ELIXIR
Scientific Programme

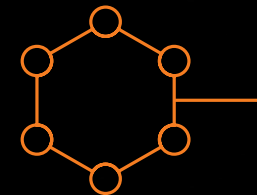2024-28

ELIXIR
Scientific
Programme

2024-28

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Foreword by ELIXIR Director

During its first ten years, ELIXIR has grown into a mature organisation and a vibrant community. ELIXIR works with life scientists in all fields, from molecular structure and genomics to biodiversity and agricultural research. Over the ten years the core mission of ELIXIR has remained unchanged: to connect data and people across national borders and scientific disciplines by coordinating infrastructure and bringing together groups of experts.

ELIXIR is rooted in bioinformatics, the science of transforming large-scale datasets into insights in the molecular and cellular sciences. Curiosity-driven and investigator-led projects provide the foundation of data-driven research into the societal challenges of food security, health and the environment. Life-science data forms the bedrock of a strong bioeconomy.

Ten years ago, in the first Scientific Programme, we described how ELIXIR would help researchers to access and analyse life science data. Our 2024-28 Programme sets out the ambitions for ELIXIR's second decade. I hope you are as excited as I am.

Niklas Blomberg, ELIXIR Director
Cambridge, UK, 2023

About ELIXIR

ELIXIR is a distributed infrastructure organised around national data infrastructures called Nodes. Nodes are composed of national centres of excellence in bioinformatics, including both universities and research institutes. Each Node brings together services, standards and resources, and has a lead institute acting as coordinator.

Collectively, Nodes bring together experts in all fields of life science data. ELIXIR's strength is this collaborative network of experts, working together to enable life science researchers throughout the world to access and analyse life science data.

www.elixir-europe.org

- ● Member State
- ● Observer
- ● ELIXIR institutes
- ☆ ELIXIR lead insititutes
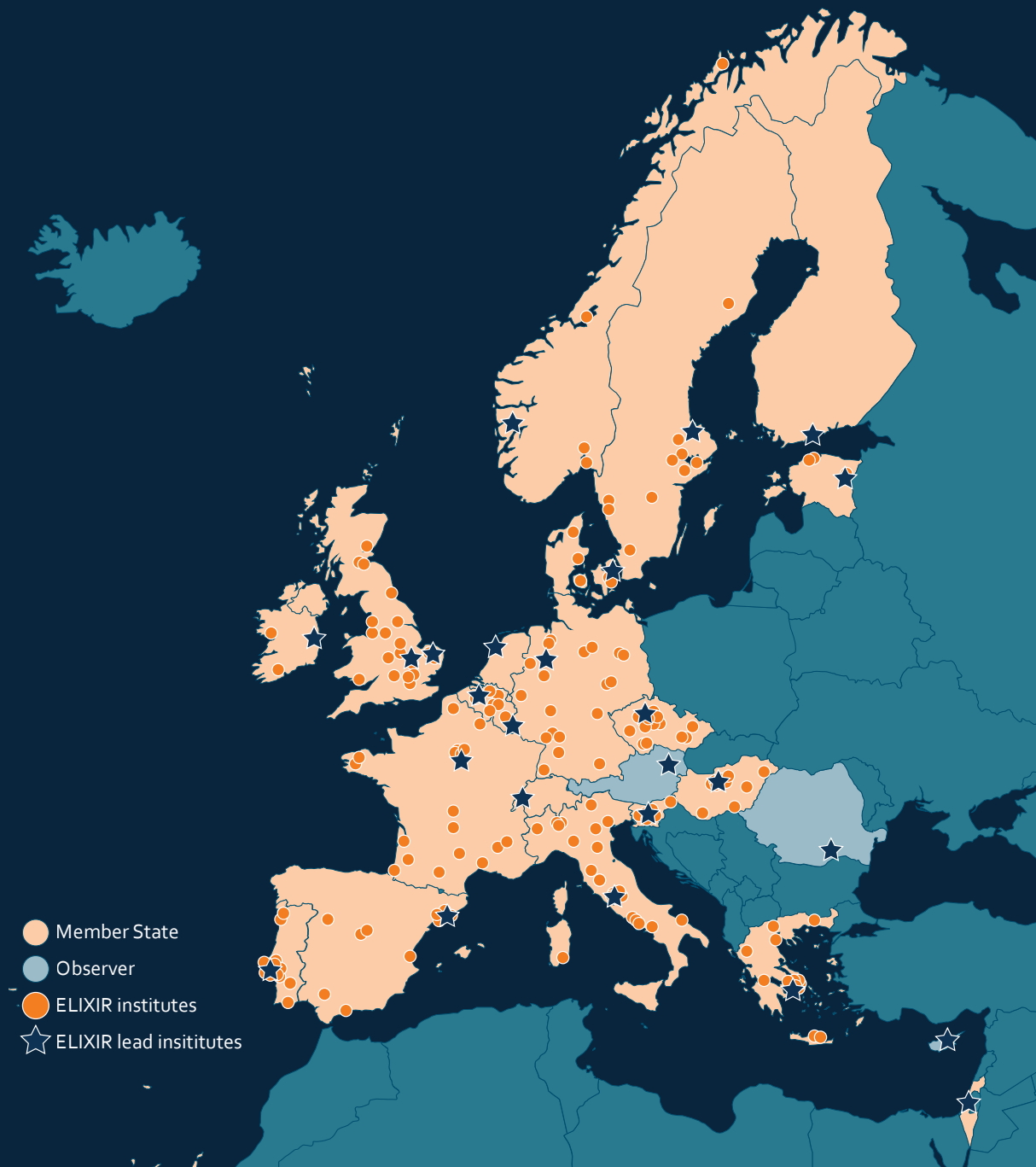
Purpose

TOGETHER WE ACCELERATE THE UNDERSTANDING OF LIFE

Identity

WE ENABLE SCIENTISTS TO ACCESS AND ANALYSE LIFE SCIENCE DATA

Values

WE WORK TO BENEFIT EVERYONE
WE ARE TRUSTED
WE WORK WITH A SPIRIT OF OPENNESS
WE STRIVE FOR EXCELLENCE
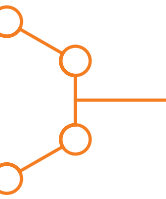**WE WORK IN AN ENVIRONMENT OF RESPECT**

Working together with shared purpose, identity and values

People are the backbone of ELIXIR. Our experts form a vibrant European community of over 850 individuals with diverse skills and experience.

Distributed infrastructures are people infrastructures

ELIXIR comprises many expert groups organised by scientific discipline, technical focus and special interest. There are working groups for technical services and external project tasks, and groups dedicated to training and knowledge exchange. These groups connect Nodes through people, and build the skills, capacity and depth of experience to guide all ELIXIR operations.

Scientific opportunities – addressing societal challenges

Connecting data is the key to progress in the life sciences. To understand life we need to study biology at all scales, from the molecular details of proteins to the glorious complexity of global ecosystems. Rapidly developing techniques such as artificial intelligence, combined with the integration of molecular, physiological and imaging data, will profoundly impact the biomedical and life sciences. ELIXIR's role is to support researchers so data can be effectively managed, integrated and used in collaborative European research projects.

Putting data to good use is challenging. Life science data are large, complex and distributed. For scientists to make use of such data, both in analysis and advanced modelling, the experimental context and potential biases must be well described. ELIXIR works with research communities in establishing standards to ensure data are 'FAIR at source'. We support the developers of innovative methods and algorithms, and the long-term management of all digital research objects. We promote the use of these assets in distributed computing environments and their integration across academic and industrial research.

To harness its full power, data must be connected across academic disciplines, for example, by linking environmental genomics to climate data or by bridging between life and social sciences. This drives a need for new partnerships and solutions that work across disciplines. Within the European data space landscape, the ELIXIR infrastructure will support researchers and research clinicians to access

and analyse diverse human data to enable the discovery, innovation and integration of genomic research findings into healthcare.

Enabling and responding to advances in cellular and molecular research will drive the life sciences

Cellular and molecular biology are developing at pace, with advances driven by novel technologies generating new insights and diverse types of data. In turn, data generates new techniques: metagenomics, proteomics and metabolomics would not be possible without carefully curated biological data resources. We must work to make this wealth of information and knowledge visible, interoperable and reusable, particularly by the applied sciences.

Biodiversity, food security and pathogens are interrelated societal challenges

The application of molecular techniques is critical to understanding the diversity and breadth of life on Earth and to help devise effective mitigations to biodiversity loss. Supplying enough food to feed a growing population requires improved crops and changes to agricultural and farming practices. New pathogens affect people, livestock and crops. The insights of molecular sciences bring a common language, along with common solutions, to these areas.

The promise of genomics research to improve health and disease outcomes

Increased understanding of disease brings opportunities to develop diagnostics, preventative measures and treatments. The undertaking is difficult: datasets must be sizable and extensive to capture modest effects and avoid bias. Large European partnerships, such as the European Genomic Data Infrastructure, are therefore necessary. Genomics raises ethical questions, the risk of discrimination and potential threats to privacy. ELIXIR must be part of this conversation and develop services and practices trusted by all stakeholders.
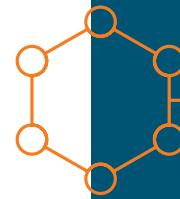
Connecting tools, data, experts and countries

ELIXIR's ambition is for Europe to have a robust, connected network of established services, internationally recognised data resources and enabling technologies that meet the data needs of life science researchers. Open and reproducible science is critical to maximising the values of publicly-funded research and must be supported by accessible infrastructure.

To analyse data, researchers need access to diverse, high-quality, interconnected and meaningful data at scale. To deliver on this promise, data, workflows, models, analytics and compute resources all need to be interoperable and available across borders.

ELIXIR will develop its infrastructure as a distributed, pan-European network of services that are stable, consolidated, avoid redundancy and duplication, and form a coherent federation.

As well as cross-European collaboration, each jurisdiction must continue to provide local resources, for example to comply with data sovereignty. To enable this, we will build a decentralised architecture to accommodate dependable international services with interoperable interfaces and common standards.

ELIXIR is based on sustainability, standards compliance and a service focus, exemplified by the ELIXIR Core Data Resources, Deposition Databases and Recommended Interoperability Resources which have become a model for the Global Biodata Coalition and adopted by funders worldwide. ELIXIR will continue to build a European network of biological data resources using common technical standards and best practices.

We will know when we have achieved our ambition when:

- Europe's leading researchers rely on ELIXIR's guidance and services to manage, analyse and publish data from ground-breaking cellular and molecular research.

- Large research datasets connecting biodiversity, agriculture and emerging pathogens are assembled, integrated and analysed in the context of environmental and socioeconomic factors.

- Millions of human genomes are discoverable and exploited in biomedical settings through ELIXIR-supported infrastructure and community-endorsed standards, software, workflows and analysis environments.

- ELIXIR Nodes are resourced to efficiently manage and run the national coordination centres making up the distributed infrastructure. Each ELIXIR Node has the capacity and skilled people to fully participate in the pan-European network.

ELIXIR priorities 2024–28

ELIXIR's purpose is to accelerate the understanding of life by facilitating data-intensive research. Scientists should be able to collaborate easily across borders to build large, multidisciplinary datasets for advanced analysis and modelling. The 2024-28 Programme will:

Science
Enable scientists to access and analyse life science data

Technology
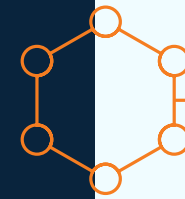Deliver services to support federated data management and analytics in life science

Nodes
Equip national Nodes for successful long-term operations

People
Develop people and capacity to benefit science and society

Together we accelerate the understanding of life

ELIXIR's 2024-28 Scientific Programme is constructed from four interconnected tiers, each mapping directly to a strategic goal of the 2024-28 Programme.

Science
Enable scientists to access and analyse life science data.

ELIXIR serves the life science community by supporting FAIR access to scientific data. As Europe's distributed research infrastructure for life sciences, our purpose is to bring together data services to advance research by enabling scientists to access and analyse data of scale and complexity. Close partnerships with life science researchers drives the development and adoption of community-agreed standards and best practices in research data and software management.

Technology
Deliver services to support federated data management and analytics in life science.

ELIXIR develops trusted and freely available resources for research data management, data deposition, workflows, analytics, interoperability and computation. Effective collaboration in all these areas requires community agreement and a joined up technical approach. In the 2024-28 Programme we expand on these resources by supporting a federated structure to build on Node strengths and meet the requirements of our users.

Nodes
Equip national Nodes for successful long-term operations.

Together, ELIXIR Nodes operate the services that allow data to be discovered, accessed and analysed. The Nodes provide data management expertise and services, and support scientists with the brokering of data into international deposition databases. ELIXIR Nodes are funded by national funders, often through national research infrastructure roadmaps. A distributed infrastructure builds on national operations, we will therefore invest in our Nodes and the services they run.

People
Develop people and capacity to benefit science and society.

The foundation for ELIXIR's operations is people. To successfully build a federated ecosystem that supports scientists across the whole of Europe, each of our Nodes needs highly qualified personnel to operate national elements in the federation, for research data management and other advanced user support. This requires specialised skills and knowledge, we therefore run a comprehensive training and capacity building programme which will be further expanded in the next Programme.

ELIXIR serves the life science community by promoting FAIR access to scientific data and the provision of high-quality digital services.

Science

As Europe's distributed research infrastructure for life science data, our purpose is to advance research by enabling scientists to access and analyse life science data of unprecedented scale and complexity across countries.

The world faces critical societal challenges over the coming decades where the remarkable biodiversity of planet Earth must be sustained at the same time as providing food for eight billion people. We must also be prepared for the inevitable emergence of new pathogens and enable data-driven decision making to become the norm in policy and healthcare.

Molecular sciences will play a key role in tackling each of these issues, with ELIXIR's unique set of services offering powerful and adaptable scientific and technical solutions. Our plan is to tackle these three scientific themes in combination, adopting a coordinated approach across our existing portfolio of communities and projects to allow scientists to integrate life science, social science and environmental data.

ELIXIR serves the whole life science community. Our role is to advance research by bringing together openly available and interoperable data, software, compute and training services.

Case Study

Enhancing biodiversity knowledge with molecular sequence data

Molecular sequencing data is now routinely used to enhance biodiversity data in GBIF, the data infrastructure aggregating global biodiversity data.

The enhancement is achieved by geo-referencing the location of samples in the sequence record in ENA, an ELIXIR Deposition Database, which is regularly uploaded to GBIF.

This furthers our understanding of individual species in GBIF and helps locate the missing 'dark taxa', which are difficult to survey using traditional methods.

Waterhouse, F1000Research 2022
https://doi.org/10.12688/f1000research.73825.2

Cellular & molecular research

Cellular and molecular biology are core to ELIXIR. Fundamental, curiosity-driven science is critical to finding solutions to the major challenges facing humanity today. The provision of a data-centric infrastructure for the rapidly developing molecular and cellular sciences is a key part of the 2024-28 Programme, covering both basic and applied research.

We will enhance our data services and software provision for nucleic acids, proteins and other biomolecules to accommodate the latest developments in experimental and analysis techniques. Cellular and molecular biology will create new demands for multi-omics and multi-modal analysis, including imaging. We will develop methods and partnerships to meet these needs. Modelling at all scales will become an increasing challenge and we will extend our expertise in reusable data and software to include FAIR models.

1.1

Connect the latest developments and established data resources to realise the potential of cellular and molecular biology

Biodiversity, food security & pathogens

Maintaining biodiversity, ensuring food security, and combating pathogens are critical societal challenges that Europe will face over the next decade. The application of molecular sciences and other data-intense disciplines offer powerful solutions to address all three challenges. The importance of these sciences in contributing to societal challenges is also widely recognised by major transnational and national funding bodies and is reflected in their research priorities.

In the 2024-28 Programme we propose to apply the operational model successfully used in co-ordinating human genomic data to biodiversity, food security and pathogens. There are a number of possible mechanisms to explore, including strategic investments in the Nodes to develop and enhance services in these scientific areas, and externally funded projects with the Hub or a Node in the coordinating role.

1.2

Mobilise and integrate molecular data to support transnational research programmes in biodiversity, food security and pathogens

Human data & translational research

Our vision to facilitate the discoverability, access, reception, storage and analysis of genomics data linked to other data types at an unprecedented scale is being implemented: in the 2024-28 Programme ELIXIR will lead the development of the European Genomic Data Infrastructure and drive the use to translate genomics research into medicine.

ELIXIR acts as the trusted coordinator for sensitive data management and analysis in the life sciences. For the infrastructure to operate in a federated landscape it is essential to organise services and community-endorsed standards into workflows to meet data management requirements. Development of these standards and services, carried out by technical experts in ELIXIR Nodes, needs to be collaborative and transparent. ELIXIR, operating through its member countries, will continue to develop the human data management landscape.

1.3

Provide the infrastructure to support the discovery, access, sharing and analysis of human genomics data and linked data on a massive scale

Our ambition is for Europe to have a robust, connected network of established services, internationally recognised resources, and federation-enabling technologies for data-centric life science research.

Technology

ELIXIR will develop its infrastructure as a distributed, pan-European network of services that are stable, avoid duplication, and form a coherent federation.

We will do this by building on our strengths and by continuing to evolve to meet the needs of our users. We have defined three strategic areas:

- Research data management and knowledge sharing
- Reproducible analytics and infrastructure
- Federated service delivery

By anchoring the technology tier of our Programme in data management and reproducible analytics, we create a connected infrastructure to support the FAIR management of all digital objects, including data, software and workflows. By further developing federated service delivery, we enable the complementary skills and expertise of our Nodes to be brought together into a single infrastructure. Furthermore, federation, especially of sensitive data, allows all European life scientists to benefit from the ELIXIR infrastructure, regardless of national borders.

Case Study

Actionable research data management

Connecting data is the key to progress in the life sciences. However, connecting datasets across experimental techniques, timescales and geographies needs careful data curation, metadata annotation and cataloguing. ELIXIR has developed a range of tools which put the ability to create and share high-quality FAIR data into the hands of individual researchers. The RDMkit and the FAIR Cookbook form the nucleus of a growing framework of tools for knowledge sharing and research data management tailored to individual research communities. Together with the Data Stewardship Wizard, a tool for data management planning, and FAIRsharing.org, the registry for databases and standards, ELIXIR has created a complete research data management ecosystem for life science data stewards and researchers.

https://ELIXIR-europe.org/what-we-offer/guidelines

Research data management & knowledge sharing

ELIXIR provides researchers with infrastructure to enable the creation, analysis, management and re-use of biological data.

In the 2024-2028 Programme we will promote closer connections between the Core Data Resources and the contributors and consumers of their data; we will put the tools and expertise developed by the large-scale data projects in the hands of research groups at all scales; and we will develop our research data management ecosystem to cover data, tools and other open digital objects.

Best practices will be shared by ELIXIR's expert networks to enable the creation and reuse of FAIR and open data across Nodes and user communities.

2.1

Provide data and knowledge management infrastructure to support open, data-driven research in the life sciences

Reproducible analytics & infrastructure

Data analysis in the life sciences is characterised by complex, multi-step workflows using a range of different representations, data management technologies, software architectures and compute environments. ELIXIR's users need support in understanding, finding, using and contributing to this undertaking in recognised and reproducible ways.

In the 2024-2028 Programme we will develop a full software lifecycle foundation, from the development of software management plans to the registration and archiving of software and algorithms. We will extend and standardise the technologies and registries for the description and deployment of complex multi-platform workflows; and we will give users access to the resources they need from the growing portfolio of cloud and high performance computing services available to research.

2.2

Develop our infrastructure to enable end-to-end management of life science software, workflows and containers

Federated service delivery

ELIXIR has developed as an infrastructure based on the complementary strengths of its Node services. Our ambition is for European researchers to have straightforward access to a robust, connected network of established services, internationally recognised resources and enabling technologies for data-centric life science research.

In the 2024-2028 Programme we will develop ELIXIR services as composable elements connected through standards-based interfaces; we will recognise, enhance and promote the enabling services that provide the common foundation for interoperable Nodes; and we will sustain and strengthen the key enabling services on which others depend through a federal delivery model for governance and operation.

2.3

Develop a federated pan-European technical infrastructure for life scientists to access data, storage and compute services

3

Nodes are the beating heart of ELIXIR. Nodes operate the services that allow data to be discovered, accessed and analysed. A European data federation builds on national operations, we will therefore invest in our Nodes to ensure they operate efficiently and sustainably.

Nodes

ELIXIR is a distributed research infrastructure bringing together 24 Nodes, which in turn connect over 240 leading institutes and universities in bioinformatics service provision.

ELIXIR Nodes must be well-coordinated, professionally run organisations that meet the needs of national stakeholders by providing high-quality support, expertise and services (described in Tiers 1-2) that are aligned with national research priorities.

To be successful over the long-term, these national operations require skilled personnel (described in Tier 4) as well as dedicated funding for service provision and coordination.

Case Study

ELIXIR Germany

Germany became a member of ELIXIR in August 2016 and has grown to encompass 21 contractual partners (universities and research institutions) as well as EMBL Heidelberg.

In 2022, ELIXIR Germany offered 104 services to the life science community, organised the first BioHackathon Germany, the third Industry Forum meeting and played a significant leadership role in ELIXIR Platforms and Communities.

In addition, the user base of the de.NBI Cloud was expanded by over 2000 and more than 700 projects were supported.

https://www.denbi.de/elixir-de

Node operations

The organisational capabilities of Nodes need to grow to meet the demands of increasing resource usage and the requirements arising from close collaboration with many national, European and international collaborators. Developments such as the creation of common European data spaces will rely on national implementation, with ELIXIR Nodes increasingly acting as crucial components of bigger infrastructures. We will support Nodes in their maturation to meet the demands of increasing usage and the requirements arising from complex collaboration with a wide range of stakeholders.

Alignment of national research priorities & open science policies

ELIXIR Nodes operate in the context of national open science and research data policies, and they not only manage digital assets produced by research infrastructures but also with other national, European and global projects. However, many national funders do not yet have open science policies or guidance, and when they do, they don't always reference ELIXIR resources. We will support Nodes to work with national funders and develop activities that highlight the benefits of ELIXIR-funded open science outputs. We will also work to ensure national funders recognise ELIXIR Nodes as key components of the data infrastructure when funding major research initiatives.

Industry & innovation

ELIXIR's services and resources are crucial for boosting open innovation in the European life sciences ecosystem. In the 2024-28 Programme, ELIXIR Nodes will continue to be supported to expand their national industry engagement offerings. A new initiative, Node industry engagement days, will be implemented to help Nodes build strong links within their national industry networks. ELIXIR will continue working closely with industry partners in multi-stakeholder projects, and members will be supported to build collaborative partnerships with the industry via the Knowledge Exchange Scheme.

Impact & long-term sustainability

ELIXIR's impact portfolio will continue to mature with a focus on systematic implementation across activities and projects, a levelling-up of Node impact capacities, as well as an expansion of efforts to externally communicate ELIXIR's scientific, socio-economic and societal impacts. We will provide opportunities for Nodes to exchange good practice in securing national funding and explore opportunities to exploit alternative funding sources. Activities to build Node long-term sustainability will be strengthened by the clear demonstration of the impact of ELIXIR's activities at all levels.

3.1 Nodes have the operational capabilities to contribute to a European infrastructure for data

3.2 Nodes are aligned with national research priorities and open science policies

3.3 Nodes are fundamental to national industry ecosystems and engage in EU-wide industry efforts

3.4 Nodes are empowered and supported in their efforts towards long-term sustainability

The foundation of ELIXIR's operations is people: our users and our Node members. Both require skills that are in short supply, we therefore will run an ambitious training and capacity building programme. ELIXIR will step up efforts on equity, diversity and inclusion and seek to understand how best to promote the participation of under-represented groups.

People

All of ELIXIR's activities depend on people. ELIXIR's 2024-28 Programme highlights the importance of life-long learning, allowing individuals to stay abreast of technical developments, strive for excellence and see training as an inherent part of working life.

It is people with specific and highly specialised expertise and skills who design, implement and maintain the ELIXIR infrastructure. Developing employees is critical for ELIXIR Nodes, along with retaining staff and knowledge.

To maintain and develop ELIXIR's sustainability and strength, the 2024-28 Programme will also look outside ELIXIR to provide our service users with the skills and resources they need to gain maximum value from our European-wide data infrastructure.

Case Study

ELITMa

The ELIXIR Training Programme in Management (ELITMa) aims to build capacity for infrastructure management at Node level.

The Programme is divided into seven modules, enabling participants to build their own training pathway. The modules include: ELIXIR Governance and Organisational Behaviour, Project Management, Communication, Financial Management, Advocacy, Leadership, and Data Management. Each module addresses specific questions related to research institutions and infrastructure management and is tailored to use cases from ELIXIR activities.

Users of ELIXIR services

ELIXIR has a strong and successful training community spanning all Nodes. The creation and delivery of targeted training, along with the development and maintenance of ELIXIR's Training Portal (TeSS), supports Europe's life scientists and bioinformatics experts to use ELIXIR's tools and services. ELIXIR will continue to strengthen national training programmes, expand bioinformatics training capacity and competence across Europe, and empower researchers to use ELIXIR's resource portfolio.

Management & operational staff

ELIXIR will build capacity and support Node personnel to run efficiently organised Nodes as part of a distributed research infrastructure. The size and complexity of projects such as the European Genomic Data Infrastructure project (GDI), initiated in 2022, and involving 20 member states, requires Node operational expertise in areas such as business and organisational management, legal, ethical and social aspects. The 2024-28 Programme will increase the capacity of people to fulfil their roles, assume more responsibilities and advance to leadership positions, as well as to support others.

Technical & scientific staff

Technical experts need to be supported in learning new technologies to meet the growing need for expertise in specific areas such as Life Science Login, TeSS and GDI, and more generally in open science, cloud resources, federated operations and research data management. ELIXIR's 2024-28 Programme highlights the importance of life-long learning, allowing individuals and the research infrastructure as a whole to stay abreast of technical developments, strive for excellence, and embrace ongoing personal development.

A diverse people network

ELIXIR is a large, distributed, interdisciplinary and virtual organisation based on a culture of openness, inclusivity and trust. We will work to further strengthen our culture and make it easier for newcomers to understand how we work. ELIXIR will increase efforts in equity, diversity and inclusion (EDI), particularly promoting the participation of under-represented groups. We will advocate for improved diversity in experimental design and awareness of gender in data analysis settings. ELIXIR will also encourage fair recognition and credit and promote the value of a wide range of contributions within the scientific community.

4.1
All users of ELIXIR services have access to training, resources and expertise

4.2
Nodes are well equipped to efficiently manage and run a distributed infrastructure

4.3
ELIXIR technical and scientific staff have the skills needed for operational excellence and impact

4.4
ELIXIR is a diverse network of people who are appropriately credited for their work

European partnerships

The world of bioinformatics is highly interconnected, with multiple dependencies between different services and organisations, within countries, across Europe and globally. ELIXIR connects over 240 universities and research institutes, and we collaborate with many other organisations and initiatives to help scientists access and analyse life science data. These include global standard-setting organisations, national bioinformatics initiatives in countries outside ELIXIR, research infrastructures with data-related needs, and industry and technology-focused initiatives.

Working in partnership with these organisations helps ELIXIR better understand user requirements, minimises duplication of effort and improves service interoperability across the globe.

Case Studies

ESFRI

ELIXIR has forged close collaborations with other research infrastructures on the **European Strategy Forum on Research Infrastructures (ESFRI)** roadmap. This includes BBMRI-ERIC, Euro-BioImaging and EMPHASIS, which has led to joint meetings, workshops and formal collaboration strategies.

Several ESFRIs provide access to technologies that generate data for which ELIXIR has solutions, and many also provide complimentary services that, along with ELIXIR's activities, help to improve the life science data ecosystem for users.

In the 2024-2028 Programme, ELIXIR will seek to formalise collaboration strategies with a small number of critical ESFRIs where there is deemed to be strategic benefit. These include ESFRIs covering health, image technologies, biodiversity and industrial biotechnology.

EuroHPC Joint Undertaking

The **European High Performance Computing** Joint Undertaking (EuroHPC JU) is an initiative for advanced high performance computing. Several ELIXIR Nodes are tightly connected to the consortia that are deploying pre-exascale computing capacity for research use. These new computing capacities will be deployed in Finland, Italy and Spain, with the ELIXIR Nodes in each country coordinating the national efforts. As a research infrastructure, ELIXIR plays a key role in bringing researcher requirements to the EuroHPC consortium.

EUROPEAN OPEN SCIENCE CLOUD

The ambition of the **European Open Science Cloud** (EOSC) is to develop a 'web of FAIR data and services' for science in Europe. ELIXIR has long identified EOSC as a significant strategic partner, participating in EOSC projects on many aspects of the underpinning technologies and applications enabled by this shared vision.
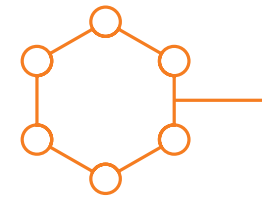
Global collaborations

Securely accessing personal genomic data at the scale of populations, and across national borders, is an enormous challenge that will require significant investments in national and international infrastructure. The scope and complexity of this infrastructure are beyond the capacity and jurisdiction of any single organisation. International collaboration is needed to provide recognised, secure, standardised, documented and interoperable services.

Case Studies

The ELIXIR::GA4GH Strategic Partnership

Global Alliance for Genomics & Health

The ELIXIR::GA4GH Strategic Partnership, was founded on a collaboration agreement from 2017, and formalised as a partnership in 2019. Building on these foundations, we hope to develop an even stronger collaboration in the 2024-28 Programme. We will coordinate the creation and implementation of the GA4GH suite of interoperable standards and policy frameworks to tackle technical and regulatory hurdles to genomic data access in Europe and globally.

Federated Analysis Systems Project (FASP)   Technical Alignment Subcommittee (TAS)

Deepening the relationship with the US National Institutes of Health

NIH National Institutes of Health

For a number of years, ELIXIR has built strong links with the Office of Data Science Strategy at the National Institutes of Health (USA). This relationship will continue through joint events at international conferences, representation at meetings and technical workshops, and the facilitation and sponsorship of study visits or secondments. In the new Programme, ELIXIR will foster other collaborations with national-level bioinformatics communities beyond Europe where there is mutual benefit and alignment in goals.

Building on strong links with the Australian BioCommons

Australian BioCommons

The ongoing collaboration between ELIXIR and the Australian BioCommons has led to considerable mutual benefits in a range of technical areas such as tools, compute and training. The collaboration strategy was formally renewed in 2023 and will expand in scope to further capitalise on the synergies of our two organisations.

Financial tables

Table 1: Projected ELIXIR Financial Plan 2024-2028

FINANCIAL PLAN 2024-28	2024	2025	2026	2027	2028
	€000	€000	€000	€000	€000
INCOME					
Member State Contributions					
Ordinary Contributions	€7,830	€7,986	€8,146	€8,309	€8,475
External Grants	**€2,988**	**€2,524**	**€2,219**	**€2,419**	**€2,531**
Total Income	**€10,817**	**€10,510**	**€10,365**	**€10,728**	**€11,005**
EXPENDITURE					
Secretariat					
Salaries	€2,596	€2,553	€2,682	€2,925	€2,933
Running Costs	€262	€275	€289	€305	€319
Capital and Equipment	€50	€51	€52	€53	€54
Total Secretariat Costs	**€2,908**	**€2,879**	**€3,023**	**€3,283**	**€3,306**
Activities with Nodes					
Commissioned Services	€4,449	€757	€5,942	€3,987	€4,645
ELIXIR funded meetings (Platforms, Communities)	€106	€111	€116	€122	€127
Signature events (All Hands Meeting, BioHackathon)	€594	€620	€650	€681	€711
Governance events	€106	€111	€116	€122	€127
Total Activities with Nodes	**€5,254**	**€1,599**	**€6,823**	**€4,911**	**€5,610**
Total Internal Expenditure before Support and Admin Infrastructure Costs	**€8,162**	**€4,478**	**€9,846**	**€8,194**	**€8,916**
Support and Admin Infrastructure Costs	**€962**	**€844**	**€887**	**€906**	**€882**
Grants Expenditure	**€2,988**	**€2,524**	**€2,219**	**€2,419**	**€2,531**
Total Expenditure	**€12,112**	**€7,846**	**€12,952**	**€11,519**	**€12,329**
Surplus/(Deficit)	-€1,294	€2,664	-€2,587	-€791	-€1,323
GENERAL RESERVE					
Opening Balance	**€5,851**	**€4,556**	**€7,221**	**€4,634**	**€3,843**
Movement in Year	-€1,294	€2,664	-€2,587	-€791	-€1,323
Closing Balance	**€4,557**	**€7,221**	**€4,634**	**€3,843**	**€2,520**

Table 1: Member State contributions 2024-2028

MEMBER STATE	2023 CONTRIBUTION (2019-23 FINANCIAL PLAN)	AVERAGE NNI (2019-21) (SOURCE: OECD)	2024	2025	2026	2027	2028
Total:	**€ 7,672,514**	**$13,609,872**	**€ 7,829,575**	**€ 7,986,163**	**€ 8,145,887**	**€ 8,308,804**	**€ 8,474,981**
Belgium	€ 211,192	$ 390,993	€224,933	€ 229,432	€234,020	€ 238,701	€ 243,475
Czech Republic	€ 74,005	$ 168,598	€ 96,992	€98,932	€ 100,911	€ 102,929	€ 104,987
Denmark	€ 144,449	$ 270,847	€ 155,815	€ 158,931	€ 162,109	€ 165,352	€ 168,659
Estonia	€ 10,071	$22,917	€ 13,184	€ 13,448	€ 13,716	€ 13,991	€ 14,271
Finland	€ 104,009	$ 191,624	€ 110,239	€ 112,443	€ 114,692	€ 116,986	€ 119,326
France	€ 1,172,000	$ 1,998,181	€ 1,149,526	€ 1,172,516	€ 1,195,967	€ 1,219,886	€ 1,244,284
Germany	€ 1,622,425	$ 2,992,487	€ 1,721,537	€ 1,755,967	€ 1,791,087	€ 1,826,908	€ 1,863,447
Greece	€ 93,970	$ 145,316	€ 83,598	€ 85,270	€ 86,976	€ 88,715	€ 90,489
Hungary	€ 49,263	$ 108,910	€ 62,654	€ 63,908	€ 65,186	€ 66,489	€ 67,819
Ireland	€ 86,399	$ 193,536	€ 111,339	€ 113,565	€ 115,837	€ 118,153	€ 120,516
Israel	€ 134,146	$ 326,037	€ 187,565	€ 191,316	€ 195,142	€ 199,045	€ 203,026
Italy	€ 866,268	$ 1,462,998	€ 841,643	€ 858,475	€ 875,645	€ 893,158	€ 911,021
Luxembourg	€ 15,916	$ 36,608	€ 21,060	€ 21,481	€ 21,911	€ 22,349	€ 22,796
Netherlands	€ 366,061	$ 674,827	€ 388,219	€ 395,983	€ 403,903	€ 411,981	€ 420,220
Norway	€ 211,451	$ 310,671	€ 178,725	€ 182,299	€ 185,945	€ 189,664	€ 193,457
Portugal	€ 88,673	$ 159,122	€ 91,541	€ 93,372	€ 95,239	€ 97,144	€ 99,087
Slovenia	€ 18,189	$ 38,429	€ 22,108	€ 22,550	€ 23,001	€ 23,461	€ 23,930
Spain	€ 569,175	$ 1,018,031	€585,659	€597,372	€ 609,320	€ 621,506	€ 633,936
Sweden	€ 241,767	$ 430,604	€ 247,721	€ 252,675	€ 257,728	€262,883	€ 268,141
Switzerland	€ 319,072	$ 532,519	€ 306,351	€ 312,478	€ 318,727	€ 325,102	€ 331,604
United Kingdom*	€1,274,013	$ 2,136,617	€ 1,229,166	€ 1,253,750	€ 1,278,825	€ 1,304,401	€ 1,330,489

*UK pays contribution in Sterling.

Note:
NNI is based on the most recent three-year period for which complete NNI data is available (period 2019-2021). The 2023 contribution to the 2019-23 Programme provided as a reference.