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Procurement Strategy and Policy: DiSSCo Prepare WP 8 - Milestone 8.4.

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Abstract
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Procurement Strategy and Policy

DiSSCo Prepare WP 8 – Milestone 8.4

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Abstract

The Distributed System of Scientific Collections Research Infrastructure (DiSSCo-RI) will need to build strategic partnerships with industrial stakeholders, and a procurement framework will be required in order to maximise these opportunities. This document (DiSSCo Prepare Milestone 8.4) looks at procurement from three perspectives: 1) strategic partnerships and co-creation; 2) the procurement legal framework; and, 3) green procurement policy. It highlights best practices in procurement, and where possible it considers how procurement frameworks have been implemented in other relevant European Research Infrastructures (RIs). Many of the areas described will help to inform DiSSCo Prepare WP4 and WP7, and it will be used as a basis for the stakeholder analysis and engagement activities of DiSSCo Prepare Task 8.3.

Key words

Procurement, strategic partnerships, DiSSCo, legal framework, industrial stakeholders

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1. Introduction

The DiSSCo RI will require strategic partnerships with industrial partners, and many of these partnerships will rely upon a procurement framework. DiSSCo will work with partners to co-create services and co-develop products such as software and will contract with third parties for goods and services. A clear procurement strategy allows an organisation to align its long term priorities and objectives with its procurement processes, helping with partnership development, scaling up processes, risk mitigation and cost efficiency.

This milestone acts as a policy briefing on the key areas of procurement strategy that DiSSCo will need to consider as it moves into the construction phase. There are close links with other DiSSCo Prepare (DPP) tasks. DPP Task 4.4 will work with a technical partner to develop a roadmap for pre-commercial procurement, and this milestone provides background material that will then be further developed as part of this task. DPP Task 7.2 is analysing legal entity models for DiSSCo, and their suitability for achieving DiSSCo objectives, and this will have a direct impact on the final procurement framework for DiSSCo. Similarly, this task has links and may build up on top of experiences gained in SYNTHESYS+ project, and specifically, from the work developed in Task 5.3 devoted to industrial engagement.

This procurement framework is considered from the perspective of DiSSCo as a buyer of goods and services, rather than as a supplier, although many of the principles discussed in this milestone will apply to other types of partnership working.

Procurement Landscape

DiSSCo will operate in an environment which will bring both challenges and opportunities to procurement. Assessment of the procurement landscape can highlight areas where risk management is required, and the potential opportunities that can be exploited through innovative procurement practice.

The timeline and procurement needs for DiSSCo will be identified throughout the prepare and construction phases. The DiSSCo Conceptual Design blueprint outlined three areas of potential future need for procurement:

- Access to storage capability through third-party repositories
- Digitisation processes and procedures
- Persistent identifier minting and resolution mechanism

There may also be requirements for the procurement of support and training services, as well as the construction of digital services supporting DiSSCo systems and processes. There is potential for co-creation with commercial innovators in areas such as artificial intelligence, software development, geo-localisation, imaging, and data storage (Hardisty *et al.,* 2020).

The creation of DiSSCo as a legal entity will shape the regulatory requirements of the organisation, and decisions will need to be taken on how procurement will operate between and within the distributed national nodes and with the institutions involved in DiSSCo. DiSSCo may adopt a ‘Centres of Excellence’ model, and the DiSSCo Conceptual Design blueprint identified four potential service clusters of digitisation-related services (digitisation, programme, infrastructure and data). These Centres of Excellence would operate at different organisational levels within DiSSCo, from institutional to pan-European. Digitisation services may be better suited at an institutional level, whereas the programme and data clusters are likely to benefit at being organised at a pan-European level. Further consideration is required on how procurement will be aligned to these different levels

of governance and coordination, as it is currently unclear where the boundaries will be between DiSSCo and institutional responsibilities (Hardisty *et al.*, 2020, Dixey *et al*., 2020).

External factors will also impact upon the procurement landscape. The Covid-19 pandemic has resulted in disruptions to many supply chains, with organisations now investing in technologies to improve supply chain resilience. There is continuing regulatory uncertainty following Brexit, and there may be future divergences in the legislative environment around areas such as data sharing, General Data Protection Regulation (GDPR) and procurement directives although these are currently still closely aligned.

Ethical and sustainable issues are also becoming ever more important as considerations for buyers, with organisations facing potential reputational risks. Given that DiSSCo aims to support research into biodiversity and climate change, it is important that sustainable practice is embedded into all organisational processes, towards a green operational scheme. DiSSCo can use its purchasing power to motivate suppliers to reduce their environmental impact, and sustainability considerations should be integrated into all procurement activity. The European Commission under the Green Deal framework continues to encourage green public procurement and supports the inclusion of green requirements in technical specifications.

2. Statement of Intent

A statement of intent, or vision, for procurement should be developed, which will guide how procurement will help DiSSCo to achieve its strategic goals. A procurement strategy should outline the objectives, goals and guiding principles of procurement with the organisation. The key strategic procurement considerations for DiSSCo include:

- **Procurement Model:** Decisions need to be taken on whether to adopt a centralised, decentralised or mixed model of procurement, and to what extent procurement will be the responsibility of a central function or through co-operation between the national nodes. This will likely depend on the type of product or service to be procured.
- **Collaboration:** Collaboration on procurement activity should be encouraged among the ESFRI landscape, and opportunities to share procurement best practices and models with other research infrastructure should be supported.
- **Supplier Relationships:** Risk and spend profiles for suppliers should inform a supplier relationship management framework, with executive-level ownership of strategic supplier performance.
- **Innovation Procurement:** Procurement practices should be adopted that encourage the development of innovative solutions. This can be through formal, large-scale procurement mechanisms such as Pre-Commercial Procurement or Public Procurement of Innovation, or through mechanisms to encourage innovation in standard tenders. DiSSCo should consider methods to improve SME participation in procurement, including dividing larger procurements into lots.
- **Governance:** The governance and accountability for procurement related activities needs to be outlined. In particular, DiSSCo must have appropriate governance in place to ensure it meets external legal requirements.
- **Sustainable Procurement:** Environmental sustainability should be a key element of any DiSSCo procurement activity, and this is a potential area of reputational risk for the consortium.

These issues are outlined in more detail throughout the milestone, alongside links to key resources, and will be developed further under DiSSCo Prepare Work Packages 4.2, 4.4, 7.2 and 8.3.

3. Strategic Partnerships and Co-Creation

DiSSCo will need to form strategic partnerships with industry and e-Infrastructure providers. Partnership management is essential throughout the procurement lifecycle, and these partnerships can range from simple customer-supplier relationships to strategic alliances developed through the procurement of innovation.

Key Reports

In 2018, the European Strategy Forum on Research Infrastructures (ESFRI) Innovation Working Group published a report describing best practice for strengthening collaboration between RIs and industry. The report notes that there is high potential to generate innovation through co-creation with industry during the construction phase of an RI's development, and industry should be engaged as early as possible. Industry can co-develop new technology and software, and pre-commercial procurement, discussed below, is often used during this phase to stimulate R&D with industry. The operation phase of an RI also offers opportunity for further industrial partnerships, with the RI both acting as an innovation provider and a technology purchaser (ESFRI Innovation Working Group, 2018).

The ESFRI report also recommends that professional intermediaries, such as Industrial Liaison Officers and Industry Advisory Boards, should become common practice in RIs, including in the central hub of a distributed RI. Industrial Liaison Officers can build relationships with relevant companies, increase the market understanding of the RI and develop flexible business models. The Industrial Liaison Officer should also be encouraged to engage in collaborative activity with Officers of other RIs. Industry Advisory Boards include external experts from relevant industries and provide strategic advice to the RI. (ESFRI Innovation Working Group, 2018 & ESFRI Long-Term Sustainability Working Group, 2017).

ENVRIplus, a Horizon 2020 project which brought together Environmental and Earth System Research Infrastructures to provide solutions for shared challenges, had a work package dedicated to Dissemination, Liaison and Collaboration. Deliverable 18.5, "Innovation and Industry Liaison Preparedness Roadmap", outlined how RIs can engage with industrial partners to create sustainable partnerships. Collaboration with industry is challenging, particularly in the context of biodiversity and nature, and most members of ENVRIplus lacked a systematic approach to establishing partnerships with industry. This deliverable outlined fourteen recommendations to improve cooperation with industry, which include the hiring of an Industrial Liaison Officer and Industry Advisory Board. It also recommends that innovation and cooperation with industry should be a key priority in an RI's Strategic Plan, and the development of an Innovation and Industry-liaison Strategy (Picard & Vitale, 2019).

Upcoming External Developments

DiSSCo is a partner in ENVRI-FAIR, which aims to improve the findability, accessibility, interoperability and reusability of the data and services provided by the ENVRI RIs. This has a work package which will develop collaborative actions with industry to "enhance the uptake of ENVRI data services", with this project due to complete in December 2022 (ENVRI-FAIR, 2019).

The European Network of Industrial Liaison and Contact Officers (ENRIITC) project aims to support the establishment of partnerships between industry and RIs. The deliverables from this project,

which runs until December 2022, are likely to be relevant to the DiSSCo RI, and include strategies and best practices to foster collaborations between research infrastructure and industry (ENRIITC, 2021).

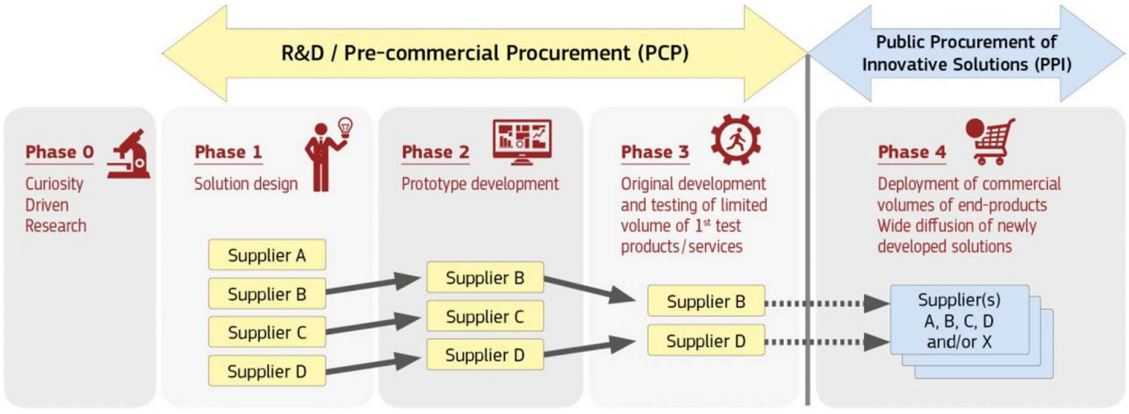
Innovation Procurement

Innovation procurement is a type of public procurement where the buyer either procures research and development, or becomes an early adopter of a product or service that is new to the market. Public procurement plays an important role in the innovation policy of the European Commission, with the Commission recognising that public providers can stimulate innovation in the private sector (European Commission, 2018a).

Pre-Commercial Procurement

Pre-commercial procurement (PCP) is an innovation procurement approach supported by the European Commission, which aims to stimulate innovation through the procurement of research and development (R&D). The approach aims to encourage innovation through sharing the risks and benefits of developing new products, software and services between the supplier and procurer. It can be used strategically by RIs when there is a need that cannot be met by existing solutions (European Commission, 2020a & Lenderink *et al.,* 2019).

Under PCP, research and development is procured prior to commercialisation, with solutions to a need developed in competition between organisations. The R&D can occur in four phases: solution design, prototyping, original development, and validation or testing of first products (Fig 1). R&D is purchased from several suppliers, with the number of suppliers reducing after each phase. The benefits and risks are shared, as suppliers retain their intellectual property rights, with the procurer keeping some of usage and licensing rights to the product. PCPs do not cover the large scale commercialisation of a new product (Lenderink *et al.,* 2019).



(Fig 1: PCP Phases, from European Commission, 2021)

PCP requires skilled procurement staff or external experts and involves considerable effort and expertise. Market research and consultation with suppliers should be conducted first, as prototypes may already exist, and therefore a regular, innovation-friendly procurement approach may be more appropriate. PCP is only suitable when a large amount of R&D effort is required (Lenderink *et al,* 2019).

PCP has been used successfully in several European projects, and the European Commission has published a brochure providing an overview of successful ICT domain funded PCPs. This includes the

Helix Nebula Science Cloud (HNSciCloud) PCP, which developed a hybrid cloud platform for ten European research centres and will support the connection of RIs through the European Open Science Cloud (EOSC). This PCP has led to the Open Clouds for Research Environments (OCRE) project, and the Archiving and Preservation for Research Environments (ARCHIVER) PCP project (European Commission, 2021).

The OCRE project has published lessons learned from the HNSciCloud and ARCHIVER PCPs. HNSciCloud formed a 'Buyers Group' of ten research organisations from across Europe, which purchased on behalf of seven ESFRI RIs, and the ARCHIVER Buyers Group consisted of four research organisations. The European Council for Nuclear Research (CERN) was the lead procurer for both PCPs, which allowed the procurement to be faster and more cost efficient. The ARCHIVER project established a Joint Procurement Agreement between members of the Buyers Group in order to establish governance and the pre-commitment of funds. Aggregation through a Buyers Group also generated economies of scale and enabled all members to benefit from their expertise and past experience (Fernandes *et al.,* 2020 & Devouassoux *et al.*, 2020). DPP Task 4.4 will explore whether PCPs are an option for DiSSCo.

Public Procurement of Innovative Solutions (PPI)

Public Procurement of Innovative Solutions is the procurement of goods and services that are not yet available on a large-scale commercial basis and is supported by the European Commission. The approach helps to increase the public sector uptake of innovative products and services and is often used after a PCP to tender one or more of the solutions developed during the process (although other suppliers may also participate).

The first stage of a PPI is for the procurers to form a Buyers Group. This group then makes an announcement of their innovation needs, listing the required functionality and intention to buy. Procurers can then choose to conformance test supplier solutions, to verify the product or service will meet the requirements. The solution is then procured through existing public procurement procedures. The OCRE PPI project is an example of a PPI, which followed the HNSciCloud PCP, and this deploys cloud services for research and education networks in Europe (European Commission, 2020b&c).

Innovation-Friendly Regular Procurement

Regular procurement processes can be made more innovation-friendly, which can both improve value for money and enhance competitiveness. Lenderink *et al*. (2019) identified five methods organisations can adopt to improve regular procurement procedures:

1. **Market Consultation:** Information is shared with potential suppliers and other stakeholders prior to the tender. This can help to optimise the requirements and award criteria of the tender. It should run alongside market analysis.
2. **Requirements specification**: Functional requirements should be used to define needs, rather than technical requirements. This allows the supplier to innovate and translate these requirements into a solution.
3. **Acceptance of alternative solutions:** Including explicit acceptance of different solutions as part of the tendering procedure can give suppliers the option to propose innovative solutions. This is known as a variant bid, and the tender documents can state the minimum requirements for any variant tender.

4. **Mechanism for awarding the contract:** In EU public procurement, contracts are awarded on the basis of the Most Economically Advantageous Tender (MEAT). MEAT can be assessed on the basis of price, cost-effectiveness or the best price-quality ratio. Using award criteria that consider quality and/or life-cycle costing, rather than lowest price, can provide the incentive and opportunity to a supplier to develop an innovative solution.
5. **High quality standards:** Including high quality standards in a tender can provide suppliers with incentive to innovate.

Public Sector Procurement and SMEs

SMEs are underrepresented in EU above-threshold public procurement in comparison to their contribution to GDP, although participation has steadily increased in recent years.

A recent European Commission report evaluated the impact of measures taken to improve SME participation in procurement and found that dividing procurement into lots can enhance SME success (de Bas *et al.* 2019).

Dividing procurement into lots can reduce the bid into a more manageable size for a supplier, and the technical and financial requirements for the supplier are often lower as a result. This can help the procurer to avoid dependency on a single supplier, and therefore spread the risk of the tender. It can also increase the level of participation and competition, but conversely may result in higher costs due to increased administration and a reduced economy of scale. The procurer needs to understand how the market operates before deciding whether to split a contract into lots, with comprehensive market analysis recommended as part of the decision-making process. The procurer must also design lots to reduce the likelihood of any collusion and must not split a contract into lots in order to avoid the application of 'above-threshold' public procurement rules (de Bas *et al.,* 2019, SIGMA, 2016a).

Best price-quality ratio criteria, publication of prior information notices and framework agreements have previously been advocated as SME-friendly procurement practices, but these were not found to improve SME success (de Bas *et al.,* 2019).

Supplier Relationship Management

Successful supplier management is essential to developing collaborative relationships and is an important component of a procurement strategy. Collaboration and co-innovation with strategic suppliers can create value for both organisations, through new product development and innovation exchange. Supplier relationship management can benefit an organisation by reducing costs, improving performance monitoring, managing the supply risk, and fostering innovation. DiSSCo would benefit from developing individual and organisational competency and capacity in this area.

Strategic suppliers are identified by looking at both the value and the risk profile of the contract. Strategic suppliers make a significant contribution toward an organisation's value proposition and may be involved in the co-creation of products or services, however, the failure in the supply would cause high impact to the buyer organisation's operations (CIPS, 2013 & Jaggaer, 2020).

Fostering collaboration and co-innovation with a strategic supplier can help to mitigate some of the risks and working together as partners allows problems and inefficiencies to be identified and resolved. This can often be aided by developing joint goals and objectives with the supplier, and these objectives can then drive the measures used to track supplier performance (CIPS, 2013 & Jaggaer, 2020).

Well defined internal governance processes are crucial to the successful management of strategic supplier relationships. There should be clearly defined ownership of the supplier relationship, ideally with executive-level sponsorship. Depending on the value and risk profile of a contract, supplier governance committees may also be required. Internal governance processes should also have a focus on ensuring compliance with ethical and regulatory requirements (Deloitte, 2015).

Strategic suppliers are often high risk due to 'vendor lock-in', where the buyer becomes dependent on the supplier as they may be the only viable option for purchasing a product or service. EOSC has mitigated this risk in the context of commercial cloud services by ensuring there are verified data exit plans. This type of risk mitigation should be built into the procurement process (CIPS, 2013, Jaggaer, 2020, Fernandes *et al.,* 2020, Dixon *et al.,* 2020).

Examples

AIT

AIT (Angewandte Informationstechnik Forschungsgesellschaft mbH) is a software company that was a technical partner in the OpenUp! Natural History Aggregator project. It led a work package to integrate scientific multimedia data into the European digital library, Europeana, and developed the metadata harvesting and transformation component. AIT continued to carry out harvesting and transformation after the project end date, and as part of the project a contribution fee schema was developed in order to allow AIT to calculate fees for current and future partners. All but one of the participants agreed to support the Memorandum of Understanding for this scheme. AIT was also part of the Biodiversity Heritage Library for Europe project and provided technical support for the aggregation process, including mapping between Community and Europeana data standards (Berendsohn, 2014, Frank *et al.,* 2013).

Bioshare Digitization

Bioshare Digitization is an SME offering products and services on automated digitisation equipment and integrated imaging lines and is developing novel digitisation methods (Tegelberg *et al* 2017). The know-how generated in connection with business operations of the company has supported the method and process development in the ICEDIG project. The project supported the implementation phase of DiSSCo by designing and addressing the technical, financial, policy and governance aspects.

Pensoft Publishers

Pensoft Publishers is an academic publishing SME, which specialises in open access publishing, software development and web design. It has been involved in managing the dissemination and communication activities for several EU projects and will be the project coordinator for the recently funded Biodiversity Community Integrated Knowledge Library (BiCIKL) Horizon2020 project. As part of BiCIKL, Pensoft will coordinate the project and contribute to the development of new-generation semantic publishing tools and open science workflows. Pensoft benefits from its involvement through new business opportunities, and through increasing its capacity. Pensoft also participated in the ViBRANT EU Framework Seven project which led to the first version of the ARPHA Writing Tool, which is now a major asset of Pensoft. This writing tool was the first publishing platform to support the full life cycle of a manuscript (Smith *et al.,* 2013, Penev *et al.,* 2017).

Picturae

Picturae is a service provider which offers museums solutions for opening up their collections, which includes the digitisation, digital storage and hosting of collections. Picturae has mass digitisation facilities and has been involved in the digitisation of herbarium collections from natural history institutions including Naturalis, Meise Botanic Garden and Royal Botanic Gardens, Kew. Picturae's systems can digitise one million herbarium sheets annually. The European Loans and Visits System

(ELViS) was co-developed with Picturae as part of the SYNTHESYS+ project, and this acts as a portal to support natural history collection virtual access and transnational access visits. Picturae had previously been involved in natural history collection software development, and their involvement helped to reduce the risk profile of the project. Picturae were also part of the ICEDIG project and led on Work Package 3, which investigated the physical handling and technical aspects of mass digitisation of collections to facilitate the design of DiSSCo (Hardisty *et al.,* 2020, Smith *et al.,* 2019, Guiraud *et al.,* 2019).

Teklia

Teklia is a company which develops optical character recognition software and AI-based document processing solutions. It is involved in the development of the Specimen Data Refinery as part of the SYNTHESYS+ project, which aims to develop a cloud-based platform for the mass processing of specimen images and their labels (Walton *et al.,* 2020).

4. Procurement Legal Framework

ERIC - Procurement Requirements

A European Research Infrastructure Consortium (ERIC) is a legal entity which allows the establishment and operation of a research infrastructure with European interest. An ERIC is not subject to the directive on public procurement as implemented in national law and instead it has the freedom to agree its own procurement policy.

The basic principles of the ERIC's procurement policy must be laid out in its Statutes, and this must respect the principles of transparency, non-discrimination and competition. The host country of an ERIC must recognise the ERIC as an international body or organisation for the purposes of the directives on VAT and excise duties. This means the ERIC can benefit from exemptions from VAT and excise duties on purchases in all EU Member States (this is subject to certain conditions). The VAT, excise duty and procurement privileges only apply to the ERIC, and so any agreements between the ERIC and other legal entities need to clearly identify the activities and resources which are the responsibility of the ERIC (European Commission, 2015).

The ERIC-Forum is a Horizon 2020 project which aims to help support RIs which are considering the ERIC legal framework. Work Package 3.2 relates directly to procurement, with this task looking at internal procurement rules, VAT exemption practices and economic activities within ERICs. A public deliverable, "Report and recommendations on VAT exemption in the ERIC legislation", is due at the end of March 2021, and once published this output may help to inform the development of the DiSSCo procurement policy and strategy. Outputs from the ERIC-Forum will have no direct impact on the ERIC regulations (ERIC-Forum, 2019).

AISBL - Procurement Requirements

An International not-for-profit Association under Belgian Law (AISBL) is an association that pursues a disinterested/non-lucrative purpose of international relevance (i.e. not for profit). The central hub of the research infrastructure must be registered in Belgium. Unlike an ERIC, an AISBL does not benefit from VAT, excise duty and procurement privileges and must follow public procurement directives (Malherbe, 2020, Magnificio *et al.,* 2020).

Relationship between DiSSCo-RI Central Hub and National Nodes

DiSSCo will be a distributed research infrastructure, with a central hub and a number of national and institutional nodes. There can be a varying degree of collaboration in procurement between the central hub and components:

- **Central Procurement:** The central hub acts as a central procuring body, and purchases the goods and services intended for use by nodes. This reduces the administrative cost of running parallel procurement procedures and can also improve leverage with suppliers and economies of scale through combining requirements into larger bids, however it requires enough capacity and expertise in the central hub to undertake large scale procurement and contract management.
- **Joint Procurement:** Procurement is jointly undertaken by the relevant nodes, either with all nodes managing the process together or one node (or the central hub) acting as a 'lead buyer' and carrying out the procurement on behalf of all other nodes. This can often be managed through a framework agreement, which is discussed in more detail below. All nodes would be jointly responsible for the procurement and for fulfilling their legal obligations.
- **Coordinated Procurement:** National nodes and/or DiSSCo member institutions can prepare and agree a common specification during the pre-procurement phase, but separate procurement processes are run by each node or institution.

These models are discussed in more detail as part of a deliverable from the DANUBIUS-RI (International Centre for Advanced Studies on River-Sea Systems) preparatory phase. It is likely that DiSSCo will use both joint and coordinated procurement models, with joint procurement beneficial in cases where a higher purchasing power is likely to result in a lower price (Graber-Soudry, 2019).

The DiSSCo legal entity, which is being considered under WP7, will have an impact on the management of procurement between the DiSSCo central hub and the national nodes, and legal advice is likely to be required. For example, the VAT and excise duty exemptions discussed above apply to the ERIC, and the status of the national nodes can determine whether these exemptions also apply. Furthermore, the ERIC statutes and by-laws have to describe the types of contractual agreements that will articulate the relationship among the ERIC and the DiSSCo Nodes and other stakeholders for, among others, procurement activities (Graber-Soudry, 2019).

Framework Agreements

Framework agreements are a type of contract recommended for non-complex, repetitive needs. Framework agreements are a type of aggregated procurement and can be entered into with multiple buyers and suppliers. A central purchasing body can enter into these agreements on behalf of other bodies i.e. central DiSSCo could enter into a framework agreement on behalf of the national nodes or member institutions, or they could also enter into a framework agreement together.

Framework agreements are set up for a specific period of time, of no more than 4 years, and they grant exclusivity to the buyers within the agreement. They are first advertised through a contract notice or prior information notice, and standard procurement procedures are used to evaluate the tender. Once the agreement is in place, contracts can then be awarded to the supplier(s) within the agreement when the need for the service or good arises. New suppliers cannot enter into the agreement once it has been established.

Framework agreements have been used by OCRE, which is part of EOSC, to tender for commercial cloud and Earth Observation service. Successful suppliers become part of the EOSC service catalogue. The OCRE-hub deliverable "D12.2 Report on business model analysis for procuring services in the EOSC" provides further information on the legal, contractual and regulatory arrangements required for this framework agreement (Blasco *et al.,* 2020, Fernandes *et al.,* 2020, & Andreozzi *et al.,* 2021). There are also examples in open access publishing, including Jisc Collections which has a framework agreement with Frontiers, giving 180 UK research institutions access to streamlined article submission and payment workflows as well as a national discount to article processing charges, and the Max Planck Digital Library which has a framework agreement with Springer Nature, allowing scientists at participating German institutions to benefit from open access publications in Nature and Nature Research journals (Jisc, 2019, Max Planck Digital Library, 2020).

Framework agreements can reduce the cost and time spent on the procurement process, as once they are awarded there is no longer any requirement to conduct a full procurement process, and these are instead awarded to the suppliers within the agreement. The length of the agreement should be carefully considered, particularly if awarded in an area where there may be rapid innovation as it restricts the option for purchasing from a new entrant into the market.

There is no limit to the number of suppliers that can be part of the agreement, however, suppliers are unlikely to join agreements with a large number of other suppliers as the likely share of business would be small. Increasing the number of suppliers also increases the complexity of awarding contracts within the terms of the agreement. (European Commission, 2018b, SIGMA, 2016b)

5. Green Procurement Policy

Public procurers can make an important contribution to environmental sustainability through their procurement policies and procedures. Green public procurement can help drive demand for sustainable goods and services and nature-based solutions and gives opportunities to SMEs to develop innovative solutions.

DiSSCo has an opportunity to use its purchasing power to encourage suppliers to reduce their environmental impact, and this should be integrated into all procurement activity. These issues should be taken seriously by DiSSCo, as there are potential reputational risks associated with poor practice in this area, and the public and key stakeholders will likely have an expectation that DiSSCo will follow environmentally sustainable procurement practices.

The European Commission publishes a handbook on green public procurement, which provides guidance on green procurement practice within the context of European Union law, and this outlines how environmental considerations can be considered throughout the procurement process. The handbook recommends that public procurers establish a green procurement policy, which should include targets, priorities and timeframes for implementation. The policy should also indicate whether it covers the whole organisation, or only specific areas (European Commission, 2016). This is particularly relevant to DiSSCo, as consideration will need to be given as to whether any sustainable procurement policy covers only the central hub or all national nodes and institutions. Most DiSSCo member institutions will have their own environmental sustainability policies, which may cover procurement, and the DiSSCo central hub will need to consider to what extent institutional policies align with a DiSSCo green procurement policy.

Prioritisation of green procurement practice should consider the environmental impact of the procurement over the lifecycle of the product, software or service, the budgetary importance and the organisation's potential ability to influence the market. The potential for reputational risk and the market availability of alternatives are other key considerations (European Commission, 2016).

Sustainable Procurement

Sustainable development has also moved beyond only considering environmental issues, and procurers should aim to achieve a balance between economic, social and environmental issues when making procurement decisions.

The potential for public procurement to unlock innovation and have a positive impact on SMEs have been discussed under the Strategic Partnerships and Co-Creation chapter of this milestone. This links with DPP Task 1.4, which will identify a set of socioeconomic impact indicators for DiSSCo activities. The Aerosol, Clouds and Trace Gases Research Infrastructure (ACTRIS) identified the number of procurement contracts signed for the development and upgrade of its infrastructure as an indicator its innovation impacts, as co-creation with industry gives opportunities for the development of new innovative products, software and services, as well as the potential knowledge exchange between the supplier and the RI (Mirasgedis *et al,* 2018). The examples listed under Strategic Partnerships and Co-Creation show some of the economic benefits realised for industry through past collaborations.

Social considerations can also be considered as part of a sustainable procurement process, and quality criteria can be included as part of the tender. Socially responsible public procurement can be a driver to promote employment opportunities, increase accessibility, ensure compliance with social and labour laws, and respect human rights and ethical trade issues. The 2014 EU Public Procurement Directives make clear public buyers can take social considerations into account during procurement. Technical or functional specifications can be used to outline accessibility requirements, and award criteria can allow a procurer to specify preferences for socially responsible goods. Similarly to a green procurement policy, a procurer should initially look to prioritise socially responsible procurement in areas where the most impact is likely to be achieved (EASME, 2020).

6. Conclusion and Next Steps

This milestone has provided a briefing on key areas of procurement strategy, providing a resource for procurement related activities during the preparatory and construction phases of DiSSCo.

This milestone links closely with DPP Task 4.4, and many areas of this report will be further analysed as part of this work package. A subcontractor will consider whether PCPs are a potential option for DiSSCo and will also look at other procurement and financial transaction models both in the context of DiSSCo as a buyer and as a seller of services. The subcontractor may also consider the types of contractual agreements that may be beneficial between DiSSCo, national nodes and DiSSCo member institutions, including procurement activities.

There are also synergies with DPP WP7. Task 7.2 is considering the creation of the DiSSCo legal entity, which will impact upon the procurement legal framework for DiSSCo. Task 7.3 will develop a DiSSCo policy tool, which will allow DiSSCo member institutions to self assess their policies against DiSSCo policies. The DiSSCo Coordination and Support Office, or its successor, will be able to use this tool to analyse policy alignment across DiSSCo member institutions. Procurement policy areas could be included in the self assessment and would, for example, allow for assessment of the alignment of green procurement practices.

Task 8.3 will build upon this milestone, and through a formal stakeholder analysis it will consider potential strategic partnerships with service providers and industry. This analysis will also consider a broader range of potential external stakeholders, including users, research infrastructures and publicly funded organisations. The task will also explore how DiSSCo should work with external stakeholders and recommend channels and methods for engagement.

7. Author Contributions

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8. Glossary

ACTRIS (Aerosol, Clouds and Trace Gases Research Infrastructure): ACTRIS is a research infrastructure which produces data and information on short-lived atmospheric constituents.

ARCHIVER (Archiving and Preservation for Research Environments): ARCHIVER is a Horizon 2020 PCP, which aims to introduce improvements in archiving and digital preservation services. The services will become part of the catalogue of the EOSC.

BiCIKL (Biodiversity Community Integrated Knowledge Library): BiCIKL will build a new European starting community of RIs in biodiversity and life sciences. It will establish open science practices through provision of access to data, associated tools and services.

CERN (European Organization for Nuclear Research): CERN is a European research organisation that provides particle accelerators and other infrastructure for high-energy physics research.

DANUBIUS-RI (International Centre for Advanced Studies on River-Sea Systems): DANUBIUS-RI is a pan-European distributed research infrastructure which supports interdisciplinary research on River-Sea Systems.

DiSSCo RI (Distributed System of Scientific Collections): DiSSCo is a pan-European Research Infrastructure mobilising, unifying and delivering bio and geo-diversity digital information to scientific communities.

DPP (DiSSCo Prepare): The preparatory phase project for DiSSCo. Preparatory phases of ESFRI roadmap projects aim to bring the new research infrastructure to the required legal, financial and technical maturity level for implementation. DPP is organised into nine work packages, each of which contribute to the implementation of DiSSCo.

ELViS (European Loans and Visits System): A unified pan-European system for managing loans and visits access to any natural history collection for any authorised user under a consistent access policy.

ENRIITC (pan-European Network of Industrial Liaison and Contact Officers): ENRIITC aims to build a pan-European network of Industrial Liaison and Contact Officers and support the establishment of strategic partnerships between industry and RI. It will establish a sustainable European network, map collaboration between RIs and industry, develop strategies and best practices for RI and industry collaboration and raise awareness among industry for RI collaboration opportunities.

ENVRI: ENVRI is a community of 26 European Environmental RIs which collaborate to provide data, tools and other services. DiSSCo is a member of ENVRI.

ENVRI-FAIR (Findable, Accessible, Interoperable and Reusable): ENVRI-FAIR aims to build a set of FAIR datasets services to support innovation, connect ENVRI RIs to the EOSC and enhance the efficiency and productivity of researchers.

ENVRIplus: ENVRIplus was a Horizon 2020 project that aimed to create an interdisciplinary and interoperable cluster of Environmental RIs. The final report was published in October 2019.

EOSC (European Open Science Cloud): The EOSC hosts and processes research data to support EU science, and promotes open science practices.

ERIC (European Research Infrastructure Consortium): An ERIC is a legal entity which allows the establishment and operation of a research infrastructure with European interest.

ERIC-Forum: The ERIC-Forum is a Horizon 2020 project that aims to strengthen coordination and networking between ERICs and support ERICs in preparation through best practices.

ESFRI (European Strategy Forum on Research Infrastructures): ESFRI supports policy making on research infrastructures and facilitates initiatives to develop research infrastructures. It has established a European Roadmap for research infrastructures, and DiSSCo was included in the ESFRI Roadmap in 2018.

HNSciCloud (Helix Nebula Science Cloud): HNSciCloud was a PCP project that developed and piloted a hybrid cloud platform for leading research organisations across Europe. This has helped to support the EOSC.

ICEDIG (Innovation and consolidation for large scale digitisation of natural heritage): This was an EU funded project which supported the implementation phase of DiSSCo, and designed some of the technical, financial, policy and governance aspect required to operate DiSSCo.

MEAT (Most Economically Advantageous Tender): MEAT criteria in procurement allows the contracting authority to take into consideration issues other than only the lowest price when awarding a contract, including life-cycle cost, sustainability and security of supply.

OCRE (Open Clouds for Research Environments): OCRE has established framework agreements with cloud service providers in order to accelerate cloud adoption in the European research community. The first tender closed in June 2020, and the successful offerings will be available via the EOSC service catalogue.

PCP (Pre-Commercial Procurement): PCP allows the public procurement of R&D services. R&D is purchased from several suppliers, which allows the procurer to compare alternative approaches and identify the best value for money. It is split into phases, with the number of competing suppliers reducing after each phase.

PPI (Public Procurement of Innovation): PPI is the public procurement of a solution that is not available on a large scale commercial basis, and allows the public sector to act as an early adopter of innovation.
RI (Research Infrastructure): RIs are organisations that provide resources and services for research communities. They can be single-sited, distributed or virtual. DiSSCo is an example of a distributed RI.

R&D (Research & Development): Innovative activities undertaken to develop and improve services or products

SME (Small and Medium-Sized Enterprises): SMEs are businesses which have a lower staff headcount, turnover or balance sheet total than larger enterprises. It can be difficult to define the difference between an SME and larger enterprise, and the European Commission has published a recommendation on the definition of a SME and provides a user guide to help European SMEs identify whether they are able to access EU funding opportunities.

VAT (Value-Added Tax): VAT is a consumption tax levied on the price of a product or service.

9. References

Andreozzi, S., Heikkurinen, M., Jones, R., Koers, H., Kramer, G., Rouse, P. & Williams, M. (2021) EOSC-hub D12.2 Report on business model analysis for procuring services in the EOSC *Under EC Review.* https://documents.egi.eu/document/3627 Accessed on 2021-04-26.

Berendohn, W.G. (2014) Opening up the Natural History Heritage for Europeana Final Report. https://cordis.europa.eu/docs/projects/cnect/0/270890/080/deliverables/001-OpenUpFinalReport.pdf Accessed 2021-04-29.

Blasco, J.M.D., Romeo, A., Heyns, D., Fernandes, J., Carrillo, R., Antoniou, N., Mamais, L.,Begin, M-E. (2020) The H2020 OCRE Project Opens the Gates of the Commercial Cloud and EO Services Usage to the Research Community. Emerging Science Journal 4(2):89-103 doi: 10.28991/esj-2020-01213

CIPS (Chartered Institute of Procurement and Supply) (2013) Monitoring the Performance of Suppliers. https://www.cips.org/Documents/Knowledge/Procurement-Topics-and-Skills/9-Supplier-Bid-Tender-Evaluation/Supplier-Evaluation-and-Appraisal/POP-Monitoring_the_Performance_of_Suppliers.pdf Accessed on 2021-04-26.

de Bas, P., Hausemer, P., Kruger, T., Rabuel, L., Maarten de Vet, J., Vincze, M. (2019) Analysis of the SMEs' participation in public procurement and the measures to support it. https://ec.europa.eu/growth/content/analysis-smes%E2%80%99-participation-public-procurement-and-measures-support-it_en Accessed 2021-04-27.

Devouassoux, M, Jones, B. & Fernandes, J. (2020) Pre-Commercial Procurement: R&D as a Service for the European Open Science Cloud. EPJ Web of Conferences, 245, 07028 Doi: 10.1051/epjconf/202024507028

Deloitte (2015) Supplier Relationship Management (SRM). Identifying and maximising the value of strategic supplier partnering. https://www2.deloitte.com/content/dam/Deloitte/ch/Documents/process-and-operations/ch-en-operations-supplier-relationship-management.pdf Accessed on 2021-04-26.

Dixey,K., Woodburn,M., Hardy, H., Livermore, L. & Smith, V.S. (2020) Identification of provisional Centres of Excellence for digitisation of European natural science collections. Research Ideas and Outcomes 6: e57750. https://doi.org/10.3897/rio.6.e57750

EASME (Executive Agency for Small and Medium-sized Enterprises), European Commission (2020) Making Socially Responsible Public Procurement Work: 71 Good Practice Cases. https://op.europa.eu/en/publication-detail/-/publication/e8cf51d0-f632-11ea-991b-01aa75ed71a1 Accessed on 2021-04-26.

ENVRI-FAIR (2019) ENVRI-FAIR Work Structure. https://envri.eu/work-packages/ Accessed on 2021-04-26.

ERIC-Forum (2019) Work Packages & Tasks. https://www.eric-forum.eu/work-packages-task-leaders Accessed on 2021-04-26.

ESFRI (European Strategy Forum on Research Infrastructures) Innovation Working Group (2018) Innovation-oriented cooperation of Research Infrastructures. ESFRI Scripta Volume III https://www.esfri.eu/sites/default/files/ESFRI_SCRIPTA_VOL3_INNO_single_page.pdf Accessed on 2021-04-26.

ESFRI Long-Term Sustainability Working Group (2017) Long-term Sustainability of Research Infrastructures. ESFRI Scripta Volume II https://www.esfri.eu/sites/default/files/u4/ESFRI_SCRIPTA_VOL2_web.pdf Accessed on 2021-04-26.

ENRIITC (pan-European Network of Industrial Liaison and Contact Officers) (2021) ENRIITC Deliverables. https://enriitc.eu/project/deliverables/ Accessed on 2021-04-26.

European Commission (2015) ERIC Practice Guidelines. Legal framework for a European Research Infrastructure Consortium. https://op.europa.eu/en/publication-detail/-/publication/c6647f05-874e-4cdd-af70-22ade4759930 Accessed on 2021-04-26.

European Commission (2016) Buying Green! A handbook on green public procurement, 3rd Edition. https://ec.europa.eu/environment/gpp/buying_handbook_en.htm Accessed on 2021-04-26.

European Commission (2018a) A renewed European Agenda for Research and Innovation - European's chance to shape its future. https://ec.europa.eu/info/sites/default/files/com-2018-306-a-renewed-european-agenda-_for_research-and-innovation_may_2018_en_0.pdf Accessed on 2021-04-26.

European Commission (2018b) Public Procurement Guidance for Practitioners. https://ec.europa.eu/regional_policy/sources/docgener/guides/public_procurement/2018/guidance_public_procurement_2018_en.pdf Accessed on 2021-04-26.

European Commission (2020a) Pre-Commercial Procurement. https://ec.europa.eu/digital-single-market/en/pre-commercial-procurement Accessed on 2021-04-26.

European Commission (2020b) Public Procurement of Innovative Solutions. https://ec.europa.eu/digital-single-market/en/public-procurement-innovative-solutions Accessed on 2021-04-26.

European Commission (2020c) EU funded projects implementing Pre Commercial Procurements (PCP) or Public Procurement of Innovative Solutions (PPIs) https://ec.europa.eu/digital-single-market/en/eu-funded-projects-im plementing-pre-commercial-procurements-pcp-or-public-procurement-innovative Accessed on 2021-04-26.

European Commission (2021) Innovation Procurement. The Power of the public purse. EU funded projects in the ICT Domain. https://digital-strategy.ec.europa.eu/en/library/innovation-procurement-power-public-purse Accessed on 2021-04-26.

Fernandes, J., Jones, B., Devouassoux, M. & Tendel, J. (2020) Research Infrastructures & NRENs Requirements for Commodity Cloud Services. Doi: 10.5281/zenodo.3635739

Frank, J. Laibl, L., Smirnova, L., Jacob, B., Mergen, P. & Hirschfeld,M. (2013) OpenUp! Component Report C1.5.4 - EUROPEANA and BHL-Europe. https://orfeo.kbr.be/bitstream/handle/internal/2075/C154_Europeana_and_BHL-Europe_MfN_v1a%201.pdf?sequence=1 Accessed on 2021-04-29.

Graber-Soudry, O. (2019) DANUBIUS-PP Deliverable 3.6 Report on common procurement of equipment, goods and services. https://danubius-pp.eu/www/wp-content/uploads/2019/11/3.6-Report-on-common-procurement-of-equipment-goods-and-services.pdf Accessed on 2021-04-26.

Guiraud, M. *et al* (2019). Best practice guidelines for imaging of herbarium specimens. Deliverable D3.6 ICEDIG. Doi: 10.5281/zenodo.3524263

Hardisty A. *et al* (2020) Conceptual design blueprint for the DiSSCo digitisation infrastructure - Deliverable D8.1. Research Ideas and Outcomes 6: e54280. Doi: 10.3897/rio.6.e54280

Jaggaer (2020) Holistic Supplier Management: Orchestrating the procurement function for maximum benefit. https://www.jaggaer.com/download/whitepaper/holistic-supplier-management/?utm_source=Blog&utm_medium=Referral&utm_campaign=CORP_WP_Holistic_Supplier_Management Accessed on 2021-04-26.

Jisc (2019) UK universities reach new national open access deal. https://www.jisc.ac.uk/news/uk-universities-reach-new-national-open-access-deal-26-nov-2019 Accessed on 2021-04-29.

Lenderink, B., Halman, J.I.M & Voordijk, H. (2019) Innovation and public procurement: from fragmentation to synthesis on concepts, rationales and approaches Innovation: The European Journal of Social Science Research, DOI: 10.1080/13511610.2019.1700101

Malherbe, P. (2020) Charitable organisations in Belgium: overview. Thomas Reuters Practical Law. https://uk.practicallaw.thomsonreuters.com/8-633-0854?transitionType=Default&contextData=(sc.Default)&firstPage=true#co_anchor_a904862. Accessed on 2021-04-28.

Magnifico, G., Evangelista, L., Nieuwejaar, P.W., Fitzgerald, A. & Flavin (2020) D8.1 EurofleetsPlus_D8.1 SWOT analysis report. https://www.eurofleets.eu/download/Deliverables/EurofleetsPlus_D8.1-SWOT-Analysis-Report-V6-CNR.pdf Accessed on 2021-04-28.

Max Planck Digital Library (2020) Open Access publishing in Nature - a new milestone in the transformation of scholarly journal publishing. https://www.mpdl.mpg.de/en/about-us/news/619-oa-nature-en.html Accessed on 2021-04-29.

Mirasgedis, S., Mihalopoulos, N., Sarafidis, Y., Georgopoulou, E. & Theodosi, C. (2018) Deliverable D8.1: Report on KPIs for the quantification of ACTRIS direct impact. Accessed on 2021-04-29.

Penev L., Georgiev T., Geshev P., Demirov S., Senderov V., Kuzmova I., Kostadinova I, Peneva S, Stoev P (2017) ARPHA-BioDiv: A toolbox for scholarly publication and dissemination of biodiversity data based on the ARPHA Publishing Platform. Research Ideas and Outcomes 3: e13088. Doi: 10.3897/rio.3.e13088

Picard, J & Vitale, V. (2019) ENVRI-PLUS D18.5 RI Innovation and IndustryLiaison Preparedness Roadmap. http://www.envriplus.eu/wp-content/uploads/2019/07/D18.5-RI-Innovation-Roadmap_V2.pdf Accessed on 2021-04-26.

SIGMA (2016a) Brief 36: Public Procurement. Division of Contracts into Lots. http://www.sigmaweb.org/publications/Public-Procurement-Policy-Brief-36-200117.pdf Accessed on 2021-04-29.

SIGMA (2016b) Brief 19: Public Procurement. Framework Agreements. http://www.sigmaweb.org/publications/Public-Procurement-Policy-Brief-19-200117.pdf Accessed on 2021-04-26.

Smith, V. *et al.* (2013) Beyond dead trees: integrating the scientific process in the Biodiversity Data Journal. Biodiversity Data Journal 1: e995. Doi: 10.3897/BDJ.1.e995

Smith V.E. *et al.* (2019) SYNTHESYS+ Abridged Grant Proposal. Research Ideas and Outcomes, 5: e46404. Doi: 10.3897/rio.5.e46404

Tegelberg R, Kahanpää J, Karppinen J, Mononen T, Wu Z, Saarenmaa H (2017) Mass digitization of individual pinned insects using conveyor-driven imaging. In: Hereld M (Editor) High throughput digitization for natural history collections. 2017 IEEE 13th International Conference on e-Science (e-Science 2017). Auckland, New Zealand, 24-27 October 2017. 5 p. DOI:10.1109/eScience.2017.85.

Walton *et al,* (2020) Landscape Analysis for the Specimen Data Refinery. Research Ideas and Outcomes, 6: e57602. Doi: 10.3897/rio.6.e57602.