UKRI Knowledge Asset Management Strategy

Finalised V1.0 2023

Version history

Version number	Revisions made	Author(s)	Date
Draft 1.0	First draft written	KA Strategy T&F group	23.03.23
Draft 2.0	First draft written	KA Strategy T&F group	27.04.23
Draft 2.1	Draft updated	KA Strategy T&F group	04.05.23
Draft 2.3	Draft updated	KA Strategy T&F group	06.06.23
Draft 2.4	Draft updated	KA Strategy T&F group	23.06.23
Draft 2.5	Draft updated	KA Strategy T&F group	14.07.23
Draft 3.1	Draft updated	KA Strategy T&F group	01.11.23
Final 1.0		UKRI ExCo	21.11.23

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1   Introduction

1.1   Definition, Purpose and Scope

Definition of Knowledge Assets

Knowledge Assets (KA's), also known as 'intangible assets', are the information an organisation holds, the skills and experience of its staff, even its reputation. They are most commonly regarded as the Intellectual Property (IP) and Intellectual Property Rights (IPR) of an organisation. This includes patents, copyrights, trademarks, data, branding and knowhow. Within UKRI there are working differences in the way Councils define and describe IP, linked with our various communities and disciplines. The Intellectual Property Office describes IP as something that you create using your mind - for example, a story, an invention, an artistic work or a symbol.

Knowledge Assets (KAs) are developed by UKRI staff across a wide range of our activities, as a direct and intended way to undertake our core activities that enable us to fulfil UKRI's unique purposes and functions within the UK research and innovation system. KAs are also generated which might have a secondary or originally 'unintended' uses.

Examples of which might include new IT software developed by departments or new knowledge generated as the result of research and development (R&D) and innovation carried out by UKRI staff. Annex 1 outlines examples of KAs and their relevant Intellectual Property (IP) rights and methods of protection, and UKRI KA case studies .

Purpose of this strategy

'The Rose Book: Guidance on knowledge asset (KA) management in government'[1] clarifies best practice, provides recommendations, and supports government departments, Arms-Length Bodies and public research organisation in the management of knowledge assets - in line with the responsibilities set out in 'Managing Public Money'[2]. The Rose Book advises that all public sector organisations should have a strategy in place to support the effective management of KAs and that includes measures to:

- identify KAs
- consider and execute appropriate protection of KAs
- support exploitation of KAs

In May 2022 the UKRI Executive Committee endorsed the development of a UKRI KA strategy, and the appointment of a Senior Responsible Owner (SRO) for KAs. This strategy aims to provide a framework for how we optimise identification, management, and appropriate exploitation of UKRI-owned KAs, developed within UKRI's unique and wide remit, role and function.

A UKRI KA Task & Finish group has provided substantial input to the scope and shape of this strategy (see Annex 2 for membership).

Scope

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[1] BEIS, December 2021

[2] HMT, updated and published May 2021

This strategy relates to Knowledge Assets (including Intellectual Property, IP) developed by UKRI staff, including UKRI-owned campuses, centres, units, institutes, and facilities. KA's in scope for the strategy will broadly emerge through one of the below routes:

- KA's arising from within UKRI-owned institutes, facilities and campuses (generally employing research and technical staff); STFC, MRC and NERC have UKRI-owned institutes, facilities and campuses
- KA's emerging from staff work within UKRI research councils and pan-UKRI capabilities, including in some cases work we commission under contract

Outside the scope of this strategy are KAs generated through UKRI grants to external, third-party organisations. UKRI research and training grant terms and conditions specify that these are owned by the grant recipient party (e.g. a university, independent research organisation or business). The Higher Education and Research Act established UKRI as a grant giving entity, and the legal principles set out that as a funder UKRI should not directly benefit from outputs of grants awarded.

The UKRI grant T&Cs set out appropriate conditions and responsibilities for identifying, protecting and making efforts to exploit KAs arising from research organisations' UKRI grants for the benefit of society and the economy. In addition, UKRI retains the right to retain ownership of intellectual assets, including intellectual property (or assign to a third party under an exploitation agreement) and to arrange for exploitation for the national benefit and that of the Research Organisation involved.

1.2 Strategic Context

UKRI has a unique and wide role within the UK and international R&I ecosystem. Our UKRI strategy 2022 to 2027: transforming tomorrow together[3] - is structured around six objectives which will ensure the UK has the people, institutions, infrastructures and partnerships to be a global science superpower with the world's most innovative economy, attracting globally mobile business and talent.

UKRI KAs can be generated across all the UKRI strategic objectives and UKRI must consider how KAs are identified and managed to ensure UKRI is able to continue to deliver our core activities and deliver our strategy.

2 Approach to Knowledge Asset Management

2.1 Identification of Knowledge Assets

The objective of identifying and managing KAs is primarily to protect UKRI's access to the KA and where applicable to maximise benefit for wider UK society.

In order to appropriately manage KA's, it is important to be aware of the kinds of activities that may to lead to KA creation. For UKRI, examples of these activities include:

- Procurement
- Creation and collection of data and other reference collections such as photographic libraries, national sediment/ice cores, genomics or specimen collections
- Research and development, innovation and related analysis and evaluation
- Research and Innovation administration and funding delivery

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[3] UKRI, March 2022

- IT projects
- Web estate/content
- Major and novel projects and programmes
- Non-commercial and commercial collaborations and joint ventures.

The first step in managing KAs it to identify them, using appropriate processes such as the '*IP Health Check*' tool, created by the Intellectual Property Office[4].

Where KAs are identified, UKRI will need to ensure that they are appropriately recorded and managed so that they are well maintained and information regarding their status can be retrieved and reported upon in a timely manner. Where appropriate there will be the need to track any potential future management, exploitation and related impact financial and socio-economic.

This will enable UKRI to demonstrate what KAs we own and, to facilitate internal and external KA reviews. For UKRI, this does not necessarily need to be a single KA register, simply the ability to collate information as and when required from existing and functioning registers. However, we will need to ensure that where UKRI KAs emerge where no such mechanism is currently in place, then appropriate and proportionate mechanisms for KA recording may need to be developed. This will link in and be complementary to UKRI work on security access, information assets and knowledge information management, and other work on collection of UKRI tangible and non-tangible assets.

2.2 Protection of Knowledge Assets

Knowledge assets are valuable public assets, critical to the effective delivery of UKRI's core objectives. Protecting UKRI KAs, where appropriate, means that we have access to, and can use, the critical KAs that we generate in the process of conducting our business. This primary protection is enabled through the clauses in UKRI's legal contracts and employment policy.

UKRI may seek to further protect through registration of its KA's for its own defence e.g. UKRI has trademark protection for its own brands in the names and acronyms of its councils, or in order to exploit them outside of the organisation to maximise the benefit of the KA's that UKRI creates to their full impact for society.

UKRI will ensure that there is appropriate support and advice for the identification and management of KAs across the organisation. At present we have a range of approaches to achieve this: for STFC this support is provided by STFC innovations and specialist staff within STFC, for MRC it is provided as a service by an external organisation. As part of implementation of this strategy, UKRI will identify where there are gaps in access to appropriate expert support and training for staff, and consider how this should most appropriately be addressed.

Different types of protection will apply depending on the KA that has been created. Decisions on what level of protection that may be appropriate for any particular KA, if any, should be taken with a view of the balance of costs and protection - including staff time, professional services and registration fees, against the potential benefits/risks. In some cases more than

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[4] Intellectual Property Office - IP Health Check (ipo.gov.uk)

one type of IPR may be applicable, some rights require registration and others are automatic.

There may be instances where it is in the public interest to allow open access to a KA without restriction (for example where release will support wider economic or social objectives or where the cost of protection will outweigh the value of potential benefits). In addition, UKRI has a commitment to open research with related policies supporting open access to research publications and sharing of research data which should be considered in relation to research and research data derived KAs. It is important to note that management of KAs can be undertaken in ways which are a complementary with UKRI open research policies.

If and when it is decided that some level of KA protection is required, then the decision about the appropriate level of protection will vary on a case-by-case basis. The potential and mechanism by which a KA will be exploited (or not) will influence the approach to protection. There are many forms of protection for certain types of KAs, including keeping information confidential, confidentiality agreements (non-disclosure agreements), which can afford coverage for discussions prior to registering IP.

2.3 Exploitation of Knowledge Assets

Where there is the potential, exploitation including through fee-free or paid for access/usage rights supports and catalyses the unleashing of UKRI KAs into real world solutions, and in turn to maximise the beneficial impacts on the economy and society.

Exploitation of a KA can take many forms and may occur through various routes, including through open access publication, open-source code, royalty free licencing, royalty-bearing licensing or spinout formation to name just a few.

Evaluating the potential of exploitation

It is important that UKRI assets are carefully evaluated to ensure that their potentials are understood. This should include understanding the asset, potential beneficiaries, deliverability and applications (see Annex 3). UKRI endeavours to involve creators of KAs when making decisions about asset exploitation as far as practically possible, as they have the best and deepest understanding of the asset.

As part of any potential exploitation, we will want to consider where there are opportunities to use the asset (either for original application or for use in a new context) within UKRI or other organisations, either on open licence, on a cost-recovery basis or on another basis.

UKRI will ensure that staff are appropriately supported and where necessary trained to evaluate the potential of KAs generated through UKRI work. This will include signposting access to available resources such as the Intellectual Property Office website, the UK Patent Library Network and the Rose Book, and advice on the use of non-disclosure agreements should there need to be a discussion with third parties.

The UKRI KA management landscape differs across UKRI. UKRI may need to put mechanisms in place where there are no current arrangements to enable receipt and management of any income generated, or to reward or acknowledge contributions through asset exploitation.

It is important to be aware of and understand the relevant legal, professional, ethical, governance and legal frameworks around working with third parties, and for the protections and exploitation of KAs including:

- Open research policies (including the UKRI open access policy and UKRI's research data sharing policies)
- Data access and charging policies e.g. NERC Licensing and charging policy
- Trusted research and innovation
- UKRI code of conduct
- Research ethics and research governance
- Responsible Innovation
- UKRI Security and Resilience Strategy
- UKRI Information and knowledge management strategies
- National Security and Investment Act, Subsidy Control and relevant security legislation

UKRI has put appropriate mechanisms in place to advise staff on how to navigate key legislation related to the transfer of assets through license or sale to a third party. Advise is available through UKRI dedicated teams and resources listed in Annex 4.

3 Implementation of Strategy

3.1 Governance Structure

UKRI has appointed a Senior Responsible Officer for KAs.

The UKRI SRO will report to UKRI Executive Committee, and as part of the implementation of this strategy UKRI will develop an appropriate KA policy, delivery and management group, building on current active and expert networks and appropriate expertise across UKRI, with responsibilities including implementation of this strategy.

3.2 Embedding the Strategy

UKRI Senior leaders will champion UKRI's commitment to this strategy and its implementation.

UKRI staff need to be given the confidence and know-how on how to identify KAs, record them, appropriately manage and if appropriate exploit KAs.

Key to this, UKRI will endeavour to create a strengthened culture and awareness of the importance of KAs. This will include active promotion of success stories.

Some councils already have training resources in place (including through UKRI's membership of Praxis Auril, within NERC Centres, and through STFC Innovations). UKRI will look to expand training to ensure all those that need training can access it, working with Government Office for Technology Training, Intellectual Property Office and others to develop access to specific more in-depth training for UKRI staff. In addition, some parts of UKRI also have IP champions, IP managers and IP analysts in place, and we will explore rolling out of IP champions across UKRI to create an empowered community of interest and network of "go-to" KA experts. This will be supported by knowledge hubs across the organisation, to provide first-step guidance and signposting to resources available.

The ownership of KAs generated by UKRI employees as part of their ordinary duties are owned by UKRI as their employer. However, UKRI will consider how best to appropriately

incentivise employees to consider and pursue KA management and exploitation, there are appropriate policies, structures and practices which strategically and appropriately incentivise exploitation of knowledge assets. There are already examples 'rewards to inventors' policies across UKRI including MRC and STFC, and approved in discussion with the appropriate Trade Unions. UKRI will consider whether additional policies might be needed for UKRI staff not covered by existing policies, including whether there might be appropriate use of the established UKRI performance review and reward processes.

4   Evaluation and Review of Strategy

UKRI will actively review and evaluate the implementation of this strategy, along with appropriate indicators to gauge identification, management and exploitation of UKRI KA. However, UKRI will not set formal targets.

As part of its implementation, this strategy will be regularly reviewed to understand whether its priorities identified remain relevant, and to understand how far our approach to knowledge assets management has been effective in achieving our strategic objectives.

Annex 1: Examples of KAs and their relevant Intellectual Property (IP) rights and methods of protection as defined by the Rose Book

Category	Type of KA	Relevant IP rights and other methods of protection
Information	Data, *research results, technical and scientific information and data, databases, research results, research administrative, business and funding data*	Database rights, Copyright, law of confidence, contract, trade secrets
Innovation	Inventions and designs*, innovations, technologies, developments, improvements, prototypes, processes, materials, compounds*	Patents, designs, plant breeders' rights
Creative	Texts, videos, graphics, software and source code*, formulae, circuitry, computer programmes, drawings, performance data, research software, copyrighted works*	Copyright, performers rights and designs
Reputational	Brands and services	Trademarks and other badges of origin, goodwill
Knowhow	Expertise including in project management, process efficiency, ways of working*, methodology, ideas, plans, manufacturing techniques, processes*	Knowhow could be associated with any or all of the IP rights but may not be protectible in itself other than by trade secrecy and the law of confidence

Knowledge asset categories and types

- Information assets as defined by the UKRI knowledge asset management are 'a body of information, defined and managed as a single unit so it can be understood, shared, protected and exploited effectively. Information Assets have recognisable and manageable value, risk, content and lifecycles.

- Innovation refers to new inventions, processes and ways of working, and can be made known to the public alongside protection with IP rights or kept secret. Design rights protect the shape and appearance of a product, including the layout of integrated circuitry.

- Creative assets refer to things like written works (including software and source code), artwork, music and film (and performances in these), which may be protected by copyright.

- Reputational assets refer to ways of distinguishing the goods and services of one entity from those of another, and includes the reputation built up in a brand (including that of the government) as well as specific rights such as trademarks and coats of arms.

- Knowhow refers to practical knowledge about how to do something, which can be hugely valuable. Knowhow might encompass material which could go on to be protected by IPR, such as a patentable invention before the patent application has been made. It might be something related to, but not part of, an IPR, such as specialist knowledge required to operate a machine. Knowhow might also be something entirely separate from IPRs, such as the competitive advantage inherent in having a more efficient business model than a competitor. Knowhow can be treated in much the same way as other IPRs, usually protected by trade secrecy when forming part of a licence or collaboration agreement.

  o It can also be all information not in the public domain held in any form, including without limitation that comprised in or derived from drawings, data formulae, patterns, specifications, notes, samples, chemical compounds, biological materials or other biological collections, computer software, simulations/model runs, , tools for modelling and prediction, component lists, instructions, manuals, brochures, catalogues and process descriptions and scientific approaches and methods.

Possible case studies (to be integrated into the strategy)

1. Gateway to research
2. UKRI Funding Service

3. An example of KAs generated in conjunction with open access publications e.g. produced by our facilities which mean findings of UKRI research are free accessible and reusable to the taxpayer etc.

4. MRC: Constructive Bio launched to build on synthetic biology breakthroughs - MRC Laboratory of Molecular Biology (cam.ac.uk)

Constructive Bio to build on synthetic biology breakthroughs – UKRI

Based in Cambridge, UK, Constructive Bio, the latest LMB spinout, aims to re-engineer biology, creating new classes of enzymes, drugs and biomaterials, building upon research and technologies developed by Jason Chin's group in the LMB's PNAC Division.

Jason's group has made ground-breaking advancements in the development and application of techniques to reprogramme the genetic code of living organisms. After designing and synthesising the entire genome of the bacterium *E. coli* in 2019, Jason's group further engineered this synthetic strain of *E. coli*, and last year published results showing that their reprogrammed cells could assemble polymers entirely from building blocks that are not found in nature. Furthermore, the modified bacteria were also resistant to a wide variety of viruses.

Constructive Bio has launched with $15 million seed investment and an exclusive licence from the Medical Research Council to IP developed by Jason's group at the LMB. The Company will develop two platform technologies; large scale DNA assembly to build whole bacterial genomes from scratch, and genome reprogramming to engineer non-natural polymers for commercial applications.

Potential applications include novel therapeutics and antibiotics, enhanced agriculture, manufacturing and materials, and polymers that can be programmed to be biodegradable. In addition, the reprogrammed cells' viral resistance can be used to increase bio-manufacturing yields for protein drug products such as insulin, which are routinely manufactured using *E. coli* bioreactors that are currently susceptible to contamination by phages (bacterial viruses).

The company was set up after seed funding led by Ahren Innovation Capital, with participation from Amadeus Capital Partners, OMX Ventures and General Inception. Jason will serve as Constructive Bio's Chief Scientific Officer and will be joined by Dr Ola Wlodek as Chief Executive Officer.

Jason commented, *"Over the last 20 years, we have created a cellular factory that we can reliably and predictably program to create new polymers. The range of applications for this technology is vast – using our approach we have already been able to program cells to make new molecules including from an important class of drugs and to program cells to make completely synthetic polymers containing the chemical linkages found in biodegradable plastics.*

Now is the right time to commercialise these technologies. I am pleased that we have attracted significant support and seed funding to establish Constructive Bio and capture this opportunity. By taking inspiration from nature and reimagining what life can become we have the opportunity to build the sustainable industries of the future."

The launch of Constructive Bio was covered by Clive Cookson, Science Editor at the Financial Times (N.B. a subscription is required to view Financial Times' content).

5. STFC

Keit Spectrometers are commercialising an optical technology developed at STFC RAL Space. Keit's technology began at RAL Space in the late 2000s as a research project. The inventor had an idea that a static-optical design was the ideal solution to create an analyser to measure the atmosphere around Mars.

Designing a Micro FTS (Fourier Transform Spectrometer) that could undergo the rigours of space travel was novel, untried and innovative. The resulting design had to be low power, low maintenance, compact and vibration tolerant to survive the extremes of a rocket launch - advantages that made it appealing for industrial uses.

The STFC IP Team worked with the inventor to secure the Micro FTS by IP through funding a prototype and filing a priority UK patent. To create a robust foundation for the technology and future patent family that would be attractive to investors. The STFC Innovation team worked in tandem to scope out a business proposition, find a leadership team, and identify funding to spinout technology.

The company was founded in May 2013, licensing in the Micro FTs Patents and related know-how, subsequently raising £8.1M in several rounds of VC funding. Keit have developed a robust mid-infrared spectrometer that can measure multiple components of liquids down to ppm levels, in real-time, in a reliable factory-tolerant instrument.

Developing hardware from a Knowledge Asset created for a space mission for the risk-averse process industries is a lengthy business. Keit have reached the tipping point where they are starting to see significant repeat sales from large multinationals; and are achieving global sales from their Harwell base across nine industrial sectors, successfully demonstrating the existence of a very large (ca. £2bn p.a.) market. Keit now employs 14 people, are recruiting two more positions, and rapidly approaching breakeven.

6. NERC

The British Antarctic Survey (BAS) is increasing Safety in Polar Maritime Activities by providing sea ice information to minimise delays, improve efficiency, evaluate and mitigate risk to vessels and the environment and support compliance with maritime regulations - now reaching several thousand users across commerce, tourism, defence and rescue each month.

Annex 2: Membership of UKRI KA Task and Finish Group

- █████████████ UKRI Research Commercialisation Shared Capability
- █████████ - UKRI
- ██████████ - STFC
- ███████ - NERC
- █████████ - MRC
- ███████████ - UKRI
- █████████ - NERC
- ██████████ - UKRI Research Commercialisation Shared Capability

Annex 3. Evaluating UKRI Knowledge Assets

The asset – What the asset is and how it could be used, whether further development would increase the value of the asset, how much the asset has cost to develop and is costing to maintain, what the IP rights relating to the asset are and who owns them, legislation that restricts the use of the asset.

- The opportunity – How the asset could be used, what do potential users see as the opportunities and threats associated with exploitation of the asset, the mechanism (licence, spinout) that could be used to transfer the asset to market.

- Competing assets – whether there are competing assets already in the market, whether this asset has a USP/what makes it better, awareness of use of existing assets by other organisations.

  Few competing assets increases the chance of successful commercialisation.

- Potential beneficiaries – whether anyone has expressed an interest in the asset, what kinds of public, private, and third sector organisations could benefit from the asset.

  Interest in an asset from a number of OGDs (sensible use of taxpayer money not to duplicate) or private sector organisations, especially if international, may be a good indicator of commercialisation success.

- Deliverability – the challenges to exploitation including cost and availability of the inventor to support asset development, potential risks to development including legal and freedom of use, institutional barriers, need for input from other departments.

- Other applications – additional applications the KA might have

- Confidentiality – the extent to which the above information can be shared with other Government Departments, other public sector organisations, and publicly

Annex 4 Useful resources and advice

- UKRI code of conduct
- UKRI Security Strategy
- UKRI Wording on IP Terms and Conditions for health emergencies
- UKRI Good Research Resource Hub generally: Good research resource hub – UKRI
- STFC IP Policy
- STFC Awards to Inventors Policy
- MRC Intellectual Assets Policy
- EPSRC Intellectual Property & Commercialisation Guide
- NERC data management policies