EGI-InSPIRE

EGI Sustainability and Business Plan

EU DELIVERABLE: D2.25

Document identifier:	EGI-InSPIRE-D2.25-V12.docx
Date:	**18/06/2014**
Activity:	**NA2**
Lead Partner:	**EGI.eu**
Document Status:	**FINAL**
Dissemination Level:	**PUBLIC**
Document Link:	https://documents.egi.eu/document/2158

Abstract

Many of these Research Infrastructures and research communities frequently have research agendas that span along decades and need to be assured of the continued operational presence of the e-Infrastructures that they adopt to support their work. In this context, the EGI's ambition is to connect researchers from all fields of science across the whole digital European Research Area with the reliable and innovative ICT services they need to undertake their collaborative world-class and world-inclusive research. This continuous effort for evolution needs to be based on a systematic approach for strategic planning and it follows, as far as it is possible, the typical structure of a corporate business plan, beginning with the statement of its vision, mission and core values, followed by an external analysis, both at macro and micro level, and an internal analysis that identifies Opportunities and Threats, and the Strengths and Weaknesses (SWOT analysis), all of which sets the basis for the formulation of the strategy. The document also focuses on the efforts and plans being undertaken to ensure that the services offered will be sustainably delivered and improved.

I. COPYRIGHT NOTICE

II. DELIVERY SLIP

	Name	Partner/Activity	Date
From	Sergio Andreozzi	NA2	18/06/2014
Reviewed by	**Moderator:** AMB **Reviewers:** AMB		18/06/2014
Approved by	**AMB & PMB**		

III. DOCUMENT LOG

Issue	Date	Comment	Author/Partner
ToC	25/3/2014	Table of Contents	Javier Jiménez/EGI.eu
ToC	27/3/2014	ToC sent to the AMB for revision	Javier Jiménez/EGI.eu
ToC	6/5/2014	Modifications in the ToC	Javier Jiménez/EGI.eu
2	7/5/2014	First draft	Javier Jiménez/EGI.eu
3	16/5/2014	Full draft	Javier Jiménez/EGI.eu
4	18/5/2014	Internal review	Sergio Andreozzi, Sy Holsinger/EGI.eu
5	27/5/2014	Added inputs from EGI Community Forum	Javier Jiménez/EGI.eu
6	2/6/2014	Internal review	Sergio Andreozzi, Sy Holsinger/EGI.eu
7	3/6/2014	Further revision	Sergio Andreozzi/EGI.eu
8	13/6/2014	Further revision	Javier Jiménez/EGI.eu
9	18/6/2014	Expanded financial sustainability	Sergio Andreozzi, Sy Holsinger/EGI.eu

IV. APPLICATION AREA

This document is a formal deliverable for the European Commission, applicable to all members of the EGI-InSPIRE project, beneficiaries and Joint Research Unit members, as well as its collaborating projects.

V. DOCUMENT AMENDMENT PROCEDURE

Amendments, comments and suggestions should be sent to the authors. The procedures documented in the EGI-InSPIRE "Document Management Procedure" will be followed:
https://wiki.egi.eu/wiki/Procedures

VI. TERMINOLOGY

A complete project glossary is provided at the following page: http://www.egi.eu/about/glossary/.

The following table provides a set of terms that are used in this document.

Term	Description
APARSEN	APARSEN is a Network of Excellence in digital preservation, cofounded by the EC and formed from a range of academic institutions, national libraries, research laboratories, and industry members.
EGI	European Grid Infrastructure: a federation of shared computing, storage and data resources from national and intergovernmental resource providers that delivers sustainable, integrated and secure distributed computing services to European researchers and their international partners
EGI.eu	A non-profit organisation based in Amsterdam established to coordinate and manage the infrastructure (EGI) on behalf of its participants: National Grid Initiatives (NGIs) and European Intergovernmental Research Organisations (EIROs)
EGI-InSPIRE	A four-year project, co-funded by the European Commission's 7th Framework Programme (contract number: RI-261323), helping to establish a sustainable, reliable e-Infrastructure that can support researchers' needs for large-scale data analysis
EIRO	European Intergovernmental Research Organisation, a legal organisation and member of the EIRO Forum that has extensive expertise in the areas of basic research and the management of large, international infrastructures, facilities and research programmes.
EISCAT	EISCAT is the European Incoherent Scatter Scientific Association, which was established to conduct research on the lower, middle and upper atmosphere and ionosphere using the incoherent scatter radar technique. https://www.eiscat.se/
EISCAT 3D	EISCAT_3D is a three-dimensional imaging radar to be located in the northernmost parts of Europe. It will be making continuous measurements of the geospace environment and its coupling to the Earth's atmosphere from its location in the auroral zone at the southern edge of the northern polar vortex. EISCAT_3D is a project led by EISCAT Scientific Association. https://www.eiscat3d.se/

ERA	European Research Area: a unified research area open to the world based on the Internal Market, in which researchers, scientific knowledge and technology circulate freely and through which the Union and its Member States strengthen their scientific and technological bases, their competitiveness and their capacity to collectively address grand challenges.
ESFRI	ESFRI, the **European Strategy Forum on Research Infrastructures**, is a strategic instrument to develop the scientific integration of Europe and to strengthen its international outreach. The competitive and open access to high quality Research Infrastructures supports and benchmarks the quality of the activities of European scientists, and attracts the best researchers from around the world.
European Coordination	For EGI, the EGI.eu organisation provides the vehicle for community coordination, policy, governance, outreach, operation and interaction within the EGI ecosystem and with similar peer bodies in other e-Infrastructures in Europe and around the world.
Funding Bodies	The European Commission, national research councils or other organisations that define policies and funding schemes to support the digital research.
IDFG	The International Desktop Grid federation born with the aim of bringing together everyone interested in the world in Desktop Grid computing and related technologies.
National Infrastructures (NGIs)	These include the NGIs that represent national activities within EGI and undertake national coordination duties through the resource infrastructure provider role. They have the responsibility to manage and deliver the operational infrastructure coming from the individual 'resource centres' within the country. They may also have the responsibility to act as platform operators for particular research communities ensuring that any research community specific services provided by the resource centres are operating effectively.
NILs	NGI International Liaison
PRACE	PRACE is the Partnership for Advanced Computing in Europe, which offers High Performance Computing (HPC) and data management resources and services through a peer review process. http://www.prace-ri.eu/
Researchers	Consumers of e-Science services that are supported by e-Infrastructures to perform their digital research; they are interested in services that can rapidly adapt and integrate with their workflows to conduct their research, achieve faster results, publish first and gain the recognition of their peers. They can be organised in research collaborations or Virtual Research Communities (VRCs).

Research Infrastructures (RIs)	Research infrastructures (RIs) refer to facilities, resources and related services used by the scientific community to conduct top-level research in their respective fields. They offer unique research services to users from different countries. RIs are a key instrument to look for solutions to many of the problems society is facing today.
Resource Centres	The European Grid Infrastructure (EGI) resources are provided by about 350 Resource Centres who are distributed across 56 countries in Europe, the Asia-Pacific region, Canada and Latin America.
Technology Providers	The technology area within the EGI ecosystem is built upon open-source or commercial software coming from technology providers within the EGI community and generic technology providers outside of it that are put together by platform integrators to meet the needs of particular research communities.

VII. EGI-INSPIRE PROJECT SUMMARY

To support science and innovation, a lasting operational model for e-Science is needed – both for coordinating the infrastructure and for delivering integrated services that cross national borders.

The EGI-InSPIRE project will support the transition from a project-based system to a sustainable pan-European e-Infrastructure, by supporting 'grids' of high-performance computing (HPC) and high-throughput computing (HTC) resources. EGI-InSPIRE will also be ideally placed to integrate new Distributed Computing Infrastructures (DCIs) such as clouds, supercomputing networks and desktop grids, to benefit user communities within the European Research Area.

EGI-InSPIRE will collect user requirements and provide support for the current and potential new user communities, for example within the ESFRI projects. Additional support will also be given to the current heavy users of the infrastructure, such as high energy physics, computational chemistry and life sciences, as they move their critical services and tools from a centralised support model to one driven by their own individual communities.

The objectives of the project are:

1. The continued operation and expansion of today's production infrastructure by transitioning to a governance model and operational infrastructure that can be increasingly sustained outside of specific project funding.

2. The continued support of researchers within Europe and their international collaborators that are using the current production infrastructure.

3. The support for current heavy users of the infrastructure in earth science, astronomy and astrophysics, fusion, computational chemistry and materials science technology, life sciences and high energy physics as they move to sustainable support models for their own communities.

4. Interfaces that expand access to new user communities including new potential heavy users of the infrastructure from the ESFRI projects.

5. Mechanisms to integrate existing infrastructure providers in Europe and around the world into the production infrastructure, so as to provide transparent access to all authorised users.

6. Establish processes and procedures to allow the integration of new DCI technologies (e.g. clouds, volunteer desktop grids) and heterogeneous resources (e.g. HTC and HPC) into a seamless production infrastructure as they mature and demonstrate value to the EGI community.

The EGI community is a federation of independent national and community resource providers, whose resources support specific research communities and international collaborators both within Europe and worldwide. EGI.eu, coordinator of EGI-InSPIRE, brings together partner institutions established within the community to provide a set of essential human and technical services that enable secure integrated access to distributed resources on behalf of the community.

The production infrastructure supports Virtual Research Communities (VRCs) – structured international user communities – that are grouped into specific research domains. VRCs are formally represented within EGI at both a technical and strategic level.

VIII. EXECUTIVE SUMMARY

The European Grid Infrastructure (EGI) operates one of the largest e-Infrastructures of the world, based on an open federation, which provides uniform access to computing, storage, applications and data resources to support the work of scientists within the European Research Area (ERA). Many of these Research Infrastructures and research communities frequently have research agendas that span along decades and need to be assured of the continued operational presence of the e-Infrastructures that they adopt to support their work. The EGI-InSPIRE project set sustainability as its main goal, and has strived to instil the confidence that the services EGI provides will be available for the coming years.

This document presents the latest update on the strategic activities that should ensure the sustainability of the EGI collaboration and of EGI.eu. Although this is the last version within the lifetime of the EGI-InSPIRE project, EGI.eu will ensure that yearly updates will be produced to answer aspects such as external environment changes, the technology evolution, the needs and demands of the researchers' development, and new players entering the market. The work done in preparation of this document is considered a iterative contribution to a Plan – Do – Check – Adjust cycle (a variant of the so-called Deming Cycle), in which the impact on sustainability of the notable number of activities performed is assessed, and the strategy planning takes place with the adjustments needed according to the new situation and forecasts. In the coming period the adopted strategy and actions will be so done and checked.

The first phase defines a vision and mission statement that set out the aspirational goals of EGI. EGI sees a future in which *researchers from all disciplines can easily connect to the most innovative ICT services, data, knowledge and expertise they need for performing collaborative excellent research.* This is the Open Science Commons and relies on three main pillars: 1) the **e-Infrastructure Commons** that provides a flexible and dynamic ecosystem of interoperable infrastructures that supports integrated services; 2) the **Open Data Commons** where observations, results and applications made available for scientific research and for anyone to use and reuse; 3) the **Knowledge Commons** in which collaborations, communities and the shared ownership of knowledge for addressing challenges in education and research, and ultimately the societal current and future challenges.

In the Open Science Commons, EGI's mission is *to be a core player of the "backbone" for federation-enabling services for compute, storage, data, communication, knowledge and expertise for the ERA, complementing community specific capabilities*. The very reason for existence of EGI and EGI.eu is that by federating ICT services (EGI) and by coordinating their whole activity (EGI.eu) there is a clear value generation not only for the scientific community and the funding bodies, but also for society as a whole.

Measuring value is not an easy task, as it is multifaceted and complex. However, there is an undeniable understanding that both EGI and EGI.eu produces value, which would be many times higher than the economic investment it requires if it were measured in terms of monetary coins. The document identifies several dimensions: EGI provides enabling services to researchers, facilitates collaboration, increases innovation and creativity, handles big data, simplifies digital research and identifies and develops human capital.

After the definition of vision and mission the document continues with the analysis of the current external environment at a macro level, and later focuses on the more detailed aspects of sector where EGI operates. This gives an understanding of the situation and define the Opportunities and Threats. The internal analysis reflects on the resources and governance model and gives a definition of the Strengths and Weaknesses. This work provides the input for the SWOT analysis that leads into the strategy formulation, where high level strategy is developed and a basic organisation level strategic plan is proposed. The PEST Analysis concludes that EGI continues to operate in an extremely complex environment with continuously rapid changes happening.

The external analysis considers a big number of incoming opportunities for EGI. The activities around Open Data, new models of public sector procurement, the integration with other e-Infrastructures and partners, both in the public and private sector, will open new markets. The existing market in which EGI operates is forecasted to continue to grow strongly. There will be an increasing need for data and computing intensive research, visible in the number of projects or Research Institutions.

The threats are also quite apparent. The analysis considers a risk of materialisation of harmful rivalry in the previously non-competing technologies that are starting to address the same basic needs. A similar risk of entering into competition with previously non-rival players (Helix Nebula, EUDAT, IDFG) is foreseen if clear market segmentation positioning and activity field coordination is not properly agreed. The need to navigate out from these risks shows the value of the activity performed by EGI.eu in the last years, and the role to be played in the future.

Another obvious threat lies in the high attractiveness of the sector, which is forecasted to attract new competitors. Especially dangerous are large companies with their own competitive edges diversifying from other activities. The continued drop of price in commercial clouds and the increase of performance capacity of local machines have already witnessed the migration of scientists to local or commercial service provision.

Nonetheless, EGI is considered to have excellent strengths: thought leadership in the sector, technological coordination for product innovation, experienced and committed human resources driving research support and advancement. There are also the strong potential aspects of a federation such as scalability, geographical coverage, distribution channel capillarity, etc. However, it has been noted several times that they only emerge if a systematic, well-led, series of actions are implemented.

The weaknesses of the EGI collaboration have been pointed out by different stakeholders. The governance model, which was useful during the previous years and served to form the foundation of EGI, seems to be not the fittest one for the upcoming new period and future of EGI. This issue is been addressed by a Governance Task Force, which is addressing this complex problem at the moment this document was being written. The lack of a central process for resource allocation seems to be the major cause for the limited availability of resources experienced in some cases.

There has been a lot of work done in order to adapt current services to new research communities, to adapt the service catalogue so it speaks to new user members, and to increase the maturity of the services, not only in the technical aspect, which has never been the problem, but in order to incorporate new or various business models. One particular weakness in which only partially has

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been some progress is the strange feeling of oddity many of the members of the EGI collaboration have towards the word "business", both in terms of embracing best practices for internal processes and seeing the value in collaboration, which may lead to some barriers moving forward.

The same approach has been conducted in the SWOT analysis for EGI.eu. The main Strengths rely on the position right at the gravity centre of all activities: reaching out to communities, proposing innovative actions resulting from knowledge interchange among the members, exploring new co-ordinated models (e.g. Pay-for-use, brokerage services, business models...), coordinating technological processes (e.g. standardisation) and project management. Also very importantly, for influencing the shape of its industry structure for the interest of the EGI collaboration and everyone's benefit, avoiding thus harmful competition. The degree of expertise and the commitment, which have been acquired by the EGI.eu staff account for a very strong point underpinning the value creation for the EGI collaboration.

The Weaknesses continue to be the budget constraints and the cash flow issues leading to layoffs of employees resulting in loss of acquired specialised knowledge and expertise and slowing progress of activities with the risk for paralysation. There are also clear signals that EGI.eu is understaffed, which has been solved thanks to the commitment to the mission, but which cannot be sustained indefinitely. The governance issues have already been noted in previous editions and the Governance Task Force are currently addressing them. Improvements are on the way.

The main Opportunities for EGI.eu are found in the value that it still can bring to the collaboration and the amount of work to be done. The Threats are the same as for many others, the spending cuts caused by the weak recovery of the economic crisis, which may still have a negative impact on the stability of the partners.

After the SWOT analysis for EGI and EGI.eu, a number of strategic actions towards growth and sustainability are identified. The assumption on which strategic plan lies in that there will be a strong growth in the demand of data and computing services. This growth presents many different opportunities, many of them yet to be explored, that will be addressed by leveraging the strengths of EGI and EGI.eu. Growth is important for sustainability because supporting excellent science is the main goal and the very raison d'être of Resource Centres, the NGIs, and EGI.eu. By supporting their main goal, it demonstrates its value to the different funding bodies at all levels (European, national or regional) and creates value that can be exploited and create sources of income.

The main focus will be on reaching out to communities, which has been defined and planned in the Engagement Strategy, D1.15 [R1] with dedicated resources. The main target groups are: the Large and Medium Size Research Infrastructures (RIs) from the ESFRI roadmap, and the large number of relatively small research collaborations and research networks.

A specific strategy for reaching out to the so-called long tail of science has also been proposed and it is in the first phase of maturation. The main novelty is that it will rely on the collaboration with partners, which a role can be played by SMEs. The advantages expected are that it should allow to focus on the main big targets (the fat end of the tail), hence better use of resources and budget, a maximal outreach, and a better segmentation, with integration strategies aligned with the needs of the research communities.

EGI will also continue to explore different options to fulfil its vision of supporting the digital European Research Area and continue to be the preferred pan-European distributed computing infrastructure for research by developing new services and solutions that meet the emerging needs of the users.

New revenue streams connected to new business models are also explored. On one side, the pay for use option is seen as an opportunity to intercept those research groups who have the capability to buy cloud services for research purpose. On the other side, the emerging public procurement framework for cloud services is another opportunity that should be explored by the EGI collaboration.

In the area of governance, a new structure is being defined with the aim to introduce more flexibility in the membership structure (e.g., where a national representation is difficult to achieve) and a different fee scheme that should increase the perception of fairness with regards to the value brought into the collaboration.

With regards to the financial sustainability of the services coordinated by EGI.eu, a new strategy is proposed as a way to ensure a long-term financial commitment. Achieving complete coverage of the costs for the operations of EGI.eu coordinated services via national funds while approaching EC funding only for innovation activities showed to be not viable due to a number of reasons. The new approach aims to recognise the European added value of EGI as whole and the in-kind contribution of the resource providers bringing their own capacity built with national funds. A mixed model where both the EC and the Member States through the EGI.eu participants support the cost of federating at European level is seen as more fair. A long-term financial commitment should be achieved in both contexts (e.g. Framework Program Agreement at the EC level and multi-annual financial commitment at national level).

Communication and promotion of the EGI value to the policy makers is an important area of improvement that has been also identified as key for ensuring the sustainability. In this area, EGI should improve the way it measures the transnational access that it enables and also the impact on excellent science.

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Science today is no longer exclusively produced in single research labs or within national boundaries. Modern scientific challenges call for integrated solutions, cross-country collaborations and computing power to analyse vast amounts of data. In this context, e-Infrastructures allow scientists to share information securely, analyse data efficiently and collaborate with colleagues worldwide. Sustainability is an essential consideration as frequently research agendas span along decades and scientific communities need a continued operational presence of the e-Infrastructures that they adopt to support their work.

The European Grid Infrastructure (EGI) operates one of the largest e-Infrastructures of the world. EGI supports the digital European Research Area (ERA) through its pan-European infrastructure, based on an open federation of reliable ICT services, which provides uniform access to computing, storage, applications and data resources across national boundaries. Achieving better sustainability was one of the main objectives of the EGI-InSPIRE project, and has strived to instil the confidence in the users that the services EGI provides will be available for the coming years.

The aim of this Sustainability and Business Plan is to reflect on the work done within the strategy planning activities, and to continue to develop the business plan that will carry into the future development of EGI. It starts by reflecting on what is meant by sustainability in EGI, and more in general, in the e-Infrastructures area. K. Glinos in the e-Concertation meeting of April 2013 [R2] stated that: "*Sustainability is ensuring confidence that a certain service/organisation [that delivers value]*[1] *will persist in the future with no concern that it will disappear; technological transitions should not be disruptive; the quality of management of infrastructures is very important*".

According to the "Roadmap to Open ICT Ecosystems"[R3], sustainability can be analysed over four main perspectives: 1) **organisational**, referring to the aspect of attracting, training, and retaining qualified professionals and knowledge within the organisations integrating the community; 2) **financial**, referring to the aspect of covering costs, optimizing them and ensuring a long-term financial support necessary to instil confidence that services will be available for many years; 3) **technical**, referring to the aspect of ensuring a reliable pipeline of technology and innovation that includes the private sector to enable a healthy knowledge transfer; 4) **legal**, referring to need for alignment with procurement, privacy, fulfilment of the legislation in Intellectual Property, Privacy, and free competition to mention a few of them.

Even though this is the last document of the series of the EGI-InSPIRE project, the situation in which the EGI collaboration and EGI.eu find themselves cannot be considered as static and final. There is an on-going, continuous process of observation of a changing environment and a permanent reflection of the adequacy of the activities performed to achieve the objectives that have been set. The structure of this document reflects this spirit of systematic revision, in the same spirit that W. Edwards Deming proposed in the 1950's[2]. As a teacher, Deming shaped a model, commonly known as the PDCA cycle (for Plan, Do, Check, Act), according to which business processes should be analysed and measured to identify sources of variations that cause deviations. Although the model

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[1] The addition between brackets is of the authors of this document.

[2] http://en.wikipedia.org/wiki/W._Edwards_Deming

has been lambasted as overly simplified, and that it focused originally on industrial production processes, still the fundamental principle that he recommended and according to which processes should be placed in a continuous feedback loop to identify and change the parts of the process that need improvements, is still considered valid and a wise learning tool.

Finally, this document also serves as a public document for giving assurance to the many stakeholders about EGI's ability to sustain their operations in the future, and provide value at both the national and European level. It also aims to be used by the stakeholders, also at high decision level, as a document for further discussions and revision of the strategy and the success of the implementation of the plans depicted.

2 EGI OVERVIEW

EGI was established in 2010 as a result of over a decade of investment by national governments and the European Commission, however, the predecessor organisations have been operating for decades providing a reliable and secure infrastructure composed of computing and storage resources contributed by a federation of national resource centres.

EGI provides uniform, secure, and stable access to large scale computing, data analysis and storage resources across Europe that allows scientists from all fields of research to gain access to the resources they need for their scientific investigation. Scientists and researchers can share information securely, collaborate with colleagues worldwide and manipulate and analyse complex data faster and efficiently. The resources provided by EGI enable a relatively new way of doing science whose results would not be otherwise possible.

The research supported by EGI covers areas such as the High Energy Particle experiments in physics performed in the Large Hadron Collider particle accelerator in CERN, or medical researchers trying to find cures for diseases such as Alzheimer's, malaria and avian flu as well as the creation of complex simulations to model climate change, among many others[3]. Each of these examples has a direct impact on society at large while employing thousands of scientists and researchers across Europe and beyond. EGI supports research collaborations of all sizes: from the large teams behind the Large Hadron Collider in CERN or the Research Infrastructures within the ESFRI roadmap, to the individuals and small research groups that also contribute to innovation in Europe.

2.1 Current Status

The current infrastructure consists on a federation of 340 computing centres in 34 National Grid Initiatives and EIROs providing 373,800 logical CPU cores, with a storage capacity of 190 PB disk, 180 PB tape, and running over 2.2 computing million jobs per day with 99.6% reliability.

This production infrastructure operates 24/7 and through its redundant and distributed architecture delivers 100% availability to the major research communities that depend on it for their data analysis needs. Access to this capacity is currently driven from the bottom up by the research collaborations and their associated resource providers from within the NGIs.

EGI has delivered an unprecedented data analysis capability to over 22,000 researchers across an array of scientific disciplines, organised in research collaborations of all sizes: from the large teams behind the Large Hadron Collider at CERN and Research Infrastructures within the ESFRI roadmap, to the individuals and small research groups that also contribute to innovation in Europe.

EGI.eu is the not-for-profit foundation coordinating EGI and governed by the national stakeholders and early-adopting international research communities. EGI.eu offers a variety of **shared services** to the wider EGI community such as overseeing infrastructure operations, coordinating user community support, working with technology providers, representing EGI in collaborative projects, steering strategy and policy development, organising EGI's flagship events and publicising the community's news and achievements.

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[3] https://www.egi.eu/case-studies/

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3   STRATEGY PLANNING

The adopted strategy planning process is summarised in Figure 1. It starts by setting the vision that EGI has for the coming years and the role it aims at playing, i.e., the mission. The process continues with an external analysis in which the observation of the complex and ever-changing environment surrounding the EGI collaboration is discussed at macro- and micro-level environments, leading to the identification of Opportunities and Threats for collaboration. Then, it moves to analysing the current internal situation of the organisation in order to determine the resources available and the situation of the governance, leading to the identification of the Strengths and Weaknesses. With the SWOT analysis, internal and external observations are put together into a matrix and are used for the strategy formulation. After defining the high level strategy, actions for executing it are documented with the description of the proposed activities.
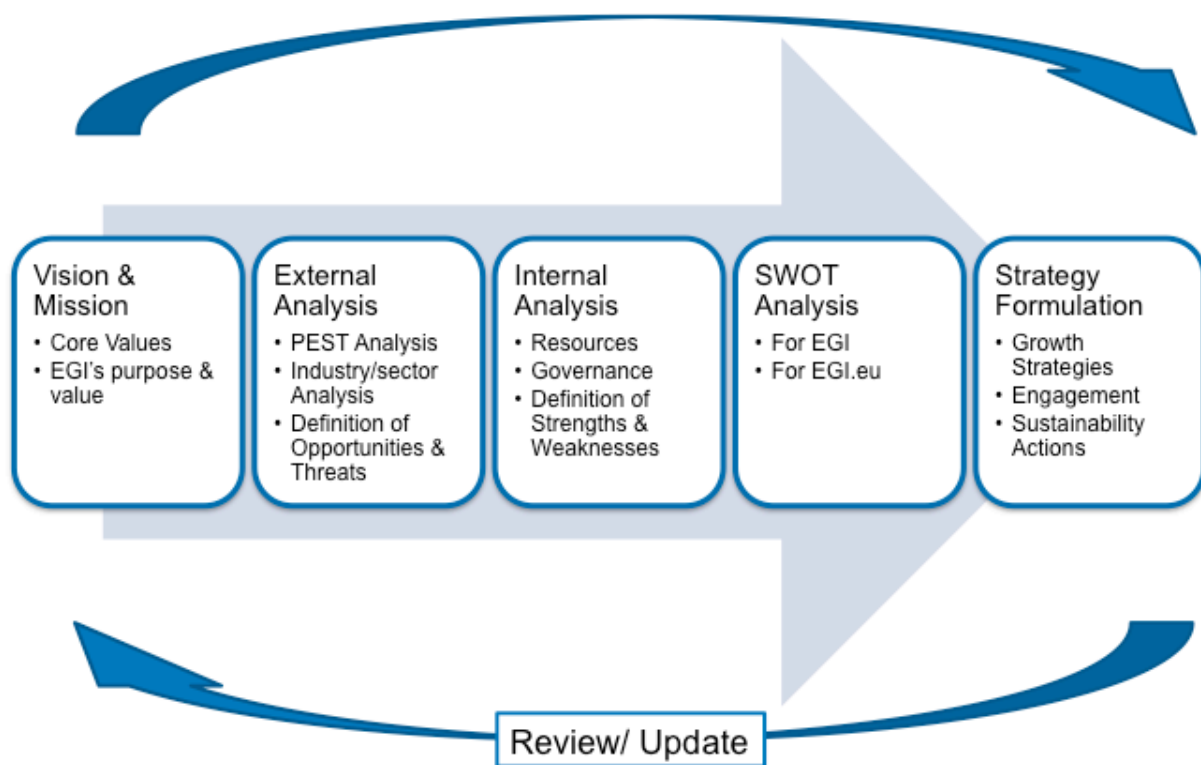
Figure 1 - EGI's Strategy Planning Process

Considering the importance of the strategy planning, and also considering that the collection of observations, the following SWOT analysis and the results proposed are not by definition a simple statement of facts, and that there are a huge number of possible alternatives for actions. This document is presented to support the EGI council decision-making process and it is open for input and discussion.

3.1 Vision

EGI sees a future in which *researchers from all disciplines have easy and open access to the digital services, data, knowledge and expertise they need to collaborate and perform excellent research*. This is the Open Science Commons (see Figure 2) and relies on three main pillars: 1) the **e-Infrastructure Commons** that provides a flexible and dynamic ecosystem of interoperable infrastructures that supports integrated services; 2) the **Open Data Commons** where observations, results and applications made available for scientific research and for anyone to use and reuse; 3) the **Knowledge Commons** in which collaborations, communities and the shared ownership of knowledge for addressing challenges in education and research, and ultimately the societal current and future challenges.
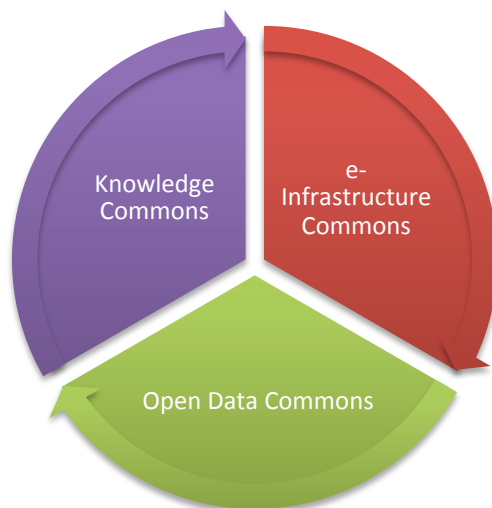
Figure 2 - Open Science Commons

3.2 Mission

EGI's mission is *to be part of the ERA's backbone as a key provider of open access to compute, storage, data, knowledge and expertise available in Europe and worldwide*.

3.3 Core values

The core values are the fundamental beliefs of an organisation and essence of its identity. They support the vision, shape the culture and are the basis for decision-making. The most important distinction that applies to values is that they cannot simply be imposed upon; they must be discovered distilling out from the daily activities of the organisation. After years of activity, EGI has identified the following four core values:

Leadership: EGI is a leading pan-European infrastructure, integrating worldwide computing, storage and data resources to support an ecosystem built on innovation and knowledge transfer.

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Openness:	EGI operates collaboratively with a transparent governance structure that integrates the views and the requirements of all stakeholders, from research communities to resource providers.
Reliability:	EGI provides a reliable infrastructure that research communities can depend on to collaborate with their peers and deliver innovation.
Innovation:	EGI will continue to meet the needs of research communities operating at unparalleled geographic and technical scale by partnering to bringing new technologies into production, and to bring the latest computing technologies for the benefit of their activities.
Commitment:	EGI community is deeply committed to provide the best possible outcome of their activities and initiatives in order to have a positive impact on the research community, the scientific work they do, and society as a whole.

3.4 EGI's Purpose and Value

EGI's main purpose is to support cutting-edge research, innovation, and knowledge transfer within Europe and the rest of the world. This is accomplished through a wide range of services. The ultimate value that is delivered to researchers and scientists can be summarised as:

- *Provides enabling services to researchers:* EGI offers a set of solutions that allows a new way of doing science, which would not be possible otherwise, and allows faster results saving time.
- *Facilitates collaboration:* EGI allows research groups, institutions and universities, and labs to share data seamlessly across borders and continents as if every member had access to the same computer leading to a greater pool of information and expertise to solve research problems and reduce duplication.
- *Increases innovation and creativity:* EGI extends the limits of what is possible by enabling researchers to discover, access and reuse cutting-edge tools, resources, skills and competencies to achieve results otherwise not possible and stimulate open innovation.
- *Handles big data:* EGI allows multinational research infrastructures to share, manipulate and analyse the mountains of data coming out of complex experiments and simulations.
- *Simplifies digital research:* EGI provides a suite of portals, science gateways and flexible virtual research environments that hide the complexity of distributed computing from researchers, lowering technical entry barriers and increasing productivity.
- *Identifies and develops human capital*: creating skilled professionals and experts that can transfer knowledge from within EGI to tomorrow's data scientists.

These primary benefits generated by the activity of EGI derive ultimately into a much bigger benefit, which covers the entire society. The main value lies in the fact that excellent science generates technology innovation that will provide the tools and means, yet to be developed, to tackle the grand societal challenges, to boost economic growth and to create jobs.

3.5 External Analysis

In order to adopt the most appropriate strategies and define a detailed action plan to implement the selected long-term strategy, it is essential to identify the opportunities to grasp and threats to face. The analysis of these external factors enables, on the one hand, to increase the existing knowledge of the specific area of activity, and on the other hand, to compare the situation of EGI's organisation with others.

Therefore, the following sections provide an overview of the external environment with two aspects: the current macro-environment that affects everyone, and a more detailed micro-environment, which focuses specifically on EGI.

The macro-environmental analysis includes Political, Economic, Social and Technological factors, known as PEST analysis, for understanding the 'big picture'. The sector analysis focuses on the environment in which EGI operates, which is rapidly evolving with the incorporation of new actors.

3.5.1 PEST Analysis

PEST analysis stands for Political, Economic, Social, and Technological, which is a strategic analysis tool describing a framework of macro-environmental factors that any organisation has to take into consideration. It looks at the external business environment, and is an appropriate strategic tool for understanding the environment in which EGI operates, enabling it to take advantage of the possible opportunities, and/or minimise the threats faced.

Table 1 - PEST Analysis for EGI

Political	Economic
Multiple government funding agencies **Diversity in national priorities** **Policy changes at national and European levels** **Different legal frameworks prohibiting simple enforceable transnational contracts** **Varying state-aid and competition laws** **Increased realization of the value of science to drive economic growth and tackle societal changes** **Increased realization of the need for the public and private sectors to co-operate to create value** **Demand for the creation of a genuine single market for knowledge, research and innovation**	**Continuation of the economic crisis or slow recovery** **Government spending cuts** **High cost of resources (human and IT)** **Government prevention for spending outside national borders**

Social	Technological
- Evolution towards the digital citizen: → data deluge - Consumer confidence that the services will be sustainable - Consumerism leading to want for on-demand service provision - Demonstration of value-add to end-user	- Barriers to entry for new consumers - Reliance on 3rd party suppliers - Rapid changes in IT technology - Rapid changes in IT usage and requirements - Exponentially increasing store of digital data ('Big Data')

Despite the turmoil of events happening last year, the conclusions shown in the four dimensions have not changed significantly. EGI continues to operate in an extremely complex environment with continuously rapid changes happening.

From a political perspective, EGI must tread carefully between national and European priorities, which can sometimes differ or be of varying importance. For instance, a currently sensitive issue for national funding agencies is justifying expenditures outside of their national borders.

Economic considerations evolve around a balance between cost cutting measures and expensive requirements when providing services. In the case of EGI and the researchers it supports, it means having the same or lower budget for conducting large-scale, and cutting-edge research.

Social issues are reflected in the well-known fact that the world is changing at a rapid pace and emerging as a globalised society. The European Commission has set up Europe 2020: a strategy for smart growth, moving towards a low-carbon economy, with a strong emphasis on job creation and poverty reduction. Europe 2020 is based on investments in research and innovation to meet societal challenges. The aim is to create a sustainable and inclusive Europe, with more skills, capable of creating products and services to generate wealth and well-being, making the most of what information and communication technologies can offer. It also includes as one of the driving forces the European Research Area (ERA), whose on-going process of digitalisation will facilitate an environment of open science and free circulation of researchers, knowledge, and technology across Europe.

Technical issues are just as complex as the rest of the issues. To minimise these effects, the technology needs to answer the needs of the users, which can be difficult with the rapid changes of both IT technology and how it is being used. Advances in technology are leading to new scientific achievements but have also led to the exponential growth in the quality and quantity of data. EGI has proven to scale to meet these challenges in the past, but needs to continue to innovate its solutions to meet its users' needs in a more technically competitive future. This challenge as already started to be met through the EGI Federated Cloud offer.

3.5.2 Sector Analysis

3.5.2.1 Market size

EGI's primary focus is on providing computational and data services to researchers for enabling their data and computing intensive research activity. This is done by providing the physical resources and the technical and collaborative tools they need. There are also additional activities and services for facilitating their work.

EGI's target market is drawn from the estimated 1.8M public sector and 1.0M private sector researchers within the European Research Area (ERA) and their international collaborators.

It should be noted that not all of them are currently producing large amounts of data in their experiments, or have to face the challenge of analysing big datasets. However, considering the current trend in science and society, the amount of digital data available is growing exponentially.

The existing research infrastructures produce continuously new data, and there are plans for new projects that will produce even more data. In addition, the putting into practice of new approaches for exploiting the current datasets will increase the demand for high throughput data analysis, the federation of multiple clouds and other data services. An interesting phenomenon that will be witnessed in the future is an increasing number of individual researchers and small research teams using data and computing intensive approaches in their scientific work.

The businesses around big data and cloud computing including those related to analytics and discovery, services and infrastructure targeted to all kind customers in general, and to researchers in particular are in the phase of growth.

It is difficult to segment the cloud between the different verticals (data analysis, high performance computing, big data services, infrastructure, applications, etc.), but all forecasts predict an expanding market for all of them. In a study released in January 2014[4], the International Data Corporation (IDC) forecasts that the big data technology and services market will grow at a 27% compound annual growth rate (CAGR) to 32.4 billion US$ through 2017 - or about six times the growth rate of the overall information and communication technology (ICT) market. Even with the perspective of different scenarios and varying changes in supply and demand, IDC expects the market to exhibit strong growth over the next five years for both large companies and start-ups. Particularly interesting, for both all industries and the market for research, is the significant amount of data in the data centres that will either get disposed of or archived to the cloud, which will result in a change of the revenue for traditional storage.

3.5.2.2 Industry structure

Industry structure refers to the explanation of the procedures and the associations that are within a given industrial sector. Each industry has a distinctive structure, which is constantly undergoing modest adjustment, and occasionally it can change abruptly. Shifts in structure may emanate from

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[4] http://www.idc.com/getdoc.jsp?containerId=prUS24542113

outside or from within. According to M.E. Porter[5] [R4], there are five basic competitive forces whose collective strength determines its long-run profit potential and state of health. A healthy industry structure is therefore a major concern for all players, and should be also considered in the strategic planning of EGI.

The Five Forces[6] [R5] are the Bargaining Power of Suppliers and Customers, the Threat of new Entrants, the Threat of Substitutes and the Rivalry among existing competitors. A full understanding of the nature of these forces is as important as difficult. Considering the importance of industry structure on an organisation such as EGI, a healthy approach is keep a close eye, because the balance among the forces can remain unaltered for a long time, it may evolve slowly or it may change abruptly altering abruptly the conditions in which the EGI collaboration sails. For this document, it has been concluded that two of the forces (namely bargaining power of suppliers and power of customers) seem to be quite benign in the sector EGI operates. Another consideration receives the threat of entry (both new competitors and substituting products) or the perceived rivalry among existing players. It must be noted that only the belief that the one or some of the other players in the market may, or will in the future, struggle for funding, resources or access to final users, causes an undesired effect of distortion, affecting negatively the creation and transfer of value.

The **power of suppliers** seems to be rather neutral in this arena. There does not seem to be much difference in the access to equipment with other suppliers, and it also seems to be the case with the access to human resources.

The customers (**power of customers**) are not perceived as putting high demands on the service that causes profit transfer of the value created, considering the policy of free services on demand. If something, customers place requirements for higher quality or expanding services. However, far from diverting value from the competitors, and by addressing these requirements, EGI drives their activity towards improvement, innovation and higher added value.

Threat of entry (new competitors or substituting products)

New entrants, particularly when diversifying from other markets, or just the perception of potential entrance of new rivals, may put pressure on price, costs or rate of investment. The threat of entry in an industry depends on the height of entry barriers and on the reaction entrants can expect from already existing actors.

Although it can be argued that not all computing capacity for science in Europe is federated under EGI, the EGI collaboration has been for years the only main actor in the provision of computing and data intensive services for science, in particular for big science. In fact, EGI has been shaped and grown according to the requirements demanded by big science. The investment capital for the provision of such services is extremely high in terms of equipment acquisition, but also in terms of

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[5] *Understanding Industry Structure* (2007), Harvard Business School, is a note prepared by Professor Michael E. Porter based on the classic and celebrated article "*How Competitive Forces Shape Strategy*," Harvard Business Review, July-August 1979. Professor Jan W. Rivkin assisted in the preparation of the note, which is an update and extension of the article.

[6] http://en.wikipedia.org/wiki/Porter_five_forces_analysis

coordination, standardisation and learning. Even though most of the technology, software and middleware development is based on open sources, and therefore available without IP restrictions, it still requires a remarkable investment in terms of time and resources for new entrants to develop similar capabilities.

The satisfactory results in the creation of excellent science are acknowledged by the EGI's customer base, and naturally by other stakeholders (brand recognition). Some examples of case studies brought about by the grid computing resources provided by the EGI federation can be found in EGI website[7].

However, the commoditisation of compute resources and data capabilities and the advent of the cloud may attract the interest of the science and research market for the commercial sector. The interest could be directed at both the large, big corporations of web services and cloud computing, or smaller parties. The first ones can become serious competitors as they leverage on their own assets and capital, the second ones can attract the necessary funds, provided the capital markets are efficient. Big corporations such as Microsoft, Amazon Web Services or Google are already aiming at research centres, for example Microsoft Azure[8].

The so-called long tail of researchers is a segment particularly underserved, which will be increasingly attractive for the commercial sector as researchers shift towards an increasingly higher data and computing intensive science. In fact, individual researchers or small teams have already started using commercial cloud services, because they find their access easier or because they do not know what EGI can do for them. This is being done even if the solution does not best meet their needs.

The interest of EGI should not be in fortifying the barriers to higher entry, but in finding its own positioning, as well as contributing in shaping industry structure. The natural trend towards intensifying competition, head-to-head rivalry, is by no means inevitable if it is directed toward new niches (differentiation for the consumers).

The screening for the **threat of substitutes** shows a potential risk that technological difference between HTC, represented by EGI, and HPC represented by PRACE, diffuses, and therefore the advanced services offered by one and the other become more alike, making the consumers' way of use converge. This contingency can be avoided by setting strategies of collaboration and co-ordination led by the representatives of those institutions with strong support from the European Commission. However, more meaningful interaction with PRACE continues to prove difficult despite numerous attempts through joint meetings and workshops, though some progress has been made.

Rivalry among existing players

This is a topic of high controversy among the writers of this document and in general in the whole community, because raising the question of internal competition in the presence of funding bodies and other stakeholders is a cause of genuine concern. There are solid arguments defending the position that the collaborations, projects, and bodies funded by European institutions are not

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[7] http://www.egi.eu/case-studies/
[8] http://azure4research.com/

designed to compete among them, on the contrary, the scopes of their goals have been carefully designed to make them complementary for value creation. However, considering that already the perception of rivalry alters the creation of value, it seems sensible to consider it towards a greater understanding and the achievement of common goals.

Additionally, competition in the research and academia sector of computing and data services for investigation might not be viewed in the sense it is in the commercial sector, because research and academia hide behind the concept of "collaboration" and the "greater good". However, in reality, there are many power plays and political manoeuvring for importance, which can lead to other projects and technologies to be pushed out, and also, many are fighting within the same funding pools. There is also a risk that there will always be some overlap in activities and redundancies that need to be argued, justified, "sold" and agreed, which happens in many meetings in the sector.

And last, but not least, the evolution of technology or the internal changes of the organisations might lead to a situation in which previously not competing organisations start to do so, as discussed in the previous subchapter (threat of entry).

After the long but needed consideration, it has been observed (also mentioned in the SWOT analysis) the risk that HPC (PRACE) and HTC (EGI) evolve into technologies and advanced services, addressing the same computing and data intensive needs, entering into collision and harmful competition. A clear understanding of this problem and the will of avoiding it by all the participants should lead to a clear strategic positioning for the institutions.

This is one of the main benefits and value that EGI.eu brings about in the sector, having a clear role as coordinator and high representative of the EGI collaboration. According to Michael E Porter[9] [R7], rivalry can actually be a positive sum, or actually increase the average profitability of an industry, when, and if each competitor aims to serve the needs of different customer segments by positioning itself. Such competition cannot expand the industry only but also support profitability, and ultimately sustainability, as the needs of more customer groups are better met. With a clear understanding of the structural underpinnings of rivalry, it can be taken, sometimes, steps to shift the nature of competition into a positive direction.

A similar argument applies when considering a false rivalry with other e-Infrastructures, such as EUDAT[10], which can make sense given the fact that EGI started as the European Data Grid in the early 2000s. However, in reality, EUDAT are natural partners and not rivals. An active work for finding ways of collaboration, shaping thus the structure of the industry towards a right direction, has been performed quite silently during the activity of the EGI-InSPIRE project.

IDGF, the International Desktop Grid federation, offers as EGI does HTC or processing embarrassingly parallel jobs, is actually a strong EGI member. However, it is not yet fully integrated within EGI, which

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[9] The Five Forces that Shape Strategy, (2008): Porter, Michael, Harvard Business Review 79, January 2008, pages 78-93, http://hbr.org/2008/01/the-five-competitive-forces-that-shape-strategy/ar/1
[10] EUDAT, a Collaborative Data Infrastructure to tackle the specific challenges of research data management, access and preservation http://www.eudat.eu/

potentially can lead to harmful competition. Both organisations are working actively in establishing a framework for full integration, which will hopefully be achieved very soon.

3.5.3 Customer analysis

Customer analysis is the process of identifying and characterising target customers, assessing their needs and motivations, in order to ferret out the best way to serve them. It is a critical part of this sustainability and business plan.

The criteria for classification consider the needs of the clients, whether they need access to data and computational services, help to access them, or they need tools for integrating and providing these services. The size or degree of aggregation within the customers is a secondary but an important dimension considered for classification.

3.5.3.1 Research Communities & Institutions

This group denomination gathers research communities and collaborations with massive data or computational requirements, which can greatly benefit from the resources, services and expertise offered by EGI.

Research Infrastructures from the ESFRI and nationals roadmaps

A particularly interesting target group are the Research Infrastructures (RIs) from the ESFRI roadmap[11], which are expected to reach implementation or operational stage in the following two years. Moreover, there are also RIs from national roadmaps that are expected to reach a similar level of maturity in a similar time span.

A number of them are already exploring the current and future needs of their communities and looking for solutions offered by very different providers.

Characteristics:

- Multinational nature;
- High level of internal organisational complexity and hierarchy;
- Have different degrees of maturity: might have already an IT resource centre for research work, or a planning to have one, or planning to expand one;
- Are supported by a relevant European partnership or intergovernmental research organisation, [political support and allows long-term financial commitment];
- Relatively high level of awareness of the problems posed by a data and computation research and typically also of the benefits of using e-Infrastructures in addressing them;
- More likely to have some internal expertise on requirements and needs, which may speed up the collaborative work, but also may close their minds to ideas out of their own box.

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[11] ESFRI roadmap: http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=esfri-roadmap

EGI is actively targeting the ESFRI RIs, although most of them are still in the early stage of their setup, with ICT often considered as a low-priority activity at the moment, but they are expected to be established and begin infrastructure setup in the next 2 years (2015-2016). A result from this effort is a complete map by scientific domain and geography, which has been made by the EGI Outreach team in collaboration with NGIs and NILs. NGIs/NILs are a vital resource in the identification and engagement process, although very few NGIs perform technical activities with ESFRIs at the moment (there have been a total of 23 identified), those who do, are expected to become drivers for European-level follow-up activities from EGI for these ESFRIs in the next few years.

During the early stage of an ESFRI, EGI defines and implements the so-called 'pathfinder' experiments for the demonstration of concepts and possibilities of the collaboration with the European Geosciences Union (EGU) for the ESFRI RIs. The work done with The Cherenkov Telescope Array[12] (CTA) and the European Incoherent Scatter Scientific Association (EISCAT[13]) for the EISCAT_3D project[14] are good examples of this.

In addition to the previous examples, EGI's work with ESFRIs currently focuses on building human links at the national level (through the NGIs) and at the European level (through EGI.eu).

More information can be found in the Annual report on community engagement activities, the EU deliverable D2.26[15] [R1].

Research collaborations and networks

The main characteristic that makes them be in the same group as the previous one is that they have massive data or computational requirements, thus being a perfect target for benefitting from the resources, services and expertise offered by EGI.

The exact figure remains unknown, however it is considered an underserved category for the time being and much effort is being put by EGI in order to reach out and serve them considering the multiplying effect such success would have.

Characteristics:

- Highly dynamic, very different scientific domains;
- Small to medium size, level of complexity and hierarchy in comparison to the previous one. Their size can typically span on a quite broad bracket: 50 – 1000 researchers;
- Unlike RIs, these groups may scarcely, or not be aware of e-Infrastructures, and their benefits to science;
- Requirement gathering may not be straightforward;
- Might be lacking in technical expertise;

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[12] https://www.cta-observatory.org/

[13] https://www.eiscat.se/

[14] https://www.eiscat3d.se/

[15] https://documents.egi.eu/document/2126

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-   Learning new tools and methods can be expensive (because of the large size of the group);
-   The group is not visible, have no clearly identifiable contacts for engagement.

EGI considers being more successful in this target group for the time being, until ESFRIs start to exist as Research Infrastructures (RIs). For these reasons, most of the work done over this last period and for the coming months will need to be focussed on the smaller communities. The NGI support teams, and projects such as SCI-BUS, IDGF, DIRAC perfectly help in this huge work.

3.5.3.2   Individual Researchers & Teams

The current number of EGI users is estimated on 22,000[16] 20,700 based on the Certificates issued by the different certification authorities. However, most of them are located in the previous target groups. Considering that the estimated market size talks about 1 to 2 million researchers, the large potential for growth is obvious. This group represents what has been defined as the long tail of science, and has been identified as a clearly underserved segment, which opens up the opportunity for EGI and other actors. In this group, not all the researchers are considered to be applying or to plan to apply data and computing intensive methodology in their investigation, which limits the size by a factor of thousandth or ten-thousandth[17].

Characteristics:

-   A wide and dispersed group distributed across countries, disciplines, academic institutions;
-   International projection and collaborations;
-   Most of them are not aware of EGI services.

3.5.3.3   Resource Centres & Institutions

This is the institutional market containing Resources Centres already integrated within the EGI community, those that are not yet part of, and other IT services providers that could benefit from some of the services and solutions provided by EGI.

Resource Centres within the EGI community

The main targets for the solution are the Resource Centres, both European and non-European, in the EGI ecosystem. The category also includes the IT centres of some Research Infrastructures.

In total, they number about 340 heterogeneous data centres in 43 countries around the world. The majority of these centres, and EGI's user base, are within the European Research Area.

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[16] The actual number of 20,700 based on the number of Certificates issues by the different certification authorities has been slightly modified by internal analysis done at the eGI.eu level.

[17] EGI.eu's internal analysis

There are still resources centres that could become part of the EGI community. Most of them are already in the defined category Research Infrastructures under ESFRI and national roadmaps, and those, smaller, of the research communities and collaborations.

These organisations are tasked with maintaining, coordinating and integrating the resources and services they provide. Researchers can request services either as individuals or through larger communities, which creates an additional degree of complexity. Most resource centres are already federated at a national level to some degree. However, as the research community becomes more and more connected, with higher requirements for computing capacity, improving and evolving how they provide a service is necessary.

The Resource Centres are using the coordination, software, tools, consulting and other high skilled services and expertise from EGI.eu and other Resource Centres that work as Operation Centres[18]. These services are maintained and updated, so that Resource Centres can serve their user community in an efficient and cost-effective way.

Resource Centres aiming to form an independent federation

These are different entities providing services largely based on IT, with a high degree of internal complexity. They may perceive a need to organise themselves into a bigger, well organised community that shares information and provides larger, more complex services, with a high level of efficiency and effectiveness.

These organisations do not necessarily need to be providing services for the research community. The specific nature of their needs might be different in some aspects, but they can benefit from the practices and procedures put in place by this solution. In fact, the expertise needed for going up to this level of organisation is not easy to find.

If the customer analysis is done from the perspective of EGI.eu then another classification applies. Most of the customers are common from for both entities. Between brackets, the relationship is described.

- EGI.eu participants: the members of the EGI Council (B2B);
- Resource providers: entities that provide computing resources integrated in EGI (B2B);
- Large research projects or research collaborations (B2B);
- Individual researchers/scientists (B2C).

3.5.4 Competitor analysis

The competitor analysis has already been considered under the Industry structure on page 23. In general, it says that EGI stands basically alone in the provisioning of data and computing services for

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[18] There are 32 distributed Operations Centres, 22 of these are managed at a national level and one at CERN. Their activity is coordinated by EGI.eu, which is also considered as an Operation Centre. Operation Centres are commissioned by EGI.eu to offer specialised services such as accounting, or monitoring to Resource Centres. The assignment has a defined pattern for charging and payment for the services provided. The figures are given as per March 2014. Updated key numbers can be found in EGI.eu website at http://go.egi.eu/EGINumbers.

researchers, but the changes in the shape of the sector, as it Integrates to support complex workflows, enabling thus a single digital market of services for research, and its attractiveness will bring new actors. The way to deal with the new situation is addressed below in the Strategy section.

3.5.5 Definition of Opportunities and Threats for EGI

3.5.5.1 Opportunities

For EGI

The external analysis indicates clearly that this is an expanding sector. The trend for data-intensive and collaborative science will inevitably strengthen in the future, as new research infrastructures are established. The already existing communities will accumulate unprecedented volumes of data. There will be a growing demand not only of integrated and interoperable tools for running complex algorithms and processing big datasets, which are the core of EGI, but also to services secondary or auxiliary services around the core services, such as providing support, or project management. There is furthermore a third sphere that only now begins to emerge, in which EGI's capacity and unique expertise can be an asset, not as a direct provider of services, but as a partner of a more complex chain of added value such as those provided on applications based on open data that are expected to become extremely frequent.

In addition to the growth of the market, there are still underserved segments in all the parts of the continuum. There are research communities of all sizes that could benefit from the capabilities and services provided by the EGI community. Even those that are already working with EGI can further benefit from additional services in the portfolio. A special mention of underserved segment is found in the so-called long tail.

The technology is evolving at a continuous, swift pace. There is a need to adapt to the technological changes and to incorporate them into the services.

Primary	Secondary or Auxiliary	Tertiary
- High-throughput data analysis - Cloud - Data storage and management - Federated operations - Helpdesk support - Project and programme management	- Technical consultancy and support - Marketing - Outreach - Protocol standardisation	- Open data related services - Added-value data services for researchers

Table 2 - Layers of current / potential services addressing opportunities

Some examples are introduced here, but the identification and screening of opportunities should be a permanent process.

For EGI.eu

A useful approach when looking at opportunities is to look at strengths, but surely the most prominent strength of EGI.eu is its excellent position for creating value for all the stakeholders which includes institutions, funding bodies, Research Institutions, Communities, Resource Providers, NGIs, European researchers and ultimately the European citizens by being a central point of coordination all of them.

The old and new opportunities will be discussed together with the threats in the SWOT Analysis section.

3.5.5.2 Threats

The PEST Analysis on page 21 already gives a good number of threats to be considered for both EGI and EGI.eu. This document deliberates on them in the SWOT Analysis section on page 35.

3.6 Internal Analysis

### 3.6.1 Organisation

3.6.1.1 Management and Direction

An attempt to present a clear picture of structure considers two dimensions of a map: the X-axis reflecting their transnationality from European to local, and the Y-axis considering the role they play in the ecosystem from provider (of resources and/or services) to user (same categories)[19].

- The e-Infrastructures are basically providers and they can be European, such as PRACE or EUDAT, national, or local.
- The Research Infrastructures can also be European (such as ESFRIs and EIROs), national or local, and in some cases they can have a double role as providers and as users.
- Research Communities can basically be considered as users, and are spread across a continuum of transnational to local communities.

EGI.eu and NGIs are bodies created to provide coordination and to manage the infrastructure. Whereas EGI.eu would fill the European position, NGIs would be in the National part of transnationality-axis. NGIs are in very different financial stability situations. The budget/monetary perspective is given by the presence of the funding bodies, which again can be either European, national or local. This network could be expanded with commercial parties, which could fill a wide number of roles such as for example e-Infrastructure providing commercial resources, developers, or even users of some of the services.

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[19] The Governance Task Force is currently in the process of defining and addressing the stakeholder categories.

Figure 3 - The EGI Organisational Ecosystem
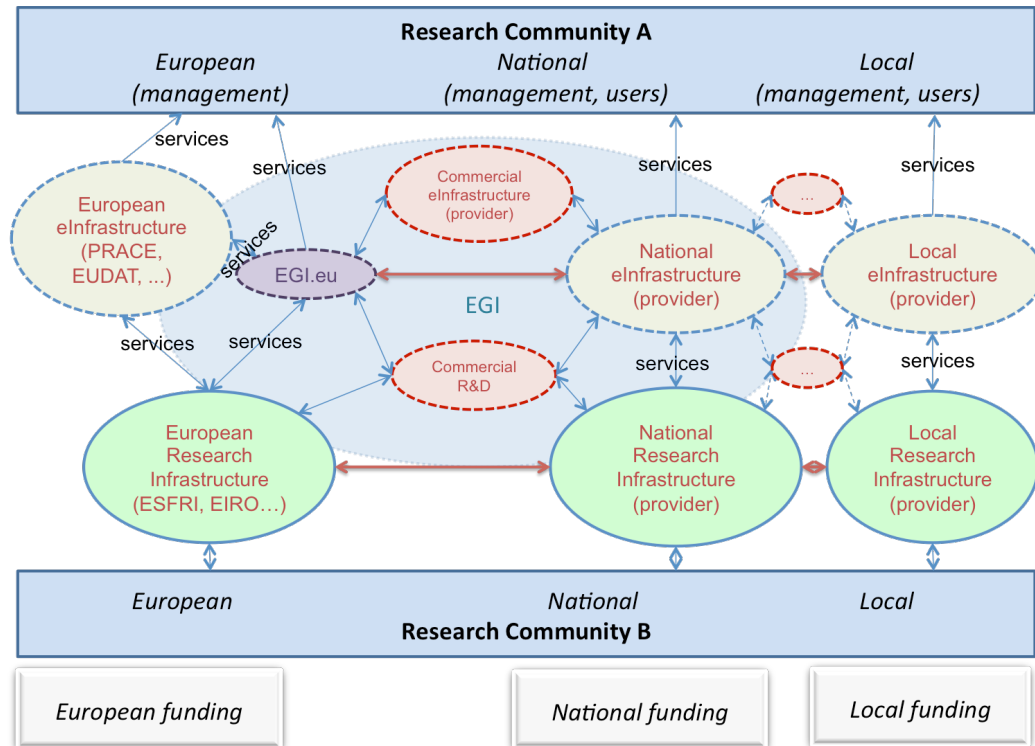
3.6.2 Governance

The relationship network around EGI provides some of the most complex environments for decision making. It has been previously likened to "trying to drive a bus where everyone has a steering wheel", due to the number of stakeholders, and the dimensions they are spread across, which are not clearly defined in time, scope and resources.

EGI.eu was created to coordinate and manage the EGI on behalf of all is participants in an efficient way and create synergies and added value, especially at the transnational level.

The governance model of EGI.eu was structured to deal with the complexity of EGI and the aim of including the voice and will of all the members, yet be flexible enough. EGI.eu is governed by the EGI Council, which is responsible for defining the strategic direction of the EGI federation. The Council acts as the senior decision-making and supervisory authority of EGI. The Council participants are the National Grid Initiatives (NGIs) and European Intergovernmental Research Organisations (EIROs)[20].

The Council delegates oversight of the day-to-day running of EGI.eu to the Executive Board currently comprised of seven members[21]. The appointment for a position in the Executive Board is for a term

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[20] The members can be found at http://www.egi.eu/about/EGI.eu/council_members.html, the EGI Council Terms of Reference at https://documents.egi.eu/public/ShowDocument?docid=152, and the EGI Council policies at http://www.egi.eu/about/EGI.eu/council_policies.html

[21] A list with the current and former members can be found at http://www.egi.eu/about/EGI.eu/

of two years. An Executive Board member can be re-elected for maximum two consecutive terms. The Executive Board devolves financial and organisational responsibility to the Director and the permanent staff of EGI.eu.

The newly formed Governance Task Force is currently investigating the degree of satisfaction with the governance model through a series of informal interviews. According to the preliminary results some Council members, it is believed that the governance should be radically changed while some others are happy with the current situation. This situation reflects very well the perception of most of the people within the EGI community, although the general feeling is that the current governance model cannot cope with the challenges to come. The structure should be such that most of the stakeholders, particularly the part in the resource end, would be willing to sign up for continuation, and able to make swift, informed decision-making.

The work of the Governance Task Force is not yet public or definitive. It is expected that it will address some of the problems that were pointed out in the review of the last period. The Task Force is looking into multiple models of structure, membership, contribution (both monetary and in-kind), each one geared to what EGI.eu wants to be and deliver in the future, very strategic and service- and customer-oriented. The current situation of the governance of the EGI collaboration and some proposals for improving the current situation were presented and discussed in an open workshop during the EGI Community Forum held in Helsinki and the closed session of the Council.

3.6.3   Resources to perform the tasks

3.6.3.1   Human Resources

Central administration and coordination

The staff of EGI.eu is composed by about 20 people that correspond to an equivalent of 17.5 FTE[22] based mostly at the EGI.eu headquarters in Amsterdam, a few of them working at a 50% remote work scheme[23]. EGI.eu's work is supported by the equivalent of another 22 full-time workers spread across many organisations around Europe.

The SWOT analysis states as one of the main strengths of EGI.eu the high quality of their human resources. There is an ongoing discussion whether the number of employees is adequate to address the magnitude of the tasks required for coordination and added value activities. However, expected responsibilities need to be balanced with available funding through both membership fees and innovation projects. Ongoing cost analyses are updated each year to understand trends and needs to maintain and/or grow the infrastructure. One facet of the governance model investigation will be

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[22] FTE stands for full time equivalent. An FTE is the equivalent of one person working full time: 8 hrs. /day. X 5 days/week.

[23] EGI.eu staff was once up to 26, then it was downsized to 23. The current figure (end of May 2014) equals to 20 and as of Aug 2014 it will be 19, which means a decreases in workforce equivalent to 7 people. This important fact is also outlined as a "threat" in the SWOT analysis about loss of knowledge and expertise. This happens in an especially sensitive period of transitioning beyond EGI-InSPIRE towards EGI-Engage.

identifying the best mechanisms to ensure staff retention and the knowledge and expertise. EGI keeps up-to-date figures of the resources at http://www.egi.eu/infrastructure/.

3.6.4 Strengths and Weaknesses

Strengths and weaknesses are considered again in the SWOT Analysis section on page 35. Some of the key success factors are related to technology: production innovation capability, expertise in federated organisations management, open source technology, standardisation, and those related to the excellent position of EGI.eu to be a cost-efficient change-shaper aligning resources and capabilities across countries, scientific disciplines and irrelevant of the sizes of resource providing institutions or research communities. These activities are creating a vast amount of value for all the stakeholders.

4 SWOT ANALYSIS

The significance of a SWOT Analysis is that it provides a logical framework for handling issues having bearing on the business situation, and for the generation of alternative strategies, and ultimately helping for the choice of strategy. The comparative account of both the internal and external environmental factors is presented in a structured form to help craft the strategies.

4.1 SWOT Analysis for EGI

Strengths	Weaknesses
Leadership: Market share	*Governance issues*
- EGI is the largest, publicly-funded, Distributed Computing Infrastructure dedicated to research[24]: highest number of cores, computing capacity, storage capacity	- Decision making process not agile enough for swift reaction to changes, decision making and strategy implementation might be delayed
Entry barriers	- Lack of a shared priorities across nations that can slow down decision making process
- Established brand with experienced staff that are close to customers. These capabilities are difficult to obtain by competitors who would aim to address the research sector	- Weak aspects of federation (lack of centralisation when needed, requires effort and the reaction may be slow)
	- Legal constraints / state-aid competition limits, considerations for targeting commercial sector
Leadership	- Lack of a good measurement system (metrics) measuring the success of the implementation of selected strategies (results) and on the adequacy of the strategies (impact)
-Excellent expertise in technology and development	
-Strong expertise on heterogeneous infrastructure interoperability, open standards and open source software	- Typical communication problems in international environments with distributed, virtual teams

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[24] Commercial clouds could potentially add up more cores if they focused their activity on the research sector.

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Innovation	*Capacity*
- Continuous innovation process (Federated Storage, iPaaS, Data Access and Dissemination, SaaS (integrated system for application developers), VLaaS,…) for best attending the needs of the customers	- Limited available capacity for resource bound researchers[25]
	- Lack of mature central process for resource allocation
Products & Services	*Services*
- Expertise in IT Service Management through the FitSM concept (quite rare, marketable service)	- Current services are tailored to only a few research communities
Virtual Research Environments / marketable concept to be offered to communities	- Service portfolio and catalogue may not yet "speak" to new user members
Structural	- Maturity of the services: Technically (ease of use),, Lack of agreed business models for the marketable services, Business portfolio development still not implemented in many NGIs
- The strong potential aspects of federation (scalability, distribution, innovation, resources (of all type widely available…), they need to be implemented to be made available though	*Skills of interaction with commercial parties*
	- Lack of knowledge/oddity or varying skills in relating with the commercial sector
- EGI's capability to reach customers locally through the local NGI (capillarity), and the huge geographical coverage by NGIs (geographical coverage)	*Customers*
	- Current access mechanisms are not ideal for the individual researchers or small collaborations
	- Only addressing the fat end of the long tail (researchers)
Opportunities	**Threats**
Growing market	*Harmful Rivalry*
- Growth **in researcher market**: Increasing need for data and computing intensive research, visible in the growing number and demand of research projects	- Risk that HPC (PRACE) and HTC (EGI) evolve into technologies and advances services capable to address the same computing and data intensive needs entering into a harmful collision if the strategic position is not clearly defined for the institutions
- Strong growth expected for the next years, difficult to quantify	
Underserved market:	-Risk of entering into competition in some technologies (cloud) with other similar services providers, if positioning is not properly co-ordinated (i.e., Helix Nebula)
- Still a substantial number of communities of all sizes that can be part of EGI	
- Small research groups and individual researchers	- Risk of entering into competition with IDGF (a current strong member of EGI) as long as their capacity is not fully integrated within EGI
- **Growth in** institutional **market**: Still room for incorporating new members to the infrastructure **resource centres**	
	Entry of new competitors
- Growing number of data producing infrastructures, which ultimately will generate more need for	- Continued increase of CPU and GPU speeds. This

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[25] EGI is the largest Distributed Computing Infrastructure but most of the resources are already committed to one or more specific scientific communities and thus there is a limited available capacity of spare resources to allocate, which leads to the following (weakness) bullet point.

computing resources	drives researchers with need for HTC to local machines
New markets	- The high attractiveness of the industry attracting new competitors, especially dangerous are large companies with own competitive edges diversifying from other activities (Increased competition through the commoditisation of compute resources and data capabilities and the advent of the cloud); e.g. Amazon, Google, Microsoft (Azure)
- **Open Data**, need for storage, processing, management, EGI can have a role together with other partners (EUDAT,…)	
- **Playing a role** in other added value data services based on big data (i.e. water cycle, earth science data, space and aeronautics data…), in which the customer is: Other researchers, Public institutions, Commercial parties: SMEs and large companies.	
- New models of **public sector procurement**	- Continued drop of price of commercial clouds. This drives researchers with need for HTC to commercial providers
Brokerage services	*Economic*
Generate a "network effect" in the digital research community?	- High cost of resources (human and IT) of acquiring and managing large, distributed IT infrastructures
- Facilitate the deployment of **easy to use virtual research environments**	

NB. Not all of the opportunities can be drafted here: this is an exercise that should be executed periodically as a part the strategic planning. Not all of the opportunities detected (or undetected) can be addressed by EGI, obtaining partners/allies for intensive/extensive opportunity scanning and screening.

4.2 SWOT Analysis for EGI.eu

Strengths	**Weaknesses**
Maturity	*Budget constrains*
-Strengthening position due to the good implementation of the previous strategy, gone through another phase of the learning curve	-EGI.eu understaffed, work getting done by the deep commitment of the team
At the central point	-Lack of resources for outreaching more communities (majority of resources already allocated for specific research communities)
-Excellent positions for reaching out for communities, an outreach strategy put in place	
-Excellent position for proposing innovative actions resulting from knowledge interchange among the members (offering thus value to the EGI members)	-Cash flow issues due to fluctuations in membership fees or gaps in successive finance rounds leading to layoff of employees and paralysation of activities
-Excellent position for exploring co-ordinately new models, PoCs (such as Pay-for-use, brokerage services, business models...)	*Governance / Legal structure*
	-The governance model of EGI also influences negatively the decision-making process
-Excellent position for coordination of technological processes (such as standardisation) and project management	-Legal structure limiting some actions (i.e. selling of activities, VAT issues)
	-Varying perception of the value of EGI.eu among the EGI members
-Excellent position for influencing the shape of its industry structure for the interest of the EGI collaboration and everyone's benefit (avoiding harmful competition)	*Maturity*
	-Difficulty or impossibility of implementation of some of the previously developments business models due

-Excellent technical and professional expertise of the Human Team, increased business-oriented expertise in EGI.eu team	to external forces -Inability to convey the message of the value currently offered to the members. Are the members fully aware of the EGI.eu value?
Opportunities *Needs of Resource Centres / NGIs* **- There is a strong need** for an efficient and cost-effective vehicle to coordinate pan-European Distributed Computing Infrastructure on their behalf, to ensure that activities are delivered on time, within budget, with high levels of reliability -Need for supporting activities in which NGIs has either no or limited resources or expertise (such as business development and service management) -Need for coordinated outreach activity -Need for coordinated communication / promotion activities -Need for a coordinated interlocutor with other stakeholders -Need for tracking research achievements and collecting scientific outputs to make them available in a public *Other's Needs / Services for EC and others* -Possibility of creating a supporting environment for relating with commercial parties, in particular SMEs in order to: Innovate in all aspects of computing and data services to science, added value services, even commercial services; Address the long tail of science -FitSM is a lightweight but powerful system for managing IT services in federated environments, interest for NGIs or other IT Services Providers outside the EGI community -Possibility of new services for EGI.eu, such as e.g. making researchers aware of the cost of their support resources	**Threats** -Economic crisis may impact on stability of partners thus endangering the whole initiative Diverging national agendas -Government reluctance to spend outside national borders -Government spending cuts

NB. There are many more opportunities that can be taken into consideration. If the opportunities detected (or still undetected) cannot be addressed by EGI.eu, then it could be considered the involvement of external partners.

5 DEFINING THE STRATEGY

The EGI Council is responsible for defining the strategic direction of the EGI federation. The Council also acts as the senior decision-making and supervisory authority of EGI.eu. EGI has established itself as an open ICT ecosystem that can attract research communities from across the whole digital ERA.

This section of the document mentions the strategies that are been planned for addressing the challenges, opportunities and threats that have been analysed in the previous sections. The higher decision-making bodies of EGI, namely the Executive Board and the Council, are involved in this analysis and in the strategic planning. Some of the strategies are already well depicted and in the first phase of implementation, whereas others are still in the first stages of definition.

The first assumption made here is that there will be a strong growth in the demand of data and computing services, that the number of Research Infrastructures, Research communities, groups will grow and that they will be doing more intensive use of data and computing intensive approaches.

This growth presents many different opportunities, many of them yet to be explored, that will be addressed leveraging on the strengths of EGI and EGI.eu. The growth is important for sustainability because supporting excellent science is the main goal and the very raison d'être of Resource Centres, EGI and EGI.eu. By supporting their main goal, it demonstrates its value to the different funding bodies at all levels (European, national or regional) and creates value that can be exploited and create sources of income. This forms part of the continued planning with the other e-Infrastructure programmes in Europe to form, ultimately, an ERIC type framework (e.g. EU e-Infrastructure Commons).

Before continuing with the description of the tactics elected for deploying the growth strategy (market penetration), it should be considered the common mistake of assuming that fast-growing industries are automatically always attractive and profitable. Growth does tend to mute rivalry, because an expanding pie offers opportunities for all. Fast growth tends to draw in new entrants though, and it does not diminish the advent of substitutes. This is the challenge that should be tackled by EGI.eu leveraging on its exceptionally good position for interacting with stakeholders to help set the structure of this sector in a win-win situation for all.

Strategy for e-Infrastructure Commons

The operation, maintenance and growth of the Infrastructure and services for the research Community still remain the core activities of EGI and EGI.eu. The activities performed are not described here again, as they are sufficiently well-known. However, the strategy sees that the following actions are taken in order to address the growth forecasted:

- Strengthen the relationship between other e-Infrastructures towards a common backbone of federated services.

- Develop policies, processes and business models for joint capacity planning within EGI and with other partners.

- Integrate into a shared marketplace, which also includes commercial providers, as shown with the work done for the Helix Nebula marketplace (HNX).

An important part of the services provided by EGI/EGI.eu are meant for building these commons. In concrete, the **Federated Operations solution**[26] is aimed at the resource providers of the e-Infrastructures that are part of EGI, to make their operations even more efficient and effective, or at those wishing to become members, to guarantee a seamless integration.

Strategy for Open Data Commons

The external analysis anticipates an impressive growth of the dataset brought by more scientific projects and the data collections made available by the Open Data policy which has been spreading across the EU. A need for services for open data sharing, curation and long term preservation has been identified.

EGI has signed an agreement with APARSEN to bring top services in digital preservation to the EGI community, according to which both institutions have defined a joint workplan of activities to expand the EGI service catalogue with services covering the long-term preservation of research outputs for European scientists and their international collaborators. The services include providing consultancy and training, defining education programs and developing the material, selection and distribution of software to resource providers and joint business models analysis for sustainable digital preservation services.

A workshop to engage research communities that need services for managing, computing and preserving Big Data was held in Amsterdam on 4-6 March[27] and resulted in the first tangible result of this collaboration.

EGI is also committed to stimulate sharing of current and future research outputs, which is aligned with the European Commission's vision of Open Access (OA). The Commission proposes to make open access to scientific publications a general principle of Horizon 2020 as a means to improve knowledge transfer, (Strategy for Knowledge Commons). EGI will collaborate with OpenAIRE to implement a vision of an Open Access portal linking scientific publications to infrastructures. The integration is meant to be tightened in the future.

Strategy for Knowledge Commons

Serving and supporting the research communities are clearly the main objective of EGI. Keeping the high standards is not only EGI's main work but also a prerequisite for the growth strategy. The experience acquired through years of testing, integrating and using distributed federated services constitutes also one of EGI's most important assets. The Distributed Competence Centre (DCC)[28] is a new mechanism, federating the know-how from the NGIs and Resource Centres, which has been set up to help international research communities when they face the data handling and processing challenges.

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[26] https://documents.egi.eu/document/2196

[27] http://go.egi.eu/bigdata-2014

[28] EGI-Engage: Call for Participation for Competence Centres, https://documents.egi.eu/document/2187

Figure 4 - The DCC or Distributed Competence Centre
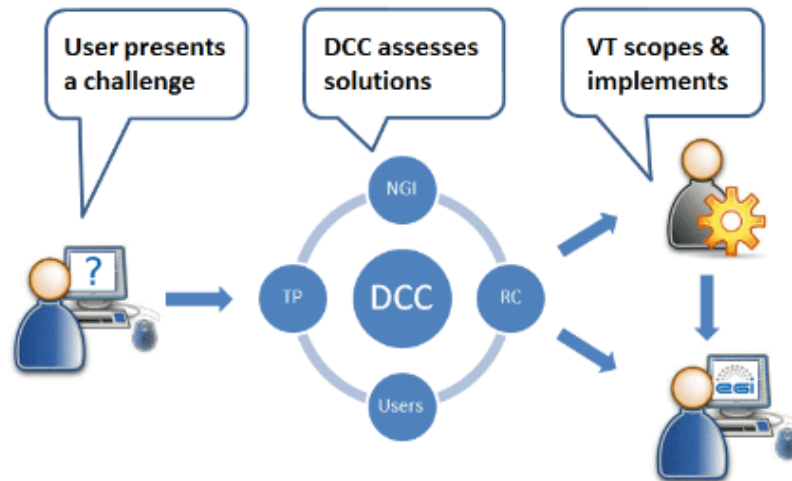
DCC, Distributed Competence Centre; NGI, National Grid Infrastructure; RC, Resource Centre; TP, Technology Provider; VT,Virtual Team.

EGI also intends to strengthen the collaboration with Centres of Excellence (CoE)[29] from the HPC strategy, and to facilitate knowledge transfer to private sector. This includes aspects that aim to facilitate the transition from the lab to the market of products or services developed within EGI and with potential for commercial exploitation. This requires engagement with the commercial sector in many different dimensions, currently explored through a dedicated Virtual Team[30], which may or not include commercial transactions with the EGI members. This collaboration, which has traditionally prompted much discussion among the EGI members, is not only aimed to increase opportunities for socio-economic impact or to ensure the future sustainability of EGI as a collaboration, but also is meant to align with the main objectives of the European Commission, made explicit in the definition of the H2020 strategy.

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[29] Achieving excellence in HPC applications (slide 12)

[30] https://wiki.egi.eu/wiki/VT_Business_Engagement

6 IMPLEMENTING THE STRATEGY

6.1 *Reaching communities: the Engagement Activity*

The Engagement Strategy, described in a publicly available document[31], set goals, priorities, and targets for engagement and defines the overall processes. For most, if not for all, of the scientific communities, it is essential to have strong assurance of the continued operational permanence of the e-Infrastructures that they adopt to support their work. Therefore EGI's sustainability plans have become increasingly coupled with its long-term strategy. This is already evident with the Resource Centres and Research Institutes historical record (some running for over 40 years).

Engagement of new communities has been identified as a major strategic action not only because the benefits that it will bring to the European Research Community, and thus to the whole society in tackling the societal changes and challenges, but also as a main pillar for assuring the EGI sustainability.

The Large and Medium Size Research Infrastructures (RIs) from both the ESFRI roadmap[32] and those outside the ESFRI's roadmap but still supporting similarly large, multinational and structured scientific collaborations are the primary potential beneficiaries of EGI services and, hence, the prime targets of EGI Engagement activity. In the next two years, the number of RIs reaching implementation or operational stage will grow significantly.

The second target group for EGI Engagement is the large number of relatively small (around 10-50 scientists) research collaborations and research networks. Unlike RIs, these groups may scarcely, or not be aware of e-Infrastructures, and their benefits to science. However, to reach these types of users, the services offered need to be extremely easy to use.

The focus on these two main targets can also be considered as a strategic action in itself. By focusing on these areas, EGI can concentrate its resources on those communities benefiting most of the e-Infrastructures, thus EGI strengthens his own position.

The strategy is implemented in a sequential process, which is best described in the document, but can be summarised as follows:

1. Target specific scientific communities throughout the ERA from EGI's market segment analysis that could break current scientific barriers with the use of EGI/NGI solutions.

2. Expand efforts in reaching out based on proven approaches and work such as with CTA, DHRIMs, ELIXIR and carry out discussions with these newly identified communities about ICT technologies to capture details of their e-Infrastructure use cases and requirements.

3. Help the communities address their scientific challenges with existing EGI solutions, and by bringing in new solutions to EGI as required.

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[31] Available at https://documents.egi.eu/document/2079
[32] ESFRI roadmap: http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=esfri-roadmap

4. Support scientific communities during the whole process they have to go through to become active and self-sufficient users of EGI e-Infrastructure services.

Every phase has an appointed responsible person, and a large list of tools. Engagements with research infrastructures from the ESFRI roadmap are monitored constantly, and define targets for focussed support projects (Virtual Team projects). The table is updated on a regular basis as part of this strategy using input from the NILs, UCB, the Council and other members of the community.

6.2 Addressing the long tail of Science

In order to reach the long tail of science and research, EGI must meet the on-demand culture that cloud computing has brought to science. EGI recognises in its mission statement, the importance of bringing the advantages of data and computing intensive methods. EGI also recognises this as a colossal task requiring a notable amount of human resources to make it possible. The need of this important and growing amount of potential customers can be served, by bringing an additional role into the picture. This role, which can initially be named as "retailers", who would serve as partners able to reach this long tail, cannot be achieved, at least not efficiently, by EGI.eu. It has already been mentioned that one of the strengths of EGI is the already existing high capillarity exercised through the member NGIs. However, the model proposed can be complementary to the one exercised in different degrees of exertion by the NGIs. The large magnitude of the so called long tail gives room for many different partners to operate without harmful interference, on the contrary both players are encourage to cooperate for a higher efficiency in their performance. Along with NGIs, SMEs could play this role as "retailers", provided a business model is developed to ensure the viability of this strategy. There is not one, but many different possible models to be explored in the future.

With this strategy, EGI not only would improve significantly and efficiently its capillarity to reach scientists at the smallest units of organisations without having to take all of that work on itself, but also would partner with the absolute main actors of the creation of economic and employment value in Europe[33].

The previously discussed Engagement Strategy (on page 40) would be the main focus of the global customer engagement strategy. The second focus would be set on the partnership with SMEs. The combination of both is depicted in the following figure. There are clear parallelisms with the combined Wholesale / Retail strategies implemented in many leading industry sectors.

The advantages of this combined strategy can be summarised as follows: Allows to focus on the main big targets (the fat end of the tail), hence better use of resources and budget; Allows maximal outreach of the long tail of science; Better segmentation (creation of integration strategies aligned with the needs of the research communities).

The main advantage can be consolidated in the drastic improvement of the budget usage margins by reducing costs of acquisition of communities while achieving a higher impact. However, the adoption of the combined strategy is a major change in the way EGI runs its business. In order to explore the

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[33] The Small and Medium size Enterprise represent more than the half of the EU economy; in fact more than 99% of all European businesses are SMEs. They have an important role to play in job creation (contributing in many sectors up to 80% of all employment, especially for young people), growth and innovation.

framework in which this partnership can be established, a number of Virtual Teams and Task Forces have been put into work.

To address the commercial outreach strategy, a dedicated Virtual Team was established to define a Business Engagement Programme for developing relationships with SMEs and bringing them into the EGI ecosystem to create mutual value, and to create the basis for future, broader actions by identifying SMEs potentially willing to collaborate with EGI in these activities and establishing active strategic partnerships. SMEs participating in the program may also be part of future Horizon 2020 proposals. This programme builds on previous efforts in the EGEE series of projects. More information is available in EGI's website[34].

6.3 New Revenue Streams

6.3.1 Pay for Use

The report *Exploring how researchers can pay for EGI Resources*[35] provided the results of an experiment around pay-for-use models for EGI services, which explored usage models where users would be billed for the services and resources consumed.

The document recognised the need for further options around a more market driven service provisioning for supporting research work in the ERA. Until now, EGI has operated within a publicly funded research and academic environment providing services free at point of delivery with resources bought from grants dedicated to certain groups or disciplines either by direct allocation or by peer review. The document also anticipated the shift towards an on-demand model of service provision, more flexible and agile, brought by the advent of cloud computing. Taking into account both assumptions, it explored how pay-for-use models for EGI resources could be implemented alongside existing procedures where users were billed for the usage of resources.

As EGI operates in a distributed environment, services are provided by a variety of different organisations spread across Europe and beyond, it considered and proposed different roles, models and plans for applying those within EGI. EGI.eu could play the role of a 'federator', providing the necessary technology, processes and governance to enable users to access an integrated set of services from autonomous organisations. The NGIs could also play a similar role on a national level.

Three main models were presented that could apply within the EGI ecosystem: The 'Independent Advisor' model, the 'Matchmaker' model and the 'One Stop Shop' model. In the 'Independent Advisor' model, the federator provides a general listing of services, facilitates relationships between customers, consumers and resource providers while playing only a support role if required during the service lifecycle. Through the federator, resource providers can promote their services to customers, while retaining the direct dialogue concerning the resource allocation, contracts and financial transactions. This model requires the customer to interact within individual (potentially multiple) resource providers to obtain the services it requires. Therefore, interactions are decentralised leading to higher overheads for the number of relationships that customers/resource providers must maintain. The federator is able to fund the services it provides through a membership model, which

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[34] https://wiki.egi.eu/wiki/VT_Business_Engagement
[35] https://documents.egi.eu/document/1391

restricts the customers and resource providers that can use them. This is the current model used by EGI.eu.

Figure 5 - The Independent Advisor model
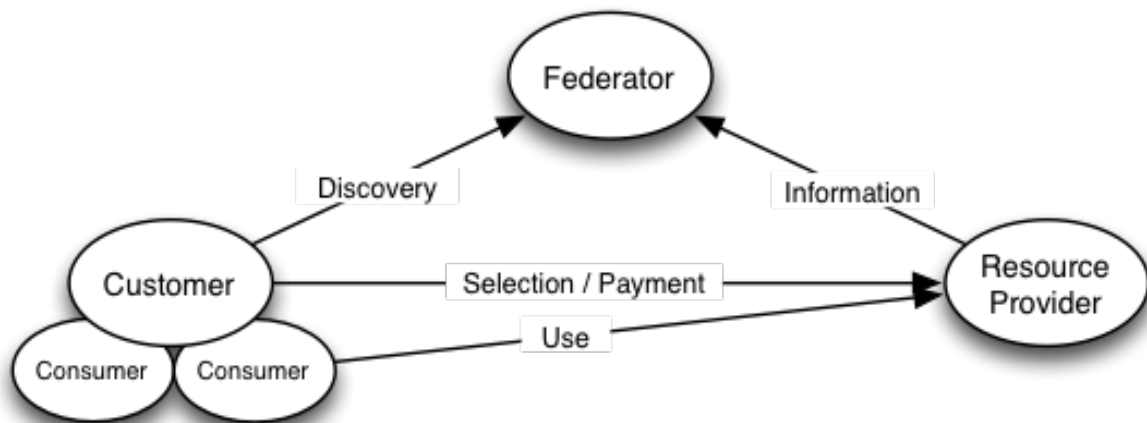
In the 'Matchmaker' model, the resource allocation is managed by the federator. The customer discusses requirements and receives a resource allocation from the federator with a resource provider. The contractual agreement is established by the federator with the customer on behalf of the resource provider but any financial transaction is handled directly between the customer and resource provider with the resource provider paying the federator for establishing the contractual agreement. This model is more suitable for customers who need access to many resource providers.

Figure 6 - The 'Matchmaker' Model
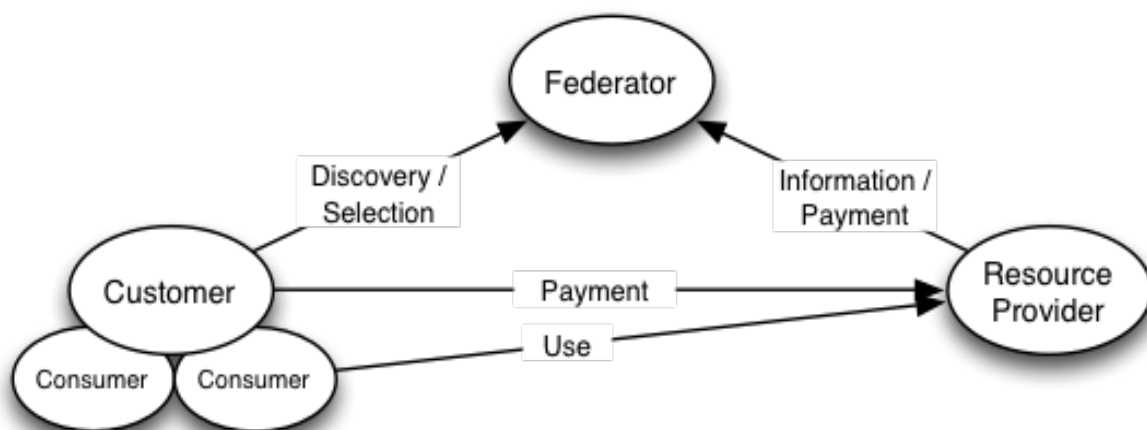
The 'One Stop Shop' model fully relies on the federator to handle the service publication, matchmaking, contract and agreement negotiation, as well as financial transactions. The resource provider receives payment for the resources used by the consumer collected by the federator from

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the customer. Reliance on such a service reduces organisation overhead on both customers and resource providers by offering them a single point-of-contact to many independent counter-parts.

Figure 7 - The 'One Stop Shop'
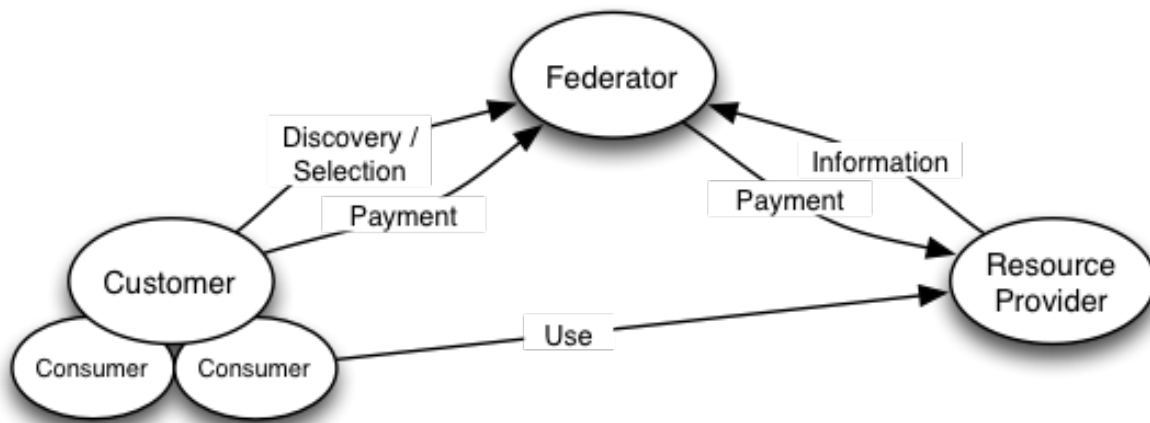
In early 2013, the EGI Council approved a policy to explore business models for pay-for-use service delivery to couple together with the traditional method of free-at-point-of-use. The goal of this activity was to support the implementation of this policy in collaboration with NGIs through the definition and execution of proof of concepts. The mandate of the group was to create a proof of concept pay-for-use prototype[36].

The activity started in January 2014 with best effort support, continuing in May 2014 as a dedicated task in PY5 (NA5.2) and will run until the end of the year 2014 with the publication and circulation of a Final Proof of Concept Report. The temporary results will also be presented for feedback at the EGI-InSPIRE EC Review. The estimations by now are that the 'Matchmaker' model could realistically be implemented by December 2014 by at least few of EGI members. Other models, such as the One-Stop-Shop or another, which has been given the name of 'Trusted Third Party' and which includes all the characteristics of the One-Stop-Shop except for the invoicing, could be implemented by a few members that have shown interest in a longer term 2015-2016.

6.3.2 Public Procurement

Public Procurement is defined as the purchase of goods and services from third parties on behalf of a public authority. The advent of cloud computing and the capability of leasing IT infrastructure on an on-demand basis is slowly changing the way research groups provision IT services. As many other businesses, they look for ways to move expenses from the Capital Expenditure (CAPEX) budget, i.e. purchasing hardware, to the Operational Expenditure (OPEX) budget, by purchasing IT services on

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[36] https://wiki.egi.eu/wiki/EGI_Pay-for-Use_PoC

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demand. In this way, they avoid investments become locked-in in the annual balance sheet, and spread the costs of running their research over time.

Policy makers have understood this trend, thus they are investigating how to align the regulations on public procurement to IT services. Beside the classical procurement, pre-commercial procurement (PCP) and procurement for innovation (PPI) are being investigated (e.g., CloudForEurope project[37]).

The participation in public procurement for science bids has been detected as a clear opportunity for EGI members of fulfilling their mission as providers of data and computing services for research within the ERA. This can also be viewed as an opportunity for supporting the sustainability of EGI members participating in this potential bid for services, and for EGI.eu if it were to take the role of mediator.

There are other benefits for all parties to be considered as an active participation of EGI members in public procurement bids could result in first, a procurement problem being resolved in an effective and creative way; second, it could lead to better value for money for the tax payer; and third it could stimulate the generation of new products and ideas that will, in turn, lead to economic growth, often based on the translation of scientific research into commercial products and services.

Two concrete scenarios can drive the assessment of the resources, policy and legal issues that would need to be addressed if those models were to be adopted within EGI. One scenario is related to the European Space Agency and opportunity connected to the exploitation of the Sentinel-1 data in collaboration with the Helix Nebula initiative. On the other side, the CloudForEurope project is working in the area of Pre-Commercial Procurement of Cloud Services and an invitation to tender is expected soon (July-August 2014).

6.4 Evolving the EGI Governance

A Governance task force has been constituted to address the governance problems and propose a new structure. It has been working since the beginning of March 2014.

The main objectives are to: present and reinforce the value of EGI and EGI.eu to their members; identify different types of stakeholders; define a membership system and fee scheme; explore different options of legal structures e.g. public, private, and full commercial; revise the legal entity of EGI.eu and the VAT position.

The aim is to revisit the current mission statement looking forward to H2020, taking into account all the changes that current members have gone through over the last years. The multi-annual financial framework, the fee scheme and the value proposition should be clear, egalitarian and attractive for NGIs to sign up for continuation.

Among the tools and the ideas explored there are: benchmarking of other similar structure of European bodies; exploring the idea of increasing flexibility and permit Resource Centres to join directly without going through an NGI; determining the nature and definition of in-kind contribution;

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[37] http://www.cloudforeurope.eu/

revising the fee system with the inclusion of a tiered fee system with different levels of participation; discussing possible business models.

6.5 New Service & Solution Development

The services provided by EGI aim to satisfy the needs of the people that EGI serves, and to create value for them. The service portfolio has been continuously evolved along the years even before the very inception of EGI. It contains services specifically designed to meet the needs and expectations of every main type of customer (defined in the section Customer analysis on page 27), and to solve their problems. EGI's website[38] describes the services provided according to the customer/user classification.

EGI continues to explore different options to fulfil its vision of supporting the digital European Research Area and continue being the preferred pan-European research infrastructure by developing new services, and by addressing the opportunities detected (and to be detected) leveraging on their resources.

During the last period the Federated Operations service has been significantly expanded based on the principles of using open standards, open source software for managing a very heterogeneous infrastructure. Furthermore, the launch of the EGI Federated Cloud[39] marked an important milestone in the evolution of the overall service portfolio.

There are other innovations that are planned for development providing the necessary funding is obtained: **Federated Storage**: Enhanced Cloud STaaS service with a single entry point, for virtually unlimited storage, single data management system, co-location of data to computing; **iPaaS**: General-purpose integration Platform-as-a-service, where users can put directly algorithm and run it over a big amount of data**; Data access and dissemination**: A general-purpose system for storing, extracting metadata, cataloguing, organising, searching and accessing scientific data**; Virtual Laboratory-as-a-Service**: Integrated system for integrating easily Virtual Laboratories or a collection of software processing and access tools; **Secure Personal Storage**: Storage solution for data sharing and collaboration, with enhanced security capabilities privacy, data ownership, data access delegation, etc.; **LTDP-on-the-cloud**: Provide a Long Data Preservation service for small communities or scientific projects.

EGI/EGI.eu has gathered a quite rare and thus marketable expertise in IT Service Management in Federated Organisations through the learning a development of FitSM, a lightweight standards family aimed at facilitating service management in IT service provision, including federated scenarios. Several members of EGI.eu have already been trained, with one having earned trainer credentials. A possible service would be providing guidance and input on different aspects of service management in Federated ICT infrastructures, which could be done either independently or together with other partners.

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[38] http://www.egi.eu/services/

[39] http://www.egi.eu/news-and-media/newsfeed/news_2014_023.html

During the last period, the concept of solution was introduced as a combination of products, services, and intellectual property focused on a specific business problem or opportunity that drives measurable business value and can be significantly standardised. The solutions components can be from either the vendor or one or more partners, and the solutions implementer can be the vendor, the partner, the customer itself, or a combination of the three[40].

The solutions marketing is a vibrant trend in marketing philosophy, which pursues the idea to start from the customer instead of the services or products that an organisation has already developed and is prepared to offer. By starting with real customer needs, organisations often discover that the customer actually needs a blended set of offerings, since the customer's business problems are broad and deep enough that a single offering will not be sufficient to deliver real value. True customer solutions require that other partnering organisations contribute their products and services in order to create the new solutions offering that will deliver the value and benefits that the customer expects and needs.

The EGI solution portfolio was first developed during 2013 to present dedicated answers to specific user needs. As the users' requirements evolved or, the EGI Solutions were again fully redefined during the first half of 2014 to better reach better EGI's users, and to align within a business framework. All the solutions were defined taking into account a marketing perspective, stating the target groups and the challenges they experience, the needs they have and how the EGI solutions create value for them. In many cases, the services have been in operation for some time, thus possible to present a few good success stories.

These solutions are marketable as such for the different groups. There is still work to do in order to finalise the "productisation" of the offerings: defining a price/value schema, finding appropriate distribution channels, creating billing systems. This work is aligned with the implementation of the fundamental strategy as discussed in this document. The current four EGI solutions are described as follows:

> The **Community-Driven Innovation & Support solution**[41] addresses the way EGI responds to the researchers' support queries. Whenever researchers encounter a challenge accessing EGI resources, they can, as before, knock on many doors. But if the problem requires a new technology, it is now possible to summon a group of experts to put their brains together and create an innovative answer. This will then become part of the pool of previously existing applications, workflows or any other already existing approach.

> The **Federated Cloud solution**[42] is the long-awaited response to the demand for a European federation of academic clouds. With this solution, researchers obtain a single cloud system for their research activities, which they are able to scale to their requirements, which is fully resilient and free from vendor lock-in. The user-researchers can focus on their core work and obtain new, innovative approaches to their work.

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[40] http://www.solutionsinsights.com/insights/what-is-the-definition-of-a-solution/

[41] https://documents.egi.eu/document/2199

[42] https://documents.egi.eu/document/2197

The **High-Throughput Data Analysis solution**[43] represents the core of the EGI activity, which is the provision of high quality data and computation intensive resources in a distributed infrastructure.

The **Federated Operations solution**[44] is aimed at the resource providers of the e-Infrastructures that are part of EGI, to make their operations even more efficient and effective, or at those wishing to become members, to guarantee a seamless integration. This solution relies on the lightweight standards family for service management in IT service provision, known as FitSM[45], which EGI has helped shape. This is a breakthrough in the implementation of service management routines in all federated IT service provisioning, not necessarily related with scientific production. With the focus on sustainability, the rare expertise achieved within EGI might also be valuable for other IT services organisations in their struggle for quality management in a federated environment.

Each solution is described in a series of white papers presenting the problems they address, who are the beneficiaries from the solution and how the solutions are built to provide value. These can be found in the EGI Document Database[46]. A series of booklets with an appealing layout has also been produced by EGI to help NGIs representatives and NILs in explaining what EGI does, and what EGI's value proposition is. They can be delivered to all members of the EGI community.

Some NGIs have started producing and promoting their own catalogue of end user services[47], however, there is still work to be done in this area. EGI.eu could have a role in helping NGIs and resource centres to develop their own service / solution portfolio and to structure it in a marketing driven perspective to better reach their own clients and to help with their own sustainability. These added value services need to be analysed in terms of available effort, as even if valuable, may not be possible.

6.6 Communicating to the Policy Makers

Promotion is one of the four elements of the marketing mix and refers to raising customer awareness of a product or services, and to make them available for the final user. The communication has been meant mainly for the user communities, or within the members, however during the last period the need for a more meaningful communication with Policy Makers has risen as a major action to improve. This is an essential activity to ensure the operation and the sustainability of the collaboration. The actions that will be taken for increasing the communication with policy makers will include: Face-to-face events; Common strategy to outreach national funding agencies; New publications describing tangible results and impact; better metrics to demonstrate transnational access and impact on excellent science.

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[43] https://documents.egi.eu/document/2198
[44] https://documents.egi.eu/document/2196
[45] http://www.fedsm.eu/fitsm
[46] https://documents.egi.eu/document/2138
[47] http://www.france-grilles.fr/-Offre-de-service-?lang=en

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On the more traditional activities' side, the Annual Report on EGI and its community engagement activity (EU deliverable: D2.26) describes the plans and tactics to reach the existing and potential customers. The document also describes the EGI engagement activities performed over the last year and the results to all identified categories, the current and potential customers, thus, scientists and scientific communities from all fields of science across the whole ERA (see section 3.5.3Customer analysis on page 27 for full description) but also:

- **Resource providers**: federate resource providers that are represented by National Grid Initiatives into the EGI production infrastructure, and into the related human networks;
- **Technology providers**: technology developers, peer-infrastructures and other organisations providing the relevant software and other solutions for the EGI production infrastructure;
- **SMEs and industry**;
- **General public**.

It has been noticed that there are communities that are not yet aware of the potential benefits of EGI, and there is still a long way to go. However, the scope and magnitude of the Engagement Strategy reflect the high priority given to this work, in which engagement with prospective communities was deepened. The technical challenges of each scientific community were understood, and matched with possible solutions.

According to the needs two different approaches were used:

1. Bottom-up approach: assessing the NGIs' collaborations with national nodes/institutes of scientific projects/communities and collecting the national requirements into European Virtual Team projects, and
2. Top-down approach: building human bridges between EGI and scientific projects through management-level meetings arranged between EGI.eu and the coordinating institutes/bodies of scientific projects/communities.

Regarding the customers of EGI.eu, their members, Resource Providers, it is in everybody's benefit to ensure a widespread knowledge of the value of the activities performed by EGI.eu. The Governance Task Force will also address this issue with special effort in their activity.

In addition, it is worth mentioning that EGI.eu coordinates the communication and marketing activities on behalf of the NGIs and partner projects. The aim is to publicise the work of EGI as a whole to target audiences, including: journalists, general public, resource providers, collaborating projects and decision makers. This is accomplished through the project website, EGI's publications, the EGI newsfeed, social media channels and representing the community at key events. There has been some suggestion that this powerful resource could also be extended as a service to make aware scientists of the costs of the computing tools they use in their resources.

6.7 *Financial Sustainability of Services Coordinated by EGI.eu*

EGI.eu coordinates a variety of **shared services** to the wider EGI community such as overseeing infrastructure operations, coordinating user community support, working with technology providers,

representing EGI in collaborative projects, steering strategy and policy development, organising EGI's flagship events and publicising the community's news and achievements. These services (collectively called the EGI.eu service portfolio) are designed to promote efficiency, generate value, achieve costs savings and improve service for the members (the NGIs/EIROs and the affiliated resource providers). Experiences from industry show cost savings from shared services in the range of 15-30% over time.

These services are described in the EGI website[48] and summarised in Figure 9. They are provided in collaboration with the NGIs. The cost analysis performed in previous years showed an average total cost of ~4M€. These costs are split into categories as showed in Figure 10 and they are currently covered as follows: EC funding: ~50%; Membership fees: ~25%; NGIs In-kind contribution: ~25%.

Coordination	Consulting and Support	Marketing and Outreach	Software and Services
• Project and Programme Management • **Operations Coordination** • Technology Coordination • **Security Coordination**	• Specialised Consultancy • **Strategy and Policy Decision Support** • Policy Development • **Technical Consultancy and Support** • Helpdesk Support	• Marketing • **Outreach**	• Federated Operations • **Repository of Validated Software** • Applications Database • **Training Marketplace**

Figure 8 - Services coordinated by EGI.eu

For the next two years (May 2014-Apr 2016), budgeted costs exist for the core activities performed by manpower located at NGIs through a bidding mechanism. Such costs sum up to 1,5M€ (see Annex 11) and support the following services: federated operations, repository of validated software, helpdesk support and security coordination.

EGI.eu staff provides the following services: project and program management, operations coordination, technology coordination, strategy and policy decision support, policy development, technical consultancy and support, marketing & outreach. The cost of EGI.eu staff for 2013 was 1,8M€ (19FTE), but the number of employees decreased over 2014 by 1,5 FTEs. Two FTEs are contributed by INFN as in-kind to support operations coordination and user support. Other costs

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[48] http://www.egi.eu/services/catalogue/

within EGI.eu cover the facilities, project & office travel, administrative costs, etc. sum up to 600K€ (see Annex 10). Other costs to be considered are AppDB (40K€/year), training marketplace and CRM.

During the first part of the EGI-InSPIRE project, one of the identified objectives with regards to the financial sustainability was to achieve the complete coverage of the costs for the operations of EGI.eu coordinated services via national funds, while approaching EC funding only for innovation activities. The experience of the first years of the EGI collaboration demonstrated that this is not the best strategy to achieve sustainability for the following motivations: Resource providers already bring their own capacity that is funded at the national level to be offered to researchers from other countries; they see this as an important in-kind contribution that should be recognised as an European added value.

The EGI collaboration creates value at the European level by acting as an interacting link across the national levels. This value generation for the European researchers and ultimately for the whole society is clearly in the interest and scope of the European funding bodies, which make explicit their support by providing the necessary funds. The European Member States contribute by providing capacity to be shared across countries and the necessary expertise to manage them.

Long-term funding cycle is essential to ensure ability to instil confidence of long-term service provision; yearly funding cycle from membership fees should be couple with long-term financial commitment.

6.8 Plan for 2015-2016

The plan for the next two years in terms of covering the costs for services coordinated by EGI.eu is:

- NGI International Tasks: EGI-InSPIRE funded NGIs to support the federated operations at the national level; during the life of EGI-InSPIRE, the NGIs managed to mature these services and embed them in their current national activities, therefore no further support will be expected from the EC
- CRM: this service will be dismissed
- Services coordinated by EGI.eu:
    - Staff at NGIs: 40% will be supported by EGI.eu, while 60% will be provided as in-kind contribution from NGIs
    - Staff at EGI.eu:
        - Membership fees: the goal is to maintain the current fee level, and possibly to increase it
        - Project under call E-INFRA1.5: the current idea is to attract around 2M€/year for EGI.eu and the rest to be split among NGIs and user communities

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6.9 Plan beyond 2016

During 2014-2015, EGI aims to solve the short-term funding cycle problem by finding different mechanisms that could guarantee the collaboration to ensure delivering of European added value services to the research communities. Both the EC and the EGI.eu members should support the added value services coordinated by EGI.eu.

A long-term financial commitment should be achieved: 1) from the EC, via exploring the option of a Framework Program Agreement (FPA); 2) from the EGI.eu members, through a multi-annual financial commitment coupled with the yearly membership fees.

7 RISK ASSESSMENT AND MANAGEMENT

It is unavoidable that issues arise or deviations to the strategic vision do not go exactly according to plan, but by identifying the potential risks allows an organisation to better adapt and overcome problems thus reducing the impact. A common risk assessment classifies risks into main types, probability, effect, and corresponding mitigation and contingency plans.

The main issues around sustainability resulting from the various analysis and risk assessments are ensuring and expanding the user base and financial stability. Therefore, the strategic direction of EGI focuses on providing the key services that will not only ensure the current user base, but also expand it towards the long-tail of science and taking the necessary steps to demonstrate the value-add of EGI to national funding agencies and research councils and the European Commission for continued support to achieve the goal of European-led, world-class research and innovation.

Whatever component of the multi-pronged strategy, it needs to take into consideration the organisational structure, which in the case of EGI defines its very nature (federation with lightweight management) and the existing 'business' culture, which could be described as the way things get done, the general beliefs, the general values. There are models available to steer the implementation of a new strategy or to manage change.

8   CONCLUSION

Sustaining EGI means ensuring that value is delivered and long-term funding is guaranteed so that research groups, which typically have a research agenda spanning years, can safely decide to rely on the fact that services will be provided.

This document presented the vision of the Open Science Commons and positioned EGI in this wider context of Science production in Europe. The Open Science envision *researchers from all disciplines having easy and open access to the digital services, data and knowledge they need to collaborate and perform excellent research.* The document also provided a rich analysis to identify strength, opportunities, weakness and threats for both the EGI collaboration and EGI.eu. The data and computing service is complex, and this complexity is expected to increase in the future higher number of actors. The most important assumption on which strategic plan lies in that there will be a strong growth in the demand of data and computing services Based on this, a number of strategic objectives have being identified as well as actions to ensure growth and sustainable delivery of the EGI value.

9 REFERENCES

R 1	EGI Engagement Strategy, https://documents.egi.eu/document/2079
R 2	http://indico.egi.eu/indico/getFile.py/access?contribId=13&sessionId=3&resId=0&materialId=slides&confId=1217
R 3	http://cyber.law.harvard.edu/epolicy/roadmap.pdf
R 4	Understanding Industry Structure (2007), Harvard Business School, is a note prepared by Professor Michael E. Porter based on the classic and celebrated article "How Competitive Forces Shape Strategy," Harvard Business Review, July-August 1979. Professor Jan W. Rivkin assisted in the preparation of the note, which is an update and extension of the article
R 5	http://en.wikipedia.org/wiki/Porter_five_forces_analysis
R 6	EGI Case Studies http://www.egi.eu/case-studies/
R 7	The Five Forces that Shape Strategy, (2008): Porter, Michael, Harvard Business Review 79, January 2008, pages 78-93, http://hbr.org/2008/01/the-five-competitive-forces-that-shape-strategy/ar/1

10 ANNEX: EGI.EU FINANCIAL STATEMENT: 2013

The following accounts relate to EGI.eu from 1 January 2013 to 31 December 2013. The complete financial accounts and accompanying statement are available online (http://go.egi.eu/1146).

The accounts were adopted by the EGI Council in April 2013.

Balance Sheet

Assets	€	Liabilities	€
Trade and other receivables [1]	674,289	Appropriated reserves [3]	1,319,763
Cash and cash equivalents [2]	1,623,007	Current liabilities [4]	977,434
Total	2,297,197	Total	2,297,197

Table 3 - EGI.eu Financial Statement for 2013 - Balance Sheet

Notes:

[1] Debtors (€69,451), interest (€50,739), receivables from employees (€960), insurance (€0), pre-payments (€205), project pre-financing (€552,934)

[2] EGI.eu current account (€454,815), EGI.eu savings account (€1,152,042), deposits (€16,150)

[3] Reserve for E-tasks that have not yet been undertaken (EGI.eu: €112,272 and partners €-814) and reserves for EGI.eu (€1,208,305)

[4] Taxes and social securities (€38,124), project pre-financing (€68,313), advance payments received (€190,451), accounts payable (€21,476), accountant (€5,000), administration (€6,199), accrued staff pay (€110,810), interests on pre-financing (€0) and Global tasks (€537,061).

Income

Income 2013	€
EGI-InSPIRE, 2013	1,123,585
EGI.eu participants	1,503,466
Helix Nebula	105,403
eScienceTalk	73,162
e-Fiscal	19,939
ENVRI	20,028
FedSM	44,624
ER-Flow	40,476
BioVel	46,817
DCH-RP	38,356
BioMed Bridges	848
CloudWatch	14,029
Other	--
Interest	62,546
TOTAL	3,093,279

Table 4 - EGI.eu Financial Statement for 2013 - Income

Expenditure

Expenditure 2013	€
Staff salaries [5]	1,835,278
Subsidy for EGI global tasks	590,482
Facilities	133,000
Office travel	13,000
Project travels	122,000
Events/project meeting	30,000
Administration costs	58,000
Exceptional costs	50,000
Direct project costs [7]	175,400
TOTAL	3,007,160

Table 5 - EGI.eu Financial Statement for 2013 - Expenditure

Notes:

[5] EGI.eu has 19 Full Time Equivalents (FTE) at the end of 2013.

[7] Expenditure incurred by EGI.eu on behalf of an EC project that can be reclaimed in full from the EC apart from any VAT paid.

EGI.eu participation fees

Participant	Fee (€)	Participant	Fee (€)	Participant	Fee (€)
NGI-DE	173,630	NGI-PL	43,407	NGI-BG	4,341
NGI-FR	173,630	NGI-TR	43,407	NGI-CY	4,341
NGI-UK	173,630	NGI-GR	32,651	NGI-EE	4,341
NGI-IT	86,815	NGI-PT	32,651	NGI-LU	4,341
NGI-NL	86,815	NGI-HU	21,704	NGI-RS	4,341
NGI-NO	86,815	NGI-IL	21,704	EMBL	4,341
NGI-SE	86,815	NGI-RO	21,704	NGI-BA	3,256
NGI-DK	65,111	NGI-SI	10,852	NGI-LT	3,256
NGI-ES	65,111	NGI-SK	10,852	NGI-LV	3,256
NGI-FI	65,111	NGI-HR	8,681	NGI-ME	1,633
NGI-BE	43,407	NGI-RU	8,681	NGI-MK	1,633
NGI-CH	43,407	NGI-AT	8,139	NGI-AM	1,225
NGI-CZ	43,407	CERN	4,341	NGI-MD	1,225

TOTAL: €1,503,466

Country-based participants pay a participation fee and receive votes based upon their national Gross Domestic Product. Associated participants select their own fee and voting level, subject to the approval of the EGI Council.

11 ANNEX: COST OF CORE ACTIVITIES PROVIDED BY NGIS STAFF

The following table provides an overview of the consortia selected for the delivery of the core activities and the respective annual cost.

Service/Activity	Bidders	Sub task	Extra costs (hardware and travel)	PMs/year	Cost for EGI.eu (Euro/year)	Total Activity Cost (EGI.eu, 40%)	Total Activity Cost (EGI.eu 40% and NGI)
Message broker network	GRNET		0	2.5	6300	10620	26550
	SRCE		0	2.5	4320		
Operations Portal	CNRS		3500	24	62840	62840	157100
	GRNET		0	0	0		
Accounting repository	STFC		4800	12	38188	38188	95469
Accounting portal	CESGA		0	6	10152	10152	25380
EGI central monitoring services	GRNET		0	6.5	16380	25884	64710
	SRCE		0	5.5	9504		
SAM central services	SRCE		2500	10	18280	63960	159900
	GRNET		0	10	25200		
	CNRS		0	8	20480		
Service Registry (GOCDB)	STFC		5581	6	32385	32385	80963
Operations Support Services	GRNET		0	2	5040	26160	65400
	CYFRONET		0	6	21120		
Security monitoring	CESNET		0	4	10240	10240	25600
Security coordination	STFC	SPG	5000	4	20236	89348	223371
		SVG	3000	4	16030		
	FOM	IGTF OGF	5000	2	12688		
		IRTF	3000	5	20400		
	SNIC	IRTF	3000	5	19994		
1st and 2nd level support	IberGrid		0	12	27072	62912	157280
	CESNET		0	14	35840		
Collaboration tools	CESNET		0	12	30720	30720	76800

Acceptance criteria	Ibergrid		0	10	22560	22560	56400
Staged rollout	Ibergrid		0	10	22560	22560	56400
Software provisioning infrastructure	GRNET		0	13	32760	51096	127740
	CESGA		12000	6	18336		
GGUS	KIT		18000	12	49896	49896	124740
TOTAL					**606089**	**606089**	**1523803**