Space East and the proposed Space Strategic Research Initiative (SI-SRI).

## 1. Introduction: Why Space, Why Now

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For much of the history of spaceflight, cost was not the defining constraint. During the Cold War era, national prestige and strategic competition often overrode concerns about efficiency or economic return, exemplified by the extraordinary scale of expenditure associated with the Apollo programme.

That context has now changed. Over the past decade, reusable launch systems, CubeSat architectures, software defined radios and the growing maturity of commercial off the shelf (COTS) components have altered the economics of access to orbit and widened the range of organisations able to participate in space activity (ESA, 2025).

This position paper therefore starts from a universal mission: making space accessible to all. It is not a UK and EU agenda alone; it is a global agenda that engages UK and EU institutions as early policy, regulatory and funding partners while placing Global South innovators, universities, public agencies and communities at the centre of the design challenge.

Yet lower technical and financial thresholds do not automatically create equitable access. The same transformations that have enabled new entrants have also reinforced concentration around a small number of vertically integrated operators, especially in launch, constellation deployment, ground systems and orbital access. In 2024, one provider accounted for 70% of total orbital mass launched globally, while Europe's upstream market share declined from 21% in 2008 to 6% in 2024 (ESA, 2025; Eurospace, 2025).

Within this environment, frugal innovation becomes analytically and strategically important. Developed at Cambridge Judge Business School, it is not a synonym for low quality or reduced ambition. It is a framework for disciplined design under constraint, combining careful scoping of mission objectives, explicit trade-offs between cost, performance and risk, modularity, reuse and deployability (Radjou and Prabhu, 2015; Corrado et al., 2026).

Applied to space, this framework directs attention to the minimum viable architecture required to generate genuine public value, the conditions under which mission learning can be codified and transferred, and the governance arrangements needed to support experimentation without undermining safety or sustainability (Corrado et al., 2026).

The East of England illustrates both the promise and the fragmentation of this new space economy. Space East identifies 281 space-focused entities across six counties, including 215 companies, 55 test and innovation facilities and 11 universities. This is already a substantial regional ecosystem, but it lacks a systematic mechanism for connecting assets, lowering entry costs for smaller actors and turning local pilots into repeatable standards, shared tools and scalable pathways (Space East and Resonance, 2025).

Within this context, there is a clear rationale for a dedicated Space Economy Initiative at Cambridge Judge Business School. Locating the Initiative at Judge allows research on mission design, economics, governance and impact to be integrated with regional assets such as Space East and university-wide initiatives such as SI-SRI, turning Cambridge into a practical

testbed for inclusive, affordable and sustainable space services (Radjou and Prabhu, 2015; Corrado and Makridis, 2026).

## 2. The Global Space Economy: Scale, Growth and Structural Tensions

### 2.1 Market Scale

The global space economy is large and expanding. Independent forecasts suggest that it could reach €1.6 trillion by 2035, implying annual growth of roughly 9% (Draghi, 2024; ESA, 2025).

Global institutional space budgets reached €122 billion in 2024, increasing by 9% year on year, while private investment rose to €7 billion globally. European private investment reached €1.5 billion in 2024, a record level and a 56% increase on the previous year (ESA, 2025).

European upstream activity remains significant. Eurospace reported €8.8 billion in upstream sales in 2024 and around 66,000 full-time equivalent jobs across the segment (Eurospace, 2025).

Indicator	Value	Year	Source
Global institutional budgets	€122 billion	2024	ESA, 2025
Global private investment	€7 billion	2024	ESA, 2025
European private investment	€1.5 billion	2024	ESA, 2025
European upstream sales	€8.8 billion	2024	Eurospace, 2025
European upstream employment	~66,000 FTEs	2024	Eurospace, 2025

### 2.2 Market Concentration and Structural Risks

Despite continued headline growth, the global space economy is structurally concentrated. The United States and China together account for around 70% of both spacecraft and launch markets, and Starlink alone accounted for approximately 1,500 tonnes of spacecraft mass launched in 2024 (ESA, 2025).

This concentration gives a small number of operators disproportionate influence over pricing, deployment cadence, infrastructure design and standards formation. It also creates supply-chain dependence for European actors and makes it more difficult for SMEs, universities and public interest missions to participate without open standards and proportionate regulation (ESA, 2025; Eurospace, 2025).

Europe's relative position has weakened steadily. Its share of global institutional space budgets fell from 15% to 10% over five years, and its upstream market share fell from 21% in 2008 to 6% in 2024. There were 259 orbital launches in 2024, an 18% increase over 2023, yet effective access to the economic core of the sector remains uneven (ESA, 2025).

### 3. The UK Space Economy: Strengths, Gaps and Policy Trajectory

#### 3.1 Economic Scale

The United Kingdom remains one of the largest space economies in Europe. For financial year 2022/23, the sector generated £18.6 billion in income, a real-terms decline of 8.9% compared with 2021/22 (UK Space Agency and London Economics, 2025).

Employment nevertheless increased by 7% to 55,550 full-time equivalents, while an additional 81,400 jobs were supported indirectly across the supply chain. Gross value added per employee was approximately £129,000, more than twice the national average (UK Space Agency and London Economics, 2025).

Research and development spending reached approximately £1 billion, equivalent to 5.7% of total sector income. The UK Space Agency's factsheet states that 18% of UK GDP, around £454 billion, depends on satellite services, and that the sector catalysed £2.2 billion in investment and revenue in 2024/25 (UK Space Agency, 2025).

Indicator	Value	Year	Source
Total space industry income	£18.6 billion	2022/23	UK Space Agency and London Economics, 2025
Real-terms change	-8.9%	2022/23 vs 2021/22	UK Space Agency and London Economics, 2025
Direct employment	55,550 FTEs	2022/23	UK Space Agency and London Economics, 2025
Indirect jobs (supply chain)	81,400	2022/23	UK Space Agency and London Economics, 2025
GVA per employee	~£129,000	2022/23	UK Space Agency and London Economics, 2025
R&D spending	~£1 billion (5.7% of income)	2022/23	UK Space Agency and London Economics, 2025
GDP reliant on satellite services	18% (~£454 billion)	2025	UK Space Agency, 2025
Investment catalysed by UKSA	£2.2 billion	2024/25	UK Space Agency, 2025

#### 3.2 Sector Optimism and Investment Dynamics

Survey evidence suggests the sector remains optimistic. In the UK Space Agency industry survey, 60% of respondents expected income growth over the following three years, 52% expected total spending to rise and 50% anticipated employment growth (UK Space Agency and London Economics, 2025).

There were 92 unique investments into 85 UK space organisations in 2024, with a total value of £481 million — a 31% increase in transaction count compared with 2023 and the highest recorded in the past decade. At the same time, total value was the lowest since 2018 (UK Space Agency and London Economics, 2025).

The underlying picture is one of persistent entrepreneurial energy but uneven capitalisation, creating viable pathways for organisations operating under tight financing constraints and high regulatory uncertainty.

### 3.3 Regulatory Framework and Policy Direction

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The Space Industry Act 2018 and the Space Industry Regulations 2021 provide the basis for licensing spaceflight activities, spaceports and range control services under Civil Aviation Authority (CAA) oversight (DSIT, 2024; Civil Aviation Authority, 2024).

The National Space Strategy set the ambition of making the UK the leading provider of commercial small satellite launch in Europe by 2030. Key milestones include the first horizontal launch attempt from Spaceport Cornwall in January 2023 and the first vertical launch licence in Western Europe granted to SaxaVord Spaceport in December 2023 (Civil Aviation Authority, 2024; UK Space Agency, 2025).

The National Audit Office found in 2024 that the National Space Strategy had stimulated investor interest but that strategic clarity to delivery bodies remained insufficient. The Space Regulatory Review identified continuing problems around licensing complexity, insurance liability caps and spectrum access (National Audit Office, 2024; DSIT, 2024; UK Parliament, 2025).

### 3.4 Structural Gaps Relevant to Frugal Innovation

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Three structural gaps are especially relevant. The first is the concentration of capability in ground stations, integration facilities, advanced component manufacturing and specialist communications testbeds, creating high fixed costs for smaller entrants (Space East and Resonance, 2025).

The second is regulatory friction. Even where the UK framework is comparatively advanced, licensing remains costly and complex for organisations without specialist regulatory expertise or legal support, strengthening the case for plain-language routes and model licences (DSIT, 2024).

The third is knowledge fragmentation. Engineering, commercialisation, economics, governance and ethics are still too often separated during mission design, limiting institutional learning and slowing the codification of reusable playbooks and standards (Space East and Resonance, 2025).

### 3.5 UK Startups: Frugality as a Scaleup Discipline

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UK space startups operate under constraints that are structurally analogous to those facing Global South actors: high fixed costs for testing and infrastructure, complex licensing, scarce patient capital, barriers to procurement and difficulty turning pilots into scalable services. Frugality should therefore be framed as a scaleup discipline for advanced UK technologies rather than a retreat from ambition.

For UK startups, the practical agenda is to reduce avoidable fixed costs through shared testbeds and ground infrastructure, make regulatory pathways more navigable through model filings and plain-language guidance, and design missions around modular architectures that prove public value early. This improves public value because lower cost pathways make it easier for government, investors and end users to support missions whose benefits are measurable, repeatable and exportable.

## **4. The EU Space Economy: Pressures and the New Regulatory Moment**

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### 4.1 Structural Pressures

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ESA identifies declining budget share, falling upstream market share, dependence on defence-driven demand and a widening resource gap with the United States as central features of the current landscape (ESA, 2025).

ESA funding per European citizen is approximately €15 per year, compared with around €220 per citizen in the United States. Defence became the dominant driver of new orders, accounting for 67% of the value of orders in 2024. Germany overtook the UK as the leading destination for private space investment, with the Munich region attracting nearly €1 billion in venture capital (ESA, 2025).

European private space investment rose from 3% of global private investment in 2019 to 22% in 2024, but 80% of that investment remained concentrated in infrastructure rather than applications (ESA, 2025).

### 4.2 The EU Space Act and the New Regulatory Moment

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In June 2025, the European Commission published the proposed EU Space Act, seeking to harmonise rules across member states and establish a common framework for safety, sustainability, debris mitigation, collision avoidance and environmental assessment (European Commission, 2025a).

The Act explicitly recognises the need for differentiated support for smaller actors, including capacity building, testing access and navigational guidance. This creates an opportunity to embed sandbox mechanisms, model licences and shared assessment frameworks from the outset (European Commission, 2025a; European Commission, 2025b).

### 4.3 EU Startups and Advanced Frugality

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EU startups face a similar constraint set: fragmented national routes to market, high compliance costs, limited access to shared infrastructure and difficulty scaling from demonstration missions to commercial or public service deployment. A frugal innovation lens helps the EU treat proportionality, sandbox access, modularity and interoperability as competitiveness tools rather than exemptions from rigour.

Frugality can coexist with advanced technology. In the EU context, it means designing high-performance systems around disciplined scope, reusable components, open interfaces and early evidence of societal value, so that smaller firms can contribute to secure connectivity, earth observation, climate resilience and downstream services without being forced into incumbent cost structures.

**5. Barriers to Inclusive Space Access: A Structured Analysis**

Participation in the space economy is constrained by a set of interacting barriers rather than a single bottleneck. Six categories limit meaningful participation for new entrants, smaller institutions and public interest missions, particularly for actors in the Global South (Corrado et al., 2026; ESA, 2025).

Barrier Category	Nature and Manifestation
High Entry Costs	Launch costs have fallen substantially, but non-recurring engineering, testing, spectrum licensing, insurance and orbital registration fees remain prohibitive for many potential entrants. The upfront cost structure disadvantages missions without established balance sheets or government backing.
Regulatory Complexity	Licensing and compliance pathways are fragmented, opaque and resource-intensive. The EU Space Act will harmonise requirements across member states but also adds new compliance obligations, making proportionality and support mechanisms especially important for SMEs, universities and public-interest missions.
Concentrated Infrastructure	Ground stations, integration facilities, cleanrooms, vibration and thermal testing infrastructure, spectrum access and advanced telecom testbeds are concentrated among a small number of large operators and national agencies. Space East shows the value of shared regional infrastructure, but access models need to be codified and scaled.
Siloed Knowledge	Engineering, economics, governance and ethics rarely interact in an integrated way at the mission design stage. SI-SRI is intended to connect these domains across Cambridge, while Space East connects them to end users and market pathways.
Absence of Shared Tools	Mission lessons are rarely codified into reusable playbooks, reference designs or open standards. Space East capability mapping and SI-SRI research coordination can form the basis of shared tools for new entrants, including assurance templates for secure connectivity use cases.
Uneven Inclusion	Emerging markets and underserved communities remain secondary in most space sector narratives, procurement decisions and regulatory design processes. The benefits of earth observation, connectivity and precision agriculture accrue unevenly.

These barriers are cumulative. Regulatory complexity increases costs, high costs reduce experimentation, limited experimentation weakens learning, and weak learning reinforces incumbent advantage. A frugal innovation approach is valuable precisely because it seeks to intervene across this system rather than treating each barrier in isolation (Radjou and Prabhu, 2015; Corrado et al., 2026).

**6. The Global South, Frugal Innovation and South-North Learning**

Resource constrained environments in the Global South are not peripheral to the future of space; they are sources of design intelligence. They show how cost pressure, infrastructure

scarcity and urgent public needs can drive disciplined mission scoping, purposeful simplicity, reuse, modularity and novel mission architectures.

India's space programme is the most visible proof point. ISRO's Mars Orbiter Mission and Chandrayaan missions demonstrate how tight scoping, reuse of proven platforms, domestic supplier development and selective technology choices can support major scientific and exploratory objectives at dramatically lower cost than conventional mission models (Corrado et al., 2026). Prabhu et al. (2026) make the same strategic argument: frugality is not merely improvisation under scarcity, but a design logic that can scale into global impact.

Other Global South examples point to complementary architectures. GhanaSat-1 and Kenya's 1KUNS-PF used CubeSat platforms, university capability building, ISS/Kibo deployment opportunities and international partnerships to create first-mission learning without replicating the full fixed-cost structure of established space powers (All Nations University Space Systems Technology Laboratory, 2019; JAXA, 2018). These cases are proof points for reusable approaches: ride-share launch, hosted payloads, shared ground segments, software-defined systems, open data and capacity building around small mission teams.

The strategic implication is cross-pollination. Frugal innovations pioneered in the Global South can and should inform space development in established markets, including the UK and EU. South-north learning can help build new markets, south-north partnerships, shared standards and more resilient ecosystems by showing how high-value missions can be designed around constraints from the beginning rather than retrofitted for affordability later.

This makes the Initiative genuinely global: it convenes Global South agencies, entrepreneurs and communities as co-design partners, while working with UK and EU regulators, funders and space agencies to translate those lessons into proportionate licensing, shared testbeds, procurement design and standards that travel across jurisdictions.

## **7. The Space Economy Initiative: Mission, Approach and Distinctive Contribution**

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### 7.1 Mission and Vision

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The Space Economy Initiative at Cambridge Judge Business School aims to make space universally accessible to all by making frugal innovation a credible, well governed and regulator compatible route into the space economy for Global South ventures, universities, public agencies, mission driven organisations and resource-constrained startups in established markets.

Its delivery model connects Global South partners, UK and EU governments, regulators, space agencies and funders, Space East as a regional living laboratory for connected-space services, and SI-SRI as a cross-School Cambridge research and policy network. The Initiative's three guiding principles are: doing more with less without compromising safety, creating repeatable pathways that others can adopt, adapt and govern, and measuring social and economic value alongside technical performance (Corrado et al., 2026).

Frugal in this context means disciplined scoping of mission objectives, explicit trade-offs between cost, performance and risk, modular and reusable design wherever possible, and systematic use of COTS components where safety-critical constraints permit (Corrado et al., 2026).

### 7.2 The Four-Layer Contribution Model

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The Initiative's distinctive contribution is to integrate four layers of analysis and output that the space sector often treats in isolation: evidence, execution, governance and impact.

Layer	What It Provides
Evidence	Comparable cost and risk data across mission architectures, enabling new entrants and policymakers to benchmark frugal design choices against established alternatives.
Execution	Reference architectures, component validation frameworks and assurance pathways that make frugal design technically credible and regulator-ready.
Governance	Model licences, sandbox blueprints and proportionate regulatory frameworks that enable supervised experimentation without compromising safety or sustainability.
Impact	Measured social and economic outcomes, tracking how space missions generate public value across connectivity, agriculture, disaster response, climate resilience and education.

This integrated structure matters because evidence without implementation remains descriptive, implementation without governance remains fragile, and governance without impact measurement is difficult to justify to funders and policymakers.

### 7.3 Why Cambridge Judge

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Cambridge Judge Business School is the intellectual home of influential work on frugal innovation, and the Initiative's academic leadership is already associated with published work on space economics, space spillovers and the democratisation of access to space (Radjou and Prabhu, 2015; Corrado, Grassi, Paolillo and Silgado-Gomez, 2023; Corrado et al., 2026).

Cambridge provides strong departments in engineering, computer science and physics, while Space East supplies a regional pathway for industry engagement, consortium building, testbed development and route to market experimentation.

## 8. Cross-Disciplinary Research Agenda

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The cross-disciplinary research agenda translates the Initiative from a policy ambition into a research programme with definable and deliverable strands.

### 8.1 Space Systems

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The engineering strand examines how missions can meet performance requirements at radically lower cost. It covers efficient LEO constellation design, on-orbit computing using constrained hardware, software defined ground infrastructure, modular and reusable spacecraft subsystems, graceful degradation design and the interoperability of frugal

terminals and payloads with secure and hybrid terrestrial and non-terrestrial defined networks.

Specific engineering pathways include the trade-off between radiation hardened and COTS components, low SWaP optical and radio frequency payloads, commercial testing facilities as alternatives to dedicated infrastructure, sustainable re-entry design, on-orbit recycling and open hardware reference designs.

### 8.2 Business Models and Finance

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The business and finance strand addresses total cost of ownership models, low ARPU service design, blended finance structures and risk sharing mechanisms suited to frontier markets. Affordability in space is not only an engineering issue, but also a question of financing structures, procurement design and market formation.

A specific priority is to study how Global South frugal architectures travel into UK and EU startup ecosystems, and conversely how UK and EU regulatory, assurance and finance tools can be adapted for Global South missions without imposing disproportionate cost.

### 8.3 Governance and Standards

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The governance strand addresses how supervised experimentation can expand without compromising safety. It includes licensing frameworks, spectrum governance, debris mitigation, data governance, liability allocation and interoperability rules for secure connectivity systems.

The Initiative proposes model licences and sandbox blueprints that regulators can adapt to their jurisdictions. For the UK, this connects directly to the Civil Aviation Authority, the Space Industry (Indemnities) Bill and the Space Regulatory Review. For the EU, it relates to proportionality provisions, SME support mechanisms and sandbox frameworks in the EU Space Act (DSIT, 2024; UK Parliament, 2025; European Commission, 2025a).

These tools should support two way learning: Global South mission architectures can inform lower cost UK and EU deployment models, while UK and EU regulators can help codify safety, sustainability and assurance standards that are practical for emerging-market agencies and startups.

### 8.4 Social Impact and Ethics

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The social impact and ethics strand addresses the distribution of public value. It asks which use cases create measurable benefits across connectivity, climate resilience, agriculture, disaster response and education; how those benefits can be tracked and verified; and what ethical frameworks are needed for governance of satellite-derived data.

### 8.5 Economic Impact and Spillovers

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The economic impact strand tracks how missions generate value beyond the mission itself through local capability building, supply-chain development, venture creation and technology spillovers across sectors (Corrado, Grassi, Paolillo and Silgado-Gomez, 2023; Corrado, Grassi and Paolillo, 2025).

### 8.6 The Space Data Commons

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Underpinning all research programmes is a shared empirical base: the Space Data Commons, comprising five flagship datasets designed to make frugality measurable and decision useful across missions and geographies.

Dataset	Description
STCFI – Satellite Technological Content and Frugality Index	Tracks subsystem design choices and frugality features, linking them to reliability and cost outcomes.
CTL-DB – Concept to Launch Cost and Timeline Database	Records concept to launch costs, timelines, milestones and delay drivers across frugal and conventional missions.
RS-FARM – Remote Sensing for Farming Outcomes	Links earth observation features to farming and agricultural decision outcomes in frontier markets.
DISASTER-EO – Disaster Monitoring and Response Evidence Base	Links Earth observation mission capabilities to disaster monitoring and emergency response performance.
S2SDG – Space to Sustainable Development Goals	Maps mission outputs to Sustainable Development Goal indicators and evaluation protocols.

The Space Data Commons provides the empirical foundation for regulatory sandbox design, financing decisions, mission benchmarking and impact reporting.

## 9. Practical Outputs and Delivery

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The Initiative's outputs are designed to translate research into institutional practice rather than stopping at diagnosis.

### 9.1 Playbooks

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The Initiative produces plain-language guides for mission teams, regulators and investors. These playbooks are intended to be usable by universities, SMEs, public agencies and regional clusters such as Space East. Illustrative playbooks cover frugal constellation design, regulatory navigation, business models and financing, impact and governance, and procurement and mission selection.

### 9.2 Reference Designs and Frugal Standards

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Open architectures, cost models, COTS component validation frameworks and testing guidance reduce the technical risk of frugal design choices. Priority standards include secure connectivity interoperability, terrestrial and non-terrestrial defined network integration, low

SWaP payload validation, reusable ground-segment patterns and shared assurance templates.

### 9.3 Frugal Labs and Sandbox Blueprints

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Regulatory sandboxes allow supervised experimentation within defined parameters. The Initiative proposes co-designed sandbox blueprints with regulators, including evidential dossiers for approval and monitoring frameworks. Initial target jurisdictions include the UK, EU member states and selected Global South partner countries.

### 9.4 Teaching and Capacity Building

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The Initiative treats capacity building as a core output. Proposed outputs include executive education for mission leaders and government officials, graduate modules in engineering, economics, policy and management, founder bootcamps and tailored training for regulators navigating new licensing challenges.

### 9.5 The Annual Impact Dashboard

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The Annual Impact Dashboard provides externally reviewable reporting against baseline metrics using open analytical pipelines. It tracks progress across the Initiative's research programmes and reports uptake by regulators, mission teams and investors.

## **10. Intended Impact and Theory of Change**

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The theory of change is structured around direct impacts, indirect impacts and stakeholder-specific value propositions, recognising that space initiatives generate value through multiple channels including cost reduction, ecosystem formation, spillovers, policy learning and public-service outcomes (Corrado, Grassi, Paolillo and Silgado-Gomez, 2023; Corrado, Grassi and Paolillo, 2025).

### 10.1 Five-Year Direct Impacts

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The Initiative's five-year targets are ambitious but sufficiently concrete to support review and accountability:

- Validated concept to launch pathways that reduce costs for Global South startups by 40% or more, with Space East used as a UK living-laboratory template for shared testbeds, procurement learning and end-user co-design.
- Ten or more frugal standards adopted by at least three national space agencies, including standards relevant to secure connectivity and terrestrial and non-terrestrial defined network integration.
- Five or more frugal first ventures supported through Initiative research and incubation activity.

- Regulatory sandboxes co-designed in three or more jurisdictions, including at least one in the EU and one in the UK, with an explicit pathway for Space East pilots and other secure connectivity trials.
- Measurable gains in connectivity, climate resilience, agricultural productivity or disaster response in identified partner communities.
- Capacity built for founders, engineers, regulators and mission teams across multiple geographies.

## 10.2 Indirect and Systemic Impacts

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Beyond direct mission outputs, the Initiative aims to shift the broader trajectory of the space economy toward inclusion and sustainability:

- Wider participation in the space economy, particularly among Global South institutions, universities and public-interest operators.
- Cross-sector partnerships linking space data to outcomes in agriculture, climate, health and education.
- Stronger local innovation ecosystems in partner geographies, with supply-chain development and downstream value capture.
- More sustainable orbital stewardship through responsibility-aware frugal design that treats debris mitigation and re-entry as first-order mission requirements.
- Better visibility on economic spillovers, supporting evidence-based policy at national and multilateral levels.

## 10.3 Stakeholder Communities

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The Initiative serves a diverse set of stakeholder communities, each of which requires different outputs and forms of value.

Stakeholder	What the Initiative Provides
Academia and Cambridge Ecosystem	Publishable datasets, joint supervision opportunities, interdisciplinary teaching, SI-SRI alignment and a platform for cross-disciplinary research across engineering, economics and policy.
Industry, Startups and Investors	Practical entry routes, de-risked reference architectures, better due diligence tools, Space East consortium pathways and a pipeline of capital-efficient ventures with validated pathways and impact evidence.
Regulators and Policymakers	Sandbox blueprints, model licences and evidence on cost-risk trade-offs to align regulation with public interest, proportionality principles and secure connectivity assurance.
Civil Society	Transparent governance frameworks, community trust tools and mechanisms for ensuring that satellite-derived benefits reach intended communities.
Global South Partners	Playbooks, reference designs and financing frameworks adapted to frontier market constraints, and a neutral convening space trusted by governments and agencies alike.

## 11. Policy Recommendations

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The policy recommendations below are specific, operational and directly linked to the structural constraints identified earlier in this paper.

### 11.1 For the UK Government and the UK Space Agency

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- Embed frugal innovation benchmarks in public procurement criteria for space contracts, requiring missions to demonstrate explicit cost-risk trade-off analysis and modular design principles as conditions of funding (DSIT and Ministry of Defence, 2024).
- Establish a UK Space Regulatory Sandbox, administered jointly by UKSA and the Civil Aviation Authority, with Space East as an early living-laboratory site for satellite-terrestrial connectivity, optical and quantum communications, smart ports, agriculture, remote health and defence-adjacent demonstrators (DSIT, 2024; Civil Aviation Authority, 2024).
- Address the liability cap gap identified in the Space Industry (Indemnities) Bill and introduce proportionate insurance requirements calibrated to mission scale and risk profile (UK Parliament, 2025).
- Invest in shared space infrastructure, including common testing facilities, open ground station networks, collaborative environments, regional teleports and shared orbital slot reservation mechanisms that reduce entry costs for universities, SMEs and public-interest operators (Space East and Resonance, 2025).
- Fund a systematic review of mission lessons from UK-licensed satellite programmes and Space East pilots, with outputs structured as open, reusable playbooks that can inform SI-SRI research, UK procurement and international collaboration.
- Create a UK-Global South frugal space partnership programme that pairs UK startups, Space East facilities and Global South agencies or universities around shared testbeds, model licences and public-value use cases in connectivity, agriculture, disaster response and climate resilience.

### 11.2 For the European Commission and European Space Policy Stakeholders

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- Incorporate proportionality provisions and sandbox mechanisms into the EU Space Act with operationally detailed guidance on how SMEs and startups access them, rather than leaving implementation entirely to member state discretion (European Commission, 2025a).
- Commission a space impact assessment as part of the Vision for the European Space Economy, examining how affordability, modularity, reuse and knowledge transfer principles could support upstream competitiveness over a ten-year horizon (European Commission, 2025b).
- Fund a pan-European Space Data Commons, enabling comparable evidence on mission costs, assurance pathways and downstream impacts across member state programmes, ESA missions, secure connectivity requirements and regional clusters such as Space East (European Commission, 2025b; ESA, 2025).

- Use Initiative evidence to support voluntary dialogue on modularity, reuse potential, interoperability with secure connectivity architectures and knowledge transfer to new-entrant organisations.
- Create a European Space Fellowship programme linking university researchers with regulatory bodies, development finance institutions and Global South partner agencies to build the cross-disciplinary capability the agenda requires.
- Support south-north frugal space demonstrators that allow EU startups and Global South partners to co-design missions, share non-sensitive assurance evidence and translate low-cost architectures into common standards under the EU Space Act.

### 11.3 For Investors and the Financial Community

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- Adopt total cost of ownership models and frugality benchmarks as standard components of due diligence, replacing point-in-time launch cost estimates with full lifecycle cost analysis (Corrado et al., 2026).
- Develop blended finance instruments that combine development finance institution capital with private investment for space missions serving frontier markets.
- Engage with Initiative research outputs, including the STCFI and CTL-DB datasets, to strengthen the evidence base for investment decisions in early-stage frugal missions.

## 12. Conclusion

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The global space economy is growing rapidly, but that growth is not translating into proportionate gains in access, inclusion or public value. Europe's competitive position is deteriorating, the UK still faces infrastructure and regulatory frictions that limit the participation of new and smaller actors, and the EU Space Act opens a timely policy window for proportionate and innovation-compatible governance.

Frugal innovation offers a coherent and evidence-grounded response to these challenges. Applied to space, it is a systematic approach to making missions affordable, replicable and governable in ways that matter for connectivity, climate resilience, agricultural productivity and disaster response, directing attention not only to launch cost but to the full lifecycle of a mission.

The Space Economy Initiative at Cambridge Judge Business School is positioned as the institutional mechanism for advancing this agenda. Its distinctive value lies in combining published frugal innovation research, space economics expertise, proximity to world class engineering capability and established Global South networks with practical implementation assets such as Space East and SI-SRI. It is global in ambition and scope, using UK and EU engagement as an immediate route to shape standards and funding pathways while treating Global South innovation as a source of lessons for the whole space economy.

By integrating evidence, execution, governance and impact into a single, coherent platform, the Initiative offers something the space economy currently lacks: an institutional home for

the rigorous, interdisciplinary and publicly accountable work needed to make space genuinely affordable, inclusive and sustainable.

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