Preparatory Phase for the pan-European Research Infrastructure DANUBIUS–RI "The International Centre for advanced studies on river-sea systems"

DANUBIUS-RI strategy on Human Resources for Researchers

Deliverable Nr. 9.4

European Commission

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 739562

Project Full title	Preparatory Phase for the pan-European Research Infrastructure DANUBIUS–RI "The International Centre for advanced studies on river-sea systems"
Project Acronym	DANUBIUS-PP
Grant Agreement No.	739562
Coordinator	Dr. Adrian Stanica
Project start date and duration	1st December 2016, 36 months
Project website	www.DANUBIUS-pp.eu

Deliverable Nr.	9.2	Deliverable Date	M18
Work Package No.	9		
Work Package Title	Capacity building		
Responsible	UCC		
Authors & Institutes Acronyms	IRELAND ***UCC*** Jeremy Gault ; Gordon Dalton ESTONIA ***EUROP*** Franck Brottier		
Status:		Final (F)	●
		Draft (D)	
		Revised draft (RV)	
Dissemination level:		Public (PU)	
		Restricted to other program participants (PP)	
		Restricted to a group specified by the consortium (RE)	●
		Confidential, only for members of the consortium (CO)	

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1 Executive Summary

This deliverable is the result of a work aimed at analysing the current status and the Human Resources (HR) gaps at the relevant DANUBIUS-RI partner institutes (institutes leading the development of one or more of the DANUBIUS-RI components). This analysis is closely linked to, and should be considered in conjunction with, tasks under WP2, WP3 WP5 in conjunction with EC's EURAXESS tool "Human Resources Strategy for Researchers".

Based on the analysis, this document describes the current status of key elements of researcher employment across the DANUBIUS-RI EU partner countries (and internationally) and contrasts key aspects such as remuneration and mobility (in Sections 2 – 7). This background is significantly augmented (in Section 8) with detail on the needs of DANUBIUS-RI for the construction and operation of the Research Infrastructure. The Human Resource needs for DANUBIUS-RI, as of May 2018, are detailed in the report and for convenience are summarised in the Table 1.1, below.

DANUBIUS-RI component	Category of profile	# of FTEs
HUB		
Biological laboratories	Management	2
	Research	59
	Support	20
Non-biological laboratories	Management	
	Research	46
	Support	24
TOTAL Hub	Management	2
	Research	105
	Support	44
NODES		
Observation Node	Management	2.0
	Research	4.0
	Support	4.5
Analytical Node	Management	4.0
	Research	23.0
	Support	4.0
Modelling Node	Management	0.45
	Research	0.9
	Support	3.0
Impact Node	Management	0.9
	Research	2.7
	Support	0.5
TOTAL Nodes	Management	7.35

	Research	30.6
	Support	12.0
SUPERSITES		
Danube Delta Supersite	Management	1.0
	Research	15.0
	Support	32.0
Elbe-North Sea Supersite	Management	1.6
	Research	9.66
	Support	4.5
Thames Estuary Supersite	Management	1.0
	Research	1.7
	Support	2.8
Ebro Llobregat deltaic system Supersite	Management	3.0
	Research	25.9
	Support	4.0
Po delta and North Adriatic lagoons Supersite	Management	1.3
	Research	9.0
	Support	4.0
Middle Danube Szigetköz Supersite	Management	4.0
	Research	Not assessed
	Support	Not assessed
Nestos Supersite	Management	7.0
	Research	17.0
	Support	7.0
Upper Danube Supersite	Management	1.00-1.20
	Research	3.5
	Support	1.5
Tay Catchment (New)	Management	
	Research	
	Support	
TOTAL Supersites	Management	19.9-20.1
	Research	81.76
	Support	54.3
OTHERS		
Technological Transfer Office	Support	9.0
NOT ASSESSED		

Data centre		
Guadalquivir Supersite (New)		
Rhine-Meuse delta Supersite (New)		
Middle Rhine Supersite (New)		
TOTAL		
	Management	29.25-29.45
	Research	171.46
	Support	110.3
TOTAL FTEs		**311.1-311.3**

Table 1-1: Overview of DANUBIUS-RI Resource Needs

2 Introduction

The objectives of this work are to (1) highlight some of key considerations for researchers in a distributed Reseach Infrastrucure such as career structure, remuneration and mobility and (2) to define the human resource needs of DANUBIUS-RI, and identify gaps in DANUBIUS-RI partner expertise, for the development of a sound Human Resource Plan covering the construction and operation phase of the Research Infrastructure.

The content of this document reflects the best knowledge of DANUBIUS-RI partners as of May 2018 and therefore cannot be construed as definitive. Works are still ongoing to define the list of services offered to DANUBIUS-RI users, and modifications of this list will undoubtedly result in modifications in the HR profiles needed to implement and operate the research infrastructure.

The preliminary exercise of identifying profiles needed at DANUBIUS-RI is the first step in the update of the DANUBIUS-RI construction and operational budget, in the context of WP4.

3 Researcher careers in EU

3.1 Background of Researcher career in EU

The career of the researcher is a relatively new career. In the late 20th century, the number positions dedicated to research was relatively small, especially outside the United States. The career of the researcher was a transition position, between the doctoral and the guaranteed progression, or tenure track, to academic career. The intake of researchers matched the vacant positions in academia, guaranteeing career progression. Industry demand for researchers was small. Since 2000's, two changes have emerged:

1. The demand for core research has increased tremendously, all across the globe, and is used as a measure of economic progress. Research has increased in both academic institutions and industry. (Nature [1])
2. The intake of PhDs has increased exponentially, whereas the number of academic positions remained constant, (and in some cases decreased). (Nature 2011 [2])

The 'postdoc' or 'early stage researcher' (ESR) position emerged as a new position, but not a career. The common element that united this new research career position was that almost all posts were offered **on short-term contract basis**. The research career was probably the first new career of the post industrial age to be completely following the new "American" employment style of short-term contract positions. Almost no positions offered to early stage researchers were permanent, as would be offered to similar positions in industry.

In 1974, UNESCO commissioned the report entitled "1974 Recommendation on the Status of Scientific Researchers". This report produced a series of insight recommendation so on researcher careers. These recommendations are as pertinent today as they were 40 years ago.

In 1999, in order to stem the abuse of workers on short term contracts, the European Union (EU) introduced the Fixed Term Workers Act [3]. This act stated that after 4 years of consecutive employment with one employer, and at least two contracts within the 4 year period, no matter what the position within the company or institute, the employee was eligible to apply for a "contract of indefinite duration" (CID), thereby providing the employee with almost all the rights and stability of full time employee.

In 2003, the European Commission report "Researchers in the European Research Area: One profession, multiple careers; key research efforts, excellence and performances" [4] identified 3 primary issues for the career of the researcher, namely:

1. Number of researchers,
2. Researchers' mobility
3. The "question" of the researcher careers.

The report identified two areas of focus relating to Early Stage Researchers (ESR) and senior researcher careers including:

1. A growing need for alternative tenure opportunities. It identified two factors which hinder long-term perspectives: the awareness of the career structure and the consciousness of the lack of long-term employment perspectives particularly for a career in academia.
2. Career evaluation systems. Evaluation marking for promotion and career advancement should value and account for diversified working experience.

In 2005, EU provided a guideline on the how Human Resources (HR) should manage the career development and training from researchers, via the European Charter & Code for Researchers [5], produced by Euraxess.

In 2007, the situation of the research career was identified by EU as needing further guidance, and issued the "European Framework on Research Careers" [6]. This framework, detailed the career progression that researchers should be able to aspire and attain, as well as the career development required to reach each stage. The European Framework of Research Careers reaffirmed the Charter and Code, stating that all researchers were professionals, and thus entitled to career progressions and stability, as in any other work force category.

The **European Framework of research careers** proposes the following 4 stages of research career development is presented in Table 3-1.

Band	Definition	Barriers faced
R1	Doctoral candidate	Staff members in EU, not UK and Ireland. Treated as students
R2	Postdoc (ESR)	Short term contracts
R3	Senior postdoc	Short term contracts , semi- independent (sometimes grouped in ESR)
R4	Research fellow+senior	Required to be independently funded. Very few funded positions
Senior academic	Academia	Different career path. Usually permanent and core funded

*Table 3-1: **European Framework of research careers** proposed the 4 stages of research career development*

Progression through stages is not defined , and opportunities decrease exponentially on advancement [7, 8]

In 2010, the Working Group on Higher Education of the European Sectoral Social Dialogue in Education [9] ("WGHE") with the support of the European Commission was set up to tackle job insecurity for ESRs. It was recognised by both the social partners that it is desirable for more ESRs to have long-term job security so that they can develop their careers. It was also recognised, however, that the short-term nature of most research funding for ESRs creates a major challenge to achieving this.

In 2012, in order to incentivise the Charter and Code and engage with HR of Research performing Organisations (RPO), Euraxess created "The Human Resources Strategy for Researchers (HRS4R)" or "European HR badge of Excellence" [10]. However, the main emphasis of the HRS4R are a set of guidelines for training and development for postdoc and researchers is, with a large emphasis on providing soft transferable skills, which would enable the researchers to transfer outside of academia. The initiative has been successful with over 400 European institutions joining.

In 2012, The **European Research Area** (ERA) was established. A key aim for the ERA is to reduce both brain drain, notably from weaker regions, as well as the wide regional variation in research and innovation performance, aiming at the spreading of excellence across the EU.

Also in 2012, Europe produced the strategy titled "Reinforced European Research Area Partnership for Excellence and Growth (ERCR)" [11].

In 2014, based on analysis of the strengths and weakness of ERCR report, the EU set out five priorities, one of which is, “An open labour market for researchers - to ensure the removal of barriers to researcher mobility, training and attractive careers”. These European initiatives have been very clear in their focus on researcher careers and mobility as central to European policy, progress and success.

3.2 Researcher Career stability

There are very few countries that offer stable employment conditions for ESRs [12]. These rather exceptional countries are Poland, Romania, Brazil, Bulgaria, Ireland, Norway, Portugal and Slovenia. Most countries in our sample offer stable working conditions for researchers from R3 career stage onwards (Table 3-2). Only Estonia (tenure-track option in R1+2), Macedonia, Latvia and Russia do not offer stable employment conditions at any career stage. For two countries, Israel and Croatia, the information provided does not allow a categorization due to changing conditions along the career stages. For two other countries, Liechtenstein and China, the required information allowing categorizing them, is missing.

Career stage with stable working conditions	Number of countries	Countries
R1	3	Poland, Romania, Brazil
R2	5	Bulgaria, Ireland, Norway, Portugal, Slovenia
R3	21	Albania, Austria, Belgium, Czech Republic, Denmark, Finland, France, Hungary, Iceland, Italy, Luxembourg, Netherlands, Serbia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Faroe Islands, Canada, USA
R4	10	Bosnia, Cyprus, Germany, Greece, Lithuania, Montenegro, Australia, Japan, Singapore, South Korea
No career stage provides stable working conditions	4	Estonia, Macedonia, Latvia, Russia
Miscellaneous	2	Israel, Croatia,
Missing information	2	Liechtenstein, China

Table 3-2: Career stage with stable employment conditions (taken from MORE2-Working conditions and career paths of ESRs- cross country report- WP3 [12])

3.3 Departmental hierarchy models and researcher opportunities per R grade

Based on the empirical data, MORE2 report [12] attempted to provide an answer to the question, does the typical hierarchy of research departments have a bearing on the sequence, timing and likelihood of academic careers. Cluster 1-4 are presented in Table 3-3:

- Academic careers in countries in cluster 1 can be expected to be more diverse within a country because RPO have a high level of autonomy, other institutions than universities are allowed to award doctorates, international mobility is a prerequisite without supported by national schemes and a low level of employment security.
- Academic careers in countries of cluster 2 show high levels of independence at mid-term career. Progressing into the R3 career stage allows them to define their own research agenda independently and provides high employment security. Researchers’ careers depend on disciplinary developments and institutional practices due to high RPO autonomy.
- Academic careers in countries of cluster 3 are characterized by early career independence. In these countries, academic independence and employment security tend to be granted earlier than in other countries.

- Academic careers in countries of cluster 4 might show a higher degree of mobility because international mobility is a prerequisite and is encouraged by national schemes; intersectoral mobility is also a prerequisite in certain areas. Researchers are exposed to more unified conditions within these countries due to a lower RPO autonomy and not very significant disciplinary differences

Cluster	Description	Number of countries	Countries
1	• Chair–model • No rank with permanent contract • International mobility is a prerequisite • Selection criteria not provided by law (in all countries of this cluster) • No national schemes to promote international mobility • Second degree is not needed • Universities and other institutions award doctorates • High degree of HEI autonomy	5	Estonia, Luxembourg, Russia, China, Singapore
2	• Departmental-model • R3 as stage when an own research agenda can be pursued • R2+R3 stages may grant at first-time a permanent position • Reward of R3 position against R2 positions is 21% to 200% • Low to middle level of social security • Second degree is not needed • Positions are nationally and internationally advertised • High to middle level of HEI autonomy • Business and higher education sector dominate R&D activities • Middle level of autonomy of universities to set employment conditions • Strong disciplinary differences in career conditions	9	Austria, Bosnia and Herzegovina, Denmark, Finland, Ireland, Montenegro, Switzerland, Australia, Canada
3	• Department-model • R2+R3 as stages when an own research agenda can be pursued • R1-R3 stages may grant at first-time a permanent position • Reward of R4 position against R1 positions is 100% or more • Structured doctoral programs are predominant (and mandatory) • Second degree is needed • Universities only award doctorates • Positions are nationally and internationally advertised • Middle to high degree of HEI autonomy • Both countries with country-wide selection procedures • Middle to low level of autonomy of universities to set employment conditions • Mix of countries with strong disciplinary and no strong disciplinary difference in career conditions	13	Albania, Czech Republic, Macedonia, France, Iceland, Italy, Latvia, Liechtenstein, Norway, Romania, Spain, Sweden, United Kingdom

4	• Chair- and department-model • International mobility is a prerequisite • National schemes to promote international mobility are in place • Reward of R4 position against R3 positions is 21% to 200% • Reward of R3 position against R2 positions is up to 40% • Reward of R4 position against R1 positions is up to 200% • High to middle level of social security • Structured doctoral programs are predominant (but not necessarily mandatory) • Universities only award doctorates • Positions are nationally advertised • Middle to low level of HEI autonomy • Business sector dominates R&D activities • Intersectoral mobility a prerequisite of certain careers (35% of this cluster, but all countries with this feature are in this cluster) • Higher education is considerably less attractive compared to other sectors (25% of this cluster, but five out of seven countries with this feature are in this cluster) • Low level of autonomy of universities to set employment conditions • No disciplinary differences in careers	20	Belgium, Bulgaria, Croatia, Cyprus, Germany, Greece, Hungary, Lithuania, Netherlands, Poland, Portugal, Serbia, Slovenia, Turkey, Faroe Islands, Israel, Brazil, Japan, South Korea, USA

Table 3-3: Academic career cluster characterisation (taken from MORE2-Working conditions and career paths of ESRs- cross country report- WP3 [12])

4 General salaries and researcher salaries

4.1 General salaries in DANUBIUS-RI member countries

	Personal earnings (1)	annual wages 2016 Nominal (US$) (2)	Average income (3)	Median Income US$ PPP (4)	Household net adjusted disposable income OECD (1)
Switzerland	$57,082	$85,718	$81,240	$34,608	$35,952
US	$57,139	$60,154	$56,180	$30,960	$41,071
Ireland	$53,286	$56,787	$52,560	$22,200	$22,969
Austria	$45,988	$45,819	$45,230	$29,278	$31,667
Finland	$40,742	$45,584	$44,730	$25,810	$28,238
Germany	$43,872	$42,369	$43,660	$25,140	$31,925
UK	$41,659	$46,252	$42,390	$21,576	$26,687
France	$40,828	$40,718	$38,950	$24,547	$29,759
Italy	$34,744	$32,205	$31,590	$20,860	$25,004
Spain	$36,013	$30,613	$27,520	$19,242	$22,007
Greece	$26,436	$19,189	$18,960		$18,099
Czech Republic	$21,185	$13,587	$17,570	$15,391	$18,953
Poland	$23,649	$12,154	$12,680	$13,630	$17,820
Hungary	$21,399	$12,157	$12,570		$15,614
Turkey	$15,992		$11,180		$13,471
Romania			$9,470		
China			$8,260		
Bulgaria			$7,470		
Serbia			$5,280		
Morocco			$2,850		
Ukraine			$2,310		
Moldova			$2,120		
India			$1,680		

Table 4-1: salaries in DANUBIUS-RI member countries : each column represents wages/ earnings/ salary/ income using the data sources own standards and metrics (data for CH, US and China included for comparison purposes) (data for some DANUBIUS-RI member countries not available and not listed). Data obtained from the following four reference sources

1 http://stats.oecd.org/Index.aspx?DataSetCode=BLI
2 http://stats.oecd.org/Index.aspx?DatasetCode=STLABOUR
3 https://www.worlddata.info/average-income.php
4 PPP stands for Purchasing power parities, rates of currency conversion that equalise the purchasing power of different currencies by eliminating the differences in price levels between countries http://stats.oecd.org/Index.aspx?DataSetCode=IDD (median Income, converted to $US)

4.2 Quality of life and Local Purchasing Power in DANUBIUS-RI countries

	Cost of Living Plus Rent Index[a] (5)	Restaurant Price Index[b] (5)	Local Purchasing Power Index[c] (5)
US	58.29	72.68	114.73
Switzerland	97.72	132.81	114.6
Germany	50.48	68.54	107.9
Finland	55.02	85.82	101.93
UK	54.97	83.05	92.5
France	54.02	76.18	89.37
Ireland	63.83	90.92	87.26
Austria	53.26	72.71	87.11
Spain	40.63	58.37	78.18
Italy	49.9	80.94	68.09
India	17.25	18.02	67.15
Czech Republic	32.44	33.68	65.78
Poland	29.46	35.32	64.79
China	31.64	29.76	62.21
Romania	24.53	32.37	57.4
Greece	36.29	59.39	49.65
Turkey	28.1	31.86	47.84
Bulgaria	24.96	32.29	46.62
Hungary	30.61	35.62	41.48
Morocco	24.7	25.33	37.62
Serbia	22.67	29.58	36.1
Moldova	20.89	23.05	25.54
Ukraine	19.81	20.84	25.2
Azerbaijan	21.49	30.81	25.12

Table 4-2: Quality of life and Local Purchasing Power in DANUBIUS-RI member countries (data for CH, US and China included for comparison purposes) (data for some DANUBIUS-RI member countries not available and not listed)

5: https://www.numbeo.com/cost-of-living/rankings_by_country.jsp
[a] Price Plus Rent Index is an estimation of consumer goods prices including rent in the city comparing to New York City. If a city has a an index of 120, it means Numbeo estimates it is 20% more expensive than New York (excluding rent)
[b] Restaurants Index is a comparison of prices of meals and drinks in restaurants and bars compared to NYC.
[c] Local Purchasing Power shows relative purchasing power in buying goods and services in a given city for the average wage in that city. If domestic purchasing power is 40, this means that the inhabitants of that city with

the average salary can afford to buy on an average 60% less goods and services than New York City residents with an average salary.

4.3 Researcher salaries in the EU

The following section is quoted from the MORE2 report 2013 on mobility patterns and career paths of researchers [13]

"Overall, EU countries are outperformed by non-EU countries in terms of purchasing power parity (PPP) adjusted salaries. Researchers' remuneration levels differ substantially across European countries and in comparison with other parts of the world. There is a substantial difference between the progression of researchers' salaries across seniority levels and across countries.

In terms of PPP adjusted salaries, the EU countries are on average outperformed by the sample of non-European countries covered in Table 4-1&Table 4-2. The average salaries across all career stages are by 5 to 10 percentage points (R2-R4) and about 25 percentage points (R1) higher in non-European countries than in the EU. The largest differences occur with the US and Brazil where salaries in all career stages are in the top '80-100%' category (relative to the best-paying country) compared to the EU which lies in the 45-55% bracket. There is however substantial heterogeneity in gross salary levels within the EU28 countries. Salaries in most of the EU12 countries are substantially lower than in the EU15. (see http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:EU_enlargements for definitions of EU12, EU15, EU25)

Amongst the best paying countries are the US (R2-R4), Brazil (R1-R4), Switzerland (R2-R4), Cyprus (R2-R4), the Netherlands (R3, R4), Ireland (R4), and Belgium (R1). Denmark pays the highest stipends for PhD candidates across countries.

In EU countries most of the remuneration-related aspects are regulated by national authorities. In particular, health care insurance, retirement pension insurance, and unemployment insurance are centrally organised. In contrast, salaries are set nationally in less than half of the EU countries. Salaries (at appointment), salary rises and working time are determined at various policy levels, from the national level via collective agreements, and universities to individual negotiations.

Major differences in setting academics' salary levels and increases exist between countries with different innovation capacities. Countries which are innovation leaders pay slightly higher wages, but more importantly, also allow more wage dispersion within positions than countries that show a lower innovation performance.

In countries that are innovation leaders, the salaries for academic positions are more often determined by the research institutions themselves rather than by law. They also put a lower emphasis on seniority and a larger one on performance for pay increases as well as emphasizing individual negotiations more strongly than pre-determined wage scales for wage increases.

Research institutions in the EU27 as a rule grant fewer provisions and bonuses to their staff than research institutions outside the EU27, and the value of these provisions and bonuses as a percentage of the salary is smaller.

Lower wages, higher insurance and social security are the norm for both junior and senior researchers in EU27. In terms of net salaries (also including mandatory deductions), both the junior and the senior researcher would earn less at both the typical EU15 and EU12 universities than at universities located outside the EU27. Although these differences diminish when taking into account mandatory contributions, they remain sizeable even after this adjustment. The lower net wages in the EU countries

are associated with much higher coverage by compulsory insurance and a more generous health insurance system. This suggests that - at least in part – researchers in the EU27 countries are compensated for the fact that their net wages are lower than those of their peers in non-EU27 countries through a more generous compulsory social security system. Although we cannot quantify the value of this better social security system to the researchers with the data at hand, this implies that comparing researcher salaries on the basis of net wages may overestimate the salary disadvantage of the EU27 countries relative to the non EU27-countries."

5 Researcher mobility in EU

5.1 Current status and issues of researcher mobility in the EU

The topic and merit of researcher mobility has been debated by the EU for last 2 decades. An extensive section of the Euraxess portal is dedicated to the subject, https://euraxess.ec.europa.eu/useful-information/policy-library .

Figure 5-1_present the current perception of the importance laid on researcher mobility in various countries across Europe, and how it affects the careers of researcher. In some countries, mobility is obligatory.

International mobility is a pre-requisite for a researcher's career:		
Yes	In certain areas	No
Albania, Austria, Bulgaria, Denmark, Macedonia, Germany, Hungary, Luxembourg, Slovenia, Spain, Switzerland, Turkey, Faroe Islands, Israel, China, South Korea	Belgium, Croatia, France, Greece, Italy, Montenegro, Netherlands, Russia	Belgium, Croatia, Cyprus, Czech Republic, Estonia, France, Greece, Italy, Liechtenstein, Lithuania, Montenegro, Netherlands, Poland, Portugal, Romania, Russia, United Kingdom, Canada, Japan, Singapore, USA

Figure 5-1: Countries where reseracher mobility is a prerequisite for career progression (Taken form MORE2-Working conditions and career paths of ESRs- cross country report- WP3 [12])

5.1.1 Foreign researcher contribution to workforce

Research by Franzoni et al in 2013 [14] indicates that there is a large variation in countries that absorb mobile researchers, and is summarised in Table 5-1. Results indicate that research intensive countries, rely heavily on foreign researchers: Countries like Switzerland, Canada, Australia, US and UK are hugely dependent on foreign researchers, with % rates varying from 33-40% for UK up to a high of 57% for Switzerland (National Postdoc Association of US (NPA) reports 62% in US see * below). On the other end of the scale, countries less well known for their research have lower foreign researcher intensities: eg Spain and Italy.

	% foreign researchers	**Countries supplying more that 10% of foreign workforce**
Switzerland	56.7	Germany 37
Canada	46.9	UK 13 US 13 China 11
Australia	44.5	UK 21 China 17

US	38.4*	China 17 India 12
Sweden	37.6	Germany 12 Russia 10
UK	32.9**	Germany 15 Italy 10
Netherlands	27.7	Germany 15 Italy 12
Germany	23.2	
Denmark	21.8	Germany 23
Belgium	18.2	Germany 15 France 15 Italy 15
France	17.3	Italy 14
Spain	7.3	Argentina 12 France 10 Italy 10
Brazil	7.1	Argentina 16 France 14 Columbia 12 Peru 12
EU average	5.6	MORE2 report [13]
Japan	5	China 33 S Korea 12
Italy	3	France 13 Germany 11 Spain 11
India	0.8	

Table 5-1:Table of Mobility by country taken from Franzoni et al 2013: [14]

*Correspondence from NPA state that the figure is much higher: temporary visa holders are at 54% and 8% are permanent residents

** Figures from Vitae CROSS 2017 survey state 41%; 26% EU non-UK national + 15.1% non EU (https://www.vitae.ac.uk/impact-and-evaluation/careers-in-research-online-survey-cros-2017-collaborative-agreement-vitae.pdf/view)

5.1.2 Mobility rates of Researchers (comparison of EU and US)

Most researchers in both EU and the US stayed in the same country or state ('sedentary') between 1996 and 2011, according to the affiliations on their published outputs [15]. However, the percentage remaining sedentary was higher in EU than in the US (Figure 5-2). Conversely, a higher rate of outside region mobility is observed for US researchers than EU researchers.

Mobility rates

- Majority of EU researchers are sedentary (56%) (31% quoted by the MORE2 report [13]). Most US researchers are also sedentary, but to a lesser extent (32%)
- Inter-country mobility rate for EU researchers is very low (6.8%), in comparison to the inter-state mobility rate for US researchers (22.2%). The statistics for the EU mobility quoted by

Science Europe are lower than those quoted by the MORE report, which quote “15% of researchers working in the EU are currently mobile.”[13]

- Very few EU (5.5%) and US (8.4%) researchers currently move out of their native zones. MORE2 report [13] quotes:
    - An estimated 34,000 EU-born researchers working abroad in five large countries, of which 15,000 in the US.
    - 70,000 of non-EU researchers are working in EU27. This is 5.6% of the total amount of researchers working in the EU.

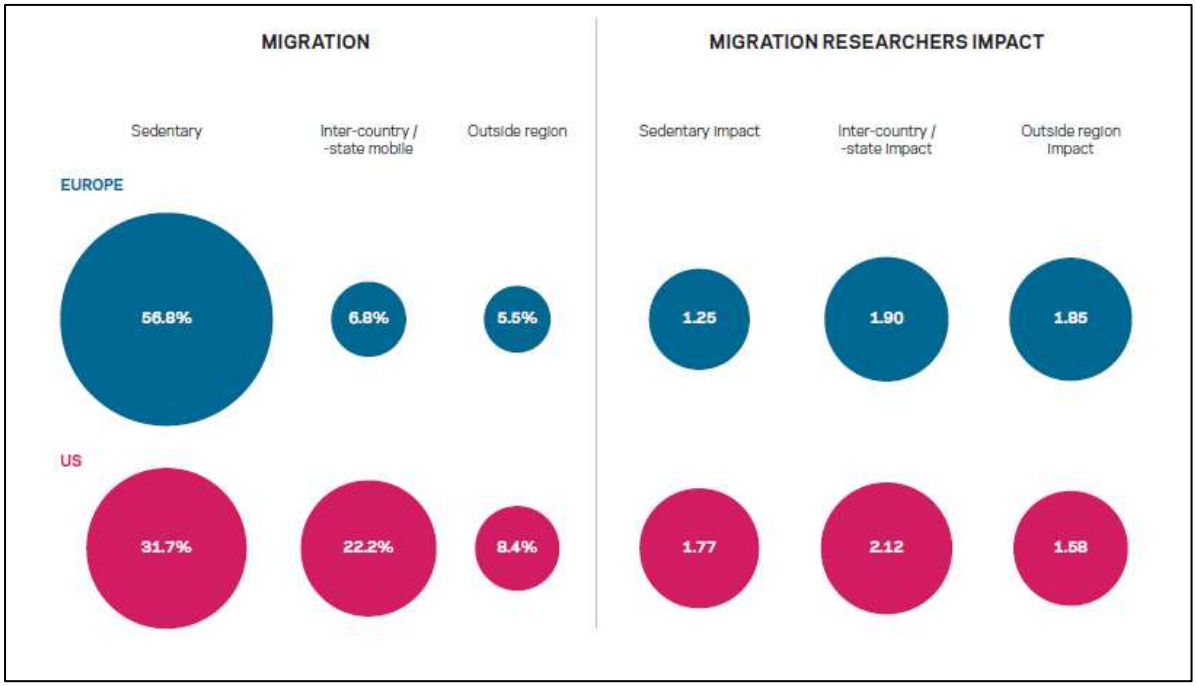

Figure 5-2:Migration patterns (1996-2011) and (right) FWCI (2007-2011) for each category of researchers and their articles for Europe and US. [15]

5.1.3 Return rate of Mobile researchers

MORE2 results indicate that researchers do not return to their country of origin.

- 11% of researchers return to their country of ‘origin’ (either citizenship or highest previous education)
- 23% of the EU researchers currently outside the EU consider returning to the EU

5.1.4 Intersectoral mobility

Intersectoral mobility is defined as being mobile to a sector outside academia, in a researchers own country or abroad [13, 16]. The outside sectors include: private industry, private not for profit, as public and government sectors.

Intersectoral mobility is also a way of ensuring a professional future for PhD holders in an increasingly difficult employment context [17]. It permits researchers holding a postdoctoral qualification who have been funded and hosted by national research organisations, and who might not find a stable position in academia, to broaden their career prospects. The scientific and technological challenges facing today's researchers are extremely complex and, in many cases, require new approaches to research and training.

Globally, there is relatively low number of researchers employed in the business sector, less than 10% [18]. EU has less than ½ the number of researchers in industry when compared with the US and Japan

EU drive to promote intersectoral mobility goes back as far as 2006 "Mobility of Researchers between Academia and Industry" [19], where it recognises that problems of *"the so-called "European Paradox", i.e. that Europe is unable to sufficiently turn research results into globally competitive products* and therefore advises that "*Intersectoral mobility at the same time adds to the employability of and diverse career development for researchers*.

Current practice rates of Intersectoral mobility

In countries such as Denmark, the Netherlands, Belgium and the US, more than a third of doctorate holders are employed in the business enterprise sector, while in countries such as Poland, Portugal, Chinese Taipei, Malta and Turkey, more than 70% of Ph.D. graduates remain employed in universities [18] (Figure 5-3).

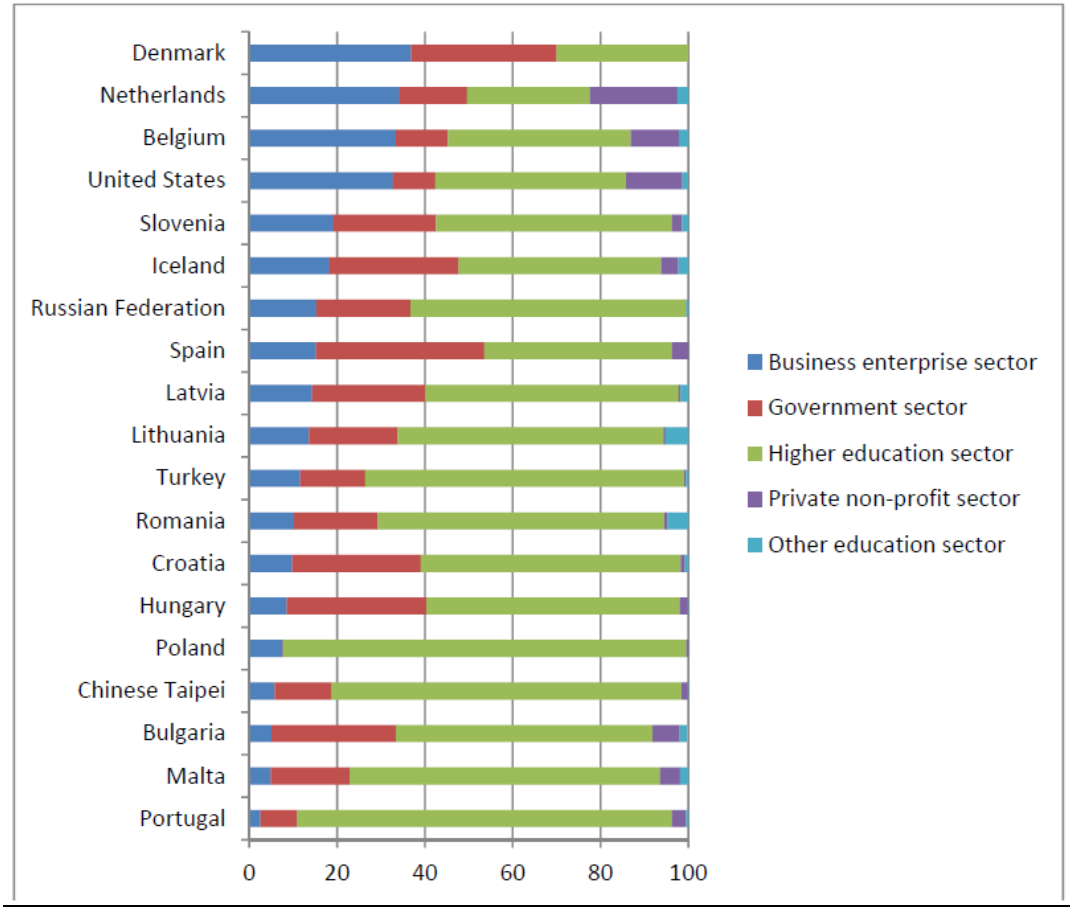

Figure 5-3: Sectoral distribution of doctorate holders, 2009 (Source: [18] taken from OECD, CDH data)

5.1.4.1 Benefits and Impact of Intersectoral mobility

Joint Research Centre (JCR) report [20] state two benefits of Intersectoral mobility:

1. Policies supporting spin-offs increase the entrepreneurial capacity of research organisations and promote the translation of research results into economic value.
2. The policy measures build industry awareness of knowledge transfer, increase the absorptive capacity of firms for internal and external R&D, strengthen academia – industry collaboration and build trust between actors.

The impact of intersectoral mobility on the careers of researchers is difficult to measure; In the Science Europe survey, Member Organisations mostly quoted intangible effects such as knowledge transfer. The main tangible impact was cited as the contribution to a higher number of start-up companies. The Impact on skills and employability of PhD researchers is evident in the evaluation of "industrial PhD programmes".

5.1.4.2 Mechanisms to promote intersectoral mobility

JCR report [20] recommends the following mechanisms to promote Intersectoral mobility:

- direct support to intersectoral mobility with dedicated funding (that is, a physical stay in the other sector);
- joint positions in academia/higher education institutions (RPO) and industry/non-academia;
- chairs and professorships at a RPO or research organisation funded by industry or non-academic body;
- joint doctorates with industry or non-academic partner;
- collaborative research projects between academia and industry or non-academia;
- intersectoral mobility included in the general grant mechanism;
- internships in other sectors; and any other form of support for intersectoral mobility (to be specified).

5.1.5 Benefits Impacts of mobility on Citation productivity

JCR report [20] states the following Benefits and Impacts of mobility on Citation productivity:

- Sedentary researchers in EU have a notably lower citation index (1.25) than sedentary researchers in US (1.77).
- Moving inter country or interstate, increases citation impact performance up to a similar range of 1.9 EU and 2.12 US, (EU getting relatively higher increase due to low initial baseline citation index for sedentary. 60% performance increase for EU, and 40% performance increase for US).
- Citation impacts for researchers who move inter-EU country of interstate US is approximately the same.
- Ironically, moving outside the researchers native zone, is not as productive as moving within the researcher native zone. The EU sedentary researcher still benefits, as starting from a low baseline. Veugelers [21] also produces similar conclusions, and adds that Mobile European researchers who went to the United States were significantly more likely to report strong positive career effects than their mobile peers who moved within the European Union (EU) (up

to twice as high). Reason suggested for this results is that EU researchers who move to the US are likely to be strongly career-motivated compared with their intra-EU–mobile peers
- However the US researcher results in a drop in productivity, due to the relatively high baseline for sedentary researchers in US.

Observation:

- EU: Europe: high impact country = high mobility
- US: high impact state = low mobility

Other reports that indicate that researcher mobility improves researcher performance:

- Scellato et al [22, 23] in the GlobSci project, stare that the impact factor of research by foreign-born scientists is on average higher than that of natives who have no international mobility experience.
- Veugelers [21] also states that “Researchers who are internationally mobile during early stages of their academic career display, on average, higher scientific productivity (e.g., increased number and quality of subsequent publications)”.

5.1.6 Disadvantages of mobility

The disadvantages of mobility are:

1. Stress and depression: Euroscientist [24] quotes that “It can be stressful not to know where you will live the following year.”
2. Difficulties in maintaining relationships
    a. Long distance relationships
    b. If one partner joins the other who already has a position, it is very difficult for the other partner to secure a similar position that they had in previous country. Very few countries of institutions promote and support parent employment arrangements.
3. Difficulties in raising a family, leading to researchers postponing families into much later in life in the hope of getting a secure position, which does not demand mobility.
4. Difficulties in establishing mature research groups. Mature research groups require a researcher to be:
    a. Well established and network in a location
    b. Experienced in applying for funds with adequate time for the lengthy process.

    Once funding is secure, the Principle Investigator (PI) will need to remain for duration of project at a minimum to coordinate, and ideally longer to apply for continuation funding to progress research further.

5.1.7 Obstacles to researcher mobility

5.1.7.1 Barriers to researcher mobility within academia

Why is researcher mobility higher within the US than in EU? There are many inherent barriers to mobility, and are split in two below relevant to A: transnational and B: EU specific barriers (statistics provided from MORE2 survey report [13]):

A: Barriers that are Transnational:

1. Obtaining funding for mobility/research is the most oft-mentioned barrier for the researcher's most recent move - 43%.
2. Finding a suitable position and logistical problems are barriers to international mobility for around 35% of researchers,
3. Family, partner reasons - 26.5%
4. Quality of training and education - 21%

B: Barriers that are more specific to EU as a collection of different nations, with individual administrative regulations:

1. Administrative systems, logistics 30% (would be less in US, but no statistic available from MORE2)
2. Transferring research funding, or portability of grant - 16.3% (no statistic available from MORE2, discussed separate in below section)
3. Pension transfer (no statistic available from MORE2, discussed separate in below section)
4. Language/culture (16% and 24% of researchers)
5. Benefits
6. Visa work permit - 11.7%. This is unexpectedly low.

On the other hand, the US have a far more homogenous administration system, enabling higher mobility, despite the equally diverse and multi-cultural constituent make-up. For example, there is greater comparability of employment law and compensation packages between states.

In summary, the barriers to mobility appear to be common barriers, with the nature of the EU not posing the most important of the barriers.

5.1.7.2 Barriers to Intersectoral Mobility

Vandevelde [18] lists the following major and lesser barriers to intersectoral mobility:

Major barriers:

- Low employer demand (especially in times of economic crisis)
- Appraisal barriers (pressure on academic research performance rather than intersectoral experience within universities)

Lesser barriers:

- Legal barriers (e.g. insurance, IP)
- Payment,
- Pensions,
- Funding

JCR Report also lists the following barriers:

- Lack of awareness by industrial firms,
- Unclear expectations from the programmes on the side of businesses
- High administrative burden linked to application
- Additional costs for the hosting company (financial participation but also human resources devoted to mentoring)

5.2 Mobility within the future DANUBIUS-RI

The project “Accelerate” (http://www.accelerate2020.eu/) unites some of the already-established European Research Infrastructure Consortia (ERIC), aimed at sharing best practices in the operation of ERICs. This project organised a workshop in Graz in November 2017 where the question of the merits of the different, possible collaboration schemes was discussed. Sections 4.2.1-4.2.3 present some of their conclusions.

5.2.1 Secondment

If the secondee remains an employee of his/her organisation, he/she continues to receive salary and other benefits are :

- Day-to-day supervision is exercised by the ERIC
- Compensation of expenses of the secondment:
- Reimbursement
- In-kind (value reduces cash contribution)
- Eligible for “personnel” in FP (Art. 6.2.A.3 GA: “Costs for personnel seconded by a third party against payment”)

It appears that there is some uncertainty as to which institution should provide the EC with the financial reporting:

- Is it the institution where the employee is seconded, or the institution where the employee comes from?

5.2.2 Service Agreement

The following provide details of Service Agreement arrangements:

- Services/tasks needed to be specifically described
- Agreement is with a legal entity
- It is not necessarily specified who is doing the service
- Not bound to any directives related to how the services shall be provided as well as work time and work place
- Eligible for category “other direct costs”

5.2.3 Consultant

The following provide details of arrangements for Consultants:

- Concrete definition of the agreed services/projects aims to be achieved
- Not bound to any directives
- Commercial risk borne by the consultant
- Right of the consultant
- Essential work material
- Eligible for “other direct costs”

5.2.4 Fiscal implications of mobility

This section gives a brief overview of issues for staff moving from a country to another on account of one or more employers, summarised in Table 5-2.

Business travel	Assignment (active service)	Secondment (passive service)	Contracts with two or more employers	Localisation
Existing contract remains in force	Existing contract remains in force, additional agreement (assignment agreement is concluded)	Leasing an employee to another company or within a group of companies	Employment relationship is maintained and additional employment relationship established	Local employment contract is concluded
Temporary work abroad (e.g. seminars or project work for a few days)	No integration in the host company, assigning company keeps authority	Integration in the host company and authority to give directives, personal costs are charged to the host company	Two or more employers at the same time with the right to authority to give directives; personnel costs are charged to host company	Company has the authority to give directives, bears the personnel costs and has the employer function
Employee works in the name and on account/risk of the employer	Employee works in the name and on account/risk of the assigning company	Employee works in the name and on account/risk of the host company	Special rules for social security within EU/EEA area (“multi state workers”) apply	Employee works in the name and on account/risk of the employer
	Assignment may result in a permanent establishment in the host country	Caution: possibly immediate tax liability in the host country		

Table 5-2: Mobility of personnel in ERICs – International aspects of taxes, social security and labour law, Deloitte Graz, «Accelerate» Project (funded by Horizon 2020), Graz, Austria, November 2017 Source: Angelika Hörzer,

The question of which country is having the authority to tax is settled by the Article 15 of the OECD Convention, and can be illustrated as follows Figure 5-4:

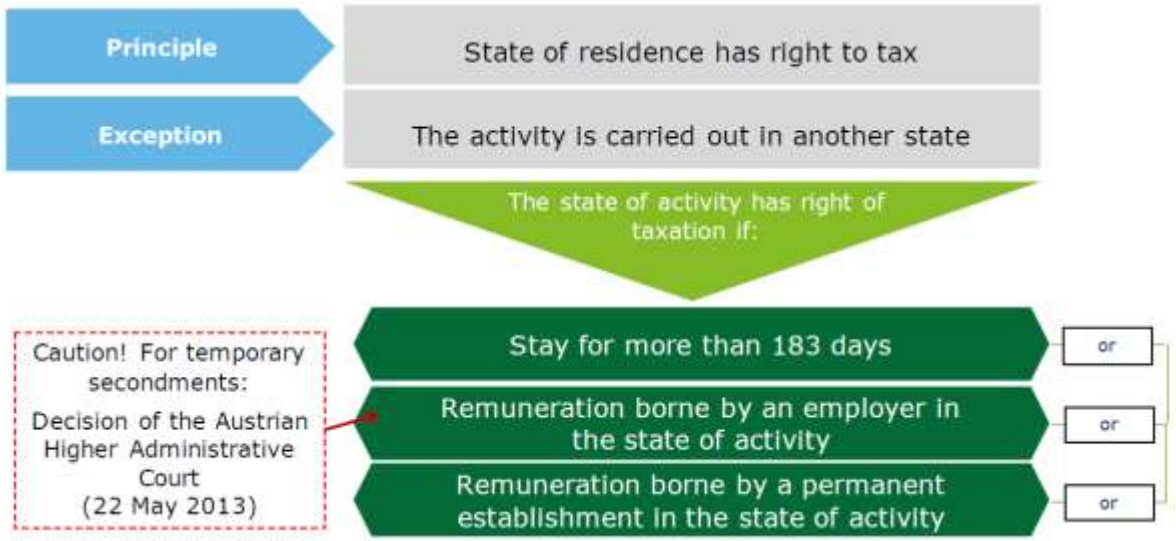

Figure 5-4: Mobility of personnel in ERICs – Remuneration rules dependant on duration of work stay Graz, Austria, November 2017 Source: Angelika Hörzer,

Article 4 of the same convention provides a decision tree including the relevant criteria for deciding of the state of residence Figure 5-5:

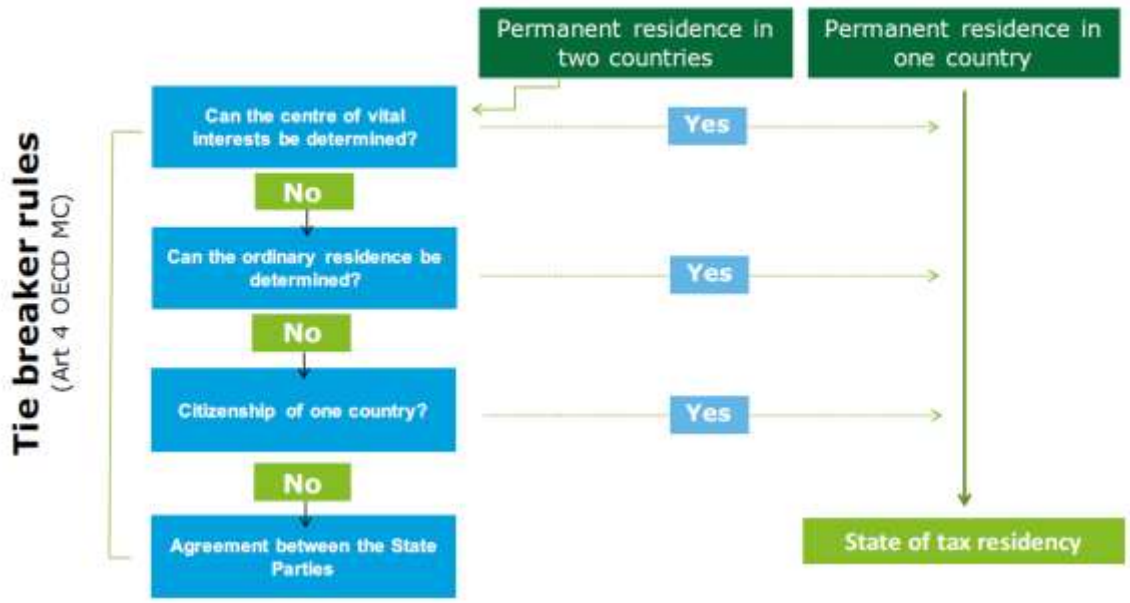

Figure 5-5: Mobility of personnel in ERICs – International aspects of taxes, social security and labour law: permanent residency factors Deloitte Graz, «Accelerate» Project (funded by Horizon 2020), Graz, Austria, November 2017 Source: Angelika Hörzer

5.2.5 Social Security implications of mobility

The legislation of reference for Social Security matters in the EU is the Regulation (EC) 883/2004. This Regulation is completed by bilateral Social Security Agreements.

The Articles 2 and 3 of this Regulation provides for the personal scope and the material scope of the Regulation respectively.

- Articles 2: Personal scope of the regulation – To whom does it apply
  - Nationals of Member States
  - Stateless persons and refugees residing in a Member State
  - Members of their families and their survivors
- Articles 3: Material scope of the Regulation – For which branches of social security is the Regulation applicable
  - sickness benefits
  - maternity and equivalent paternity benefits
  - invalidity benefits
  - old-age benefits
  - survivors' benefits
  - benefits in respect of accidents at work and occupational diseases
  - death grants
  - unemployment benefits
  - pre-retirement benefits
  - family benefits

Article 11 of the Regulation (EC) 883/2004 provides a principle of single insurance for workers in Europe and is illustrated in the following graphic (Figure 5-6).

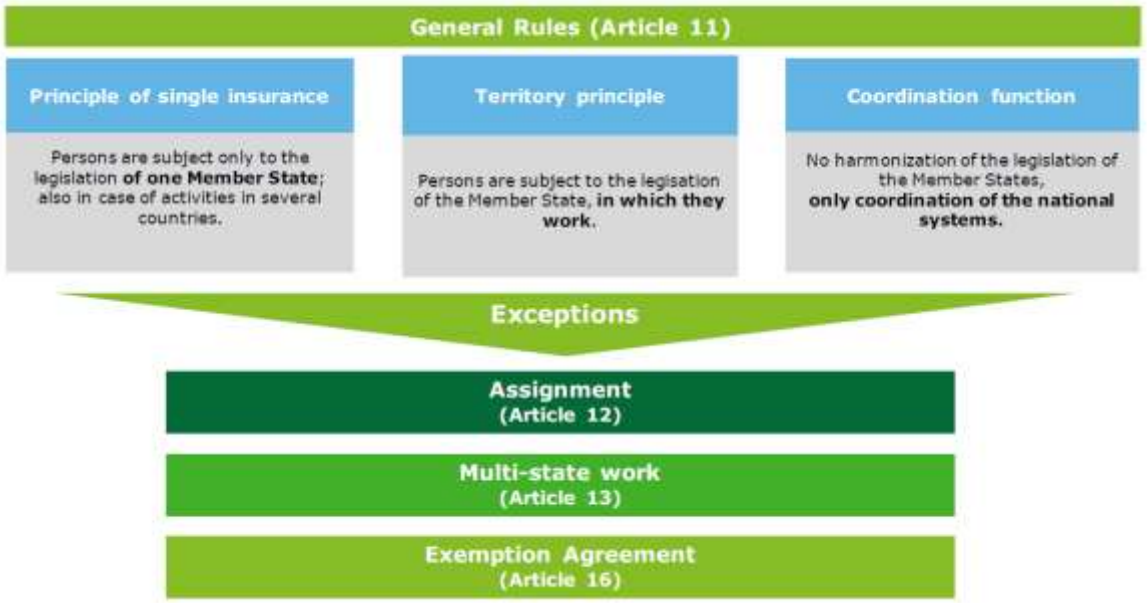

Figure 5-6:Principle of single insurance for workers in Europe Mobility of personnel in ERICs – International aspects of taxes, social security and labour law, Deloitte Graz, «Accelerate» Project (funded by Horizon 2020), Graz, Austria, November 2017 Source: Angelika Hörzer,

Article 12 provides that the maximum duration of an assignment in another Member State cannot exceed 24 months. Article 13 addresses the case of a work carried out in several countries.

For the future DANUBIUS-RI, Article 13 is of high importance as it provides for the case of multi-state work, and the criteria to decide which Social Security insurance the worker will be affiliated with, and is illustrated in the following graphic (Figure 5-7).

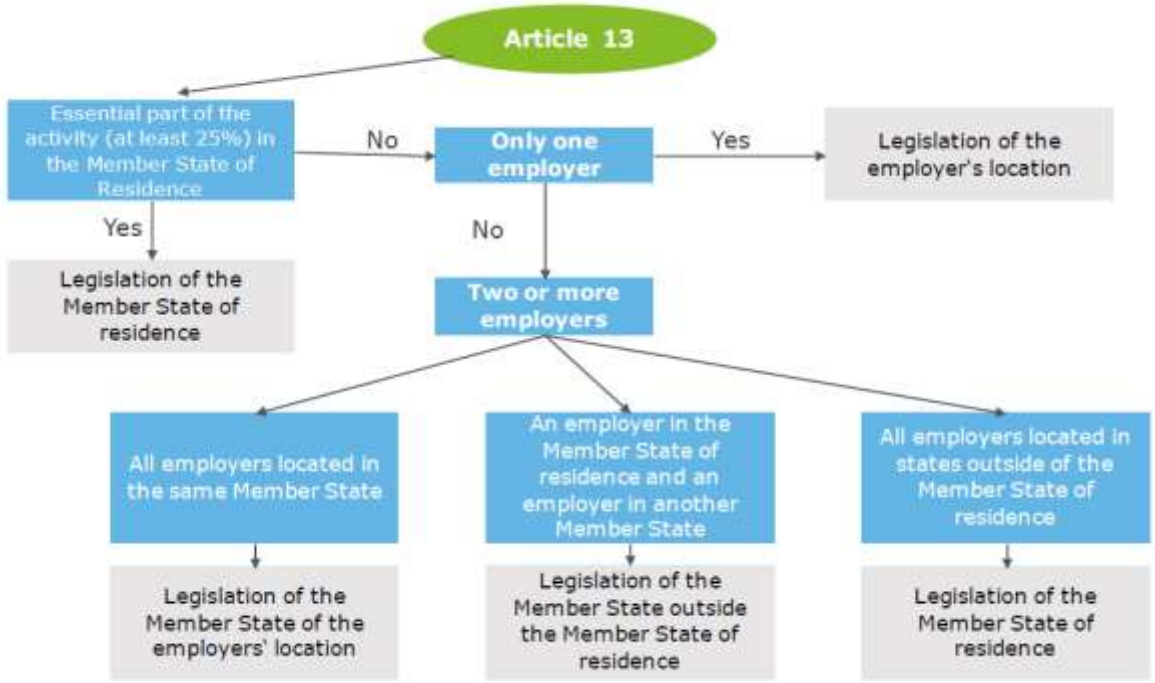

Figure 5-7: case of multi-state work, and the criteria to decide which Social Security insurance the worker will be affiliated with. Source: Angelika Hörzer, Mobility of personnel in ERICs – International aspects of taxes, social security and labour law, Deloitte Graz, «Accelerate» Project (funded by Horizon 2020), Graz, Austria, November 2017

6 Pensions

6.1 Pension schemes background and definitions

6.1.1 State Pension (sometimes called the First Pillar)

All EU countries have state pension schemes. Every country that a researcher works in can claim the state pension. It is the responsibility of the host country to forward the researcher claim to the country in which that research last worked in. That country is then responsible for processing the claim and bringing together records of the researchers' contributions from all the countries they had worked in.

Most researchers have first pillar pensions. This requires an employment relationship between the researchers and his/her employer where they pay social security contributions. This is often supplemented by an occupational pension provided by the researcher's employer. Depending on the country, the first or second pillar pensions can carry more or less weight.

6.1.2 Supplementary pension (sometimes called the Second Pillar)

Supplementary pensions are retirement, survivors' or invalidity pension schemes designed to supplement or replace state pensions. If a researcher leaves a supplementary pension scheme because they move to another EU country to work, they have the same rights as people who stay in the same country but stop paying contributions.
However, due to the fragmentation of the European pension landscape the researcher may encounter difficulties in preserving supplementary pension benefits when moving between different countries and changing jobs

There are two types of supplementary schemes:

- Defined Benefit (DB) schemes
  Defined benefit schemes aim to provide a set level of pension and/or lump sum at retirement. The level of benefits depends on your service in the scheme and salary at retirement. Generally DB schemes in the private sector aim to provide employees with a pension of 1/60th of salary for every year of service to a maximum of 40/60ths. You may have the option to take a retirement lump sum and a reduced pension. Public sector schemes tend to provide retirement lump sums of 3/80ths of salary and a pension of 1/80th of salary for every year of service to a maximum of 40 years service.
- Defined Contribution (DC) scheme
  In a defined contribution scheme, the employee contribution and the contribution paid by the employer are usually fixed as a percentage of the salary. The contributions will be invested in a fund in order to provide the employee's retirement benefits. DC schemes do not provide any guarantees, the employee's benefits at retirement will depend on a number of different factors including contribution levels, fund performance, plan charges and the annuity rates available when the employee retires.

6.1.3 Private pension schemes (sometimes called the Third Pillar)

i.e. individual savings, often in the form of a life insurance

6.2 What happens to researchers' pensions when they move?

If a researcher moves within the EU, the European Economic Area (EEA) countries and Switzerland, his/her first pillar pension (i.e. State pension) will be coordinated between the countries involved under EU social security coordination rules. With countries outside the EU, bilateral agreements exist that govern the portability of pension rights. When the researcher retires, these rules will determine where and how much pension benefits the researcher receives.

There are, however, no EU rules relating to the portability of second pillar pension rights. Researchers who spend part of their career abroad—even if it's just a few hundred kilometers from home—can find themselves paying into a variety of supplemental plans, often resulting in lower benefits than they would enjoy if they just stayed put [25]. There is also a risk that the researcher loses some of his/her entitlements as a consequence of his/her move. This also puts a damper on scientists' mobility.

6.3 Pensions schemes in DANUBIUS-PP member countries

Spain

Although many institutions in Spain are part of the consortium, there are obstacles in Spanish law to joining a foreign pension fund.

Germany

In Germany, implementation of the new Pan –European pension scheme called RESAVER will require legislative changes (RESAVER explained in detail in Section 6.4). Supplementary retirement pension arrangements are run on a federal basis.

An additional barrier is that, researchers in private institutes have little incentive to join because they already enjoy attractive pension packages (at the Max Planck).

UK

UK has its own pension for higher education institutes, called USS, and UK universities cannot joint the new scheme. For this reason, Cambridge University, while a member of the task force that drew up the plan for the fund, has not officially joined in the scheme. Researchers can join Universities USS and when they move to another country transfer to RESAVER.

France

Many researchers have their pension fully covered by the state as civil servants. But not all French researchers are civil servants. Private research institutions are interested in the scheme and the consortium is consulting with the appropriate French ministries.

Finland (Not represented in the PP consortium**)**

"It's difficult to change payments to Resaver due to our strict law about retirement funds in Finland.

Other countries info supplied by partners?

6.4 Pan European pension scheme - RESAVER

The goal of RESAVER initiative is that researchers could move freely without having to worry about preserving their supplementary pension benefits [26].

The RESAVER fund will not substitute for state-run pension systems, also known as first pillar pensions, but will provide supplementary benefits financed through employer contributions and private pension plans for individuals, so-called second and third pillar pensions (see also sections 5.1.1 – 5.1.3) [27].

6.4.1 RESAVER Background

The European Commission (EC) conducted a feasibility study in 2010 on a Pan-European pension arrangement for researchers. Following the feasibility study, the EC's Directorate-General for Research and Innovation invited a group of interested employers and employer representatives to prepare the ground for the establishment of what has become known as “Retirement Savings Vehicle for European Research Institutions” or RESAVER.

The initiative was singled out as a priority in the 2012 Communication on ERA, in which the EC committed itself to "support stakeholders in setting up pan-European supplementary pension fund(s) for researchers". A pan-European supplementary pension fund would enable researchers to remain affiliated to the same pension fund, even when changing jobs and moving between different countries. The European Commission would cover the initial set up costs through a four-year framework contract. It was planned that this contract would be awarded before the end of 2014.

6.4.2 RESAVER Current structure

The RESAVER consortium works as an international not-for-profit association registered in Belgium.

The founding and 5 ***only*** current subscribed RESAVER members to date are:

1. Central European University Budapest;
2. Central European Research Infrastructure Consortium (CERIC-ERIC);
3. Elettra - Sincrotrone Trieste S.C.p.A; Fondazione Edmund Mach;
4. Istituto Italiano di Tecnologia; Technical University of Vienna; and the
5. Association of universities in the Netherlands (VSNU).

BlackRock was chosen as the investment manager, the main challenge for the team led by managing director Tony Stenning will be to accommodate the investment regimes of the various EU member states, as the requirements must be met for each fund member in each country [28].

UK-based pension consultant Aon Hewitt, was appointed to provide support for this new cross-border pension, which is structured as an IORP in the jargon; which stands for Institutions for Occupational Retirement Provision [29].

6.4.3 Disadvantage of RESAVER to researchers

1. The RESAVER pension plan will be ‘defined contribution’- rather than ‘defined benefit’-based, meaning that researchers will know how much they put in but not how much they’ll get, as they would with many other pension plans in Europe.
2. RESAVER will have to compete against local and national pension scheme for members.
3. With so few institutions participating, RESAVER could actually be a barrier to mobility, at least in the short term, by limiting researchers to those institutions.
4. Inequalities because Ph.D. candidates are employed in some places but are considered students in others, making them ineligible for participation.

6.4.4 Advantage of RESAVER to researchers

1. Economy of scales will make the scheme competitive and attractive.
2. Lower overhead costs (and therefore improved member benefits) through economies of scale;
3. Once established, institutions having RESAVER will attract researchers.

7 Portability of Grants within the EU.

Portable grants for research staff are an important component of a healthy funding ecosystem that should also include support for teams, projects, students, equipment, travel, and more.

7.1 Current status

Definition: “Grant portability occurs when an individual researcher or a group of researchers continues the research at another institution in another country than originally foreseen in the grant agreement and the remainder the grant is transferred for that purpose” or more succinctly, “money follows researcher” [30].

Statistics for Portability [30]:

- Single PI (Principle Investigator): 24% of the EU funding agencies and research programmes directly funded by the ministries allow individual grants and project grants to be portable.
- Project grants: 12% of the EU funding agencies and research programmes directly funded by the ministries support portable grants

7.1.1 Advantages:

- Empowers researchers giving them freedom to bring their research and research team with them
- Enables research projects to be on-going and not discontinued due to a job change from an institution from one country to another institution from another country. Additional benefit of team building purposes and networking

7.1.2 Disadvantages:

- Loss of revenue for funding bodies
- Considerable admin logistics of transferring funds for the funding body.
- Financial administration in partner countries challenging
- Brain-drain
- Loss of the knowledge base,
- Potential steep salary discrepancies between the sending and host institutions/countries,
- Overheads not paid abroad

7.1.3 Barriers:

There are important considerations that portable grants must address in order to achieve their goal of promoting researcher mobility.

- Some institutions, particularly in the UK, retain rites to IP and Publications, with ramifications that researcher essentially starts with no publications to offer new host university.
- Visa restrictions must be addressed as they have an impact on the
    - Viability of winning the grant
    - Lifestyles and quality of life of international researchers

- Dual-career considerations
    - Policies promoting researcher mobility should align with support mechanisms for families, including residence and work status
- Ownership of Intellectual Property (IP) – research questions, experimental design, unpublished results – must be addressed
- Different approval rates
- Different decision making systems (panel system vs. decision based on external reviews only)

7.1.4 Recommendations to improve portability for candidates

- Promote equal Status, recognition, and benefits should be on par with nationals
- Career exploration should be allowed and facilitated
- Temporary leave to remain in-country after the contract ends in order to allow time for job hunting, as well as vacation leave within contract.

7.1.5 Examples of Portable Grants

- Marie Skłodowska-Curie Actions – requires hosting in another country
    - Caters for early stage researchers
- European Research Council (ERC) – option to remain in host institute, but most accept offers from highest bidder institutes.
    - Caters for senior researchers
    - Available only for the highest grade researchers, therefore limited in availability.
- Ireland
    - Irish Research Council (IRC) programme called INSPIRE, the function of which was to encourage and facilitate international mobility. It was a co-fund with Marie-Curie and no longer runs. There were 18-19 of them in 2008/09.
    - Enterprise Partnership Programme 2012/13 – enable researchers to conduct 1 year of their research in a European industry of their choice. Might be re-introduced.
    - Science Foundation Ireland (SFI) have SIRG grants (Starting Investigator Research Grant) which encourage researchers from abroad to come to Ireland. They are awarded in the name of the researcher with a dedicated host supervisor. 2/3 of the grants MUST be awarded to individuals based outside Ireland to relocate here but they are not really mobile. The host institution must be Irish
- Canada
    - Fellowships: can move between countries, institutions, and supervisors
    - Grants: Canadian postdoctoral researchers can only hold non-funding council research grants; some are portable. Foreign nationals cannot apply to national funding sources at all.

Challenges include limited access to national fellowships and grants for foreign nationals, and a clustering effect that as researchers move to centers of excellence

7.1.6 Transfer procedures that must be fulfilled

- A Schedule Plan for project transfer
- Information on the new research institution (including information on project-related infrastructure at that institution)
- Confirmation from the new research institution that the infrastructure required to carry out the project will be made available
- Information on the effects of the transfer on the original project plan
- What effects will the transfer have on existing project staff?
- Where equipment belonging to the host research institution is transferred: Confirmation that ownership rights to the equipment will be transferred to the new research institution.

7.1.7 Conclusions

Truly portable grants are very rare. Europe has the gold standard portable grants but the grants are like gold dust.

More portable grant schemes are required to enable researcher mobility and enhance the research eco-system

8 Research Communities and ESR communities

Research communities have been in existence for some time in the form of communities collaborating for purely academic research benefit, both in Natural Sciences and Social Sciences and Humanities (SSH) (physics, genetics, history, politics; National and International. COST action is one of the main promoters of academic research communities.

Online communities also exist: LinkedIn, Researchgate. These are great discussion forums, but rarely achieve physical manifestation, or physical engagement [31].

However, there are very few communities devoted to the career development of the researcher community.

By 2010, researchers were beginning to become organised in Networks, attempting to have a voice in the development of researcher career with policy. National researcher association emerged in Europe; examples are:

- Irish research Staff Association in 2007 (**www.irishrsa.ie**)
- **UK research staff association** in 2009
- ANDes French association in 2007 (**www.andes.asso.fr/**)

Transnational umbrella association also formed, with goal to share best practice between national associations, and have a collective voice in Europe, where European policy was making recommendations to its state members. Such organisations examples were:

- **ICoRSA**: International Consortium of research staff associations , in 2012 **www.icorsa.org**
- **Eurodoc** 2005: European doctoral candidates and early stage postdoc associations.
- **Global Young Academy** in 2013: umbrella group for young academies in many member states.
- **World Association of Young Scientists** (WAYS), linked with UNESCO, although not funded.

The EC itself endeavoured to include researchers directly in consultancy process, forming the '*Voice of Researchers'* in 2013. This group met 2-3 times a year and discussed research careers and development. This group has essentially disbanded **https://euraxessvor2015.teamwork.fr/**

9 Human Resources Requirements for DANUBIUS-RI

9.1 Context

As DANUBIUS-RI partners define more precisely the works and services offered at DANUBIUS-RI, the need for qualified support staff is becoming more precise. The definition of support staff needed presented below took into account:

- a preliminary list of services offered to the user, and
- “internal” works, i.e. work considered necessary for the Supersite to remain fully operational;

The staff working at the Hub, at Nodes or Supersites (Figure 8.1), were divided in three groups: administrative, research, technical and are detailed from Section 8.4 onwards.

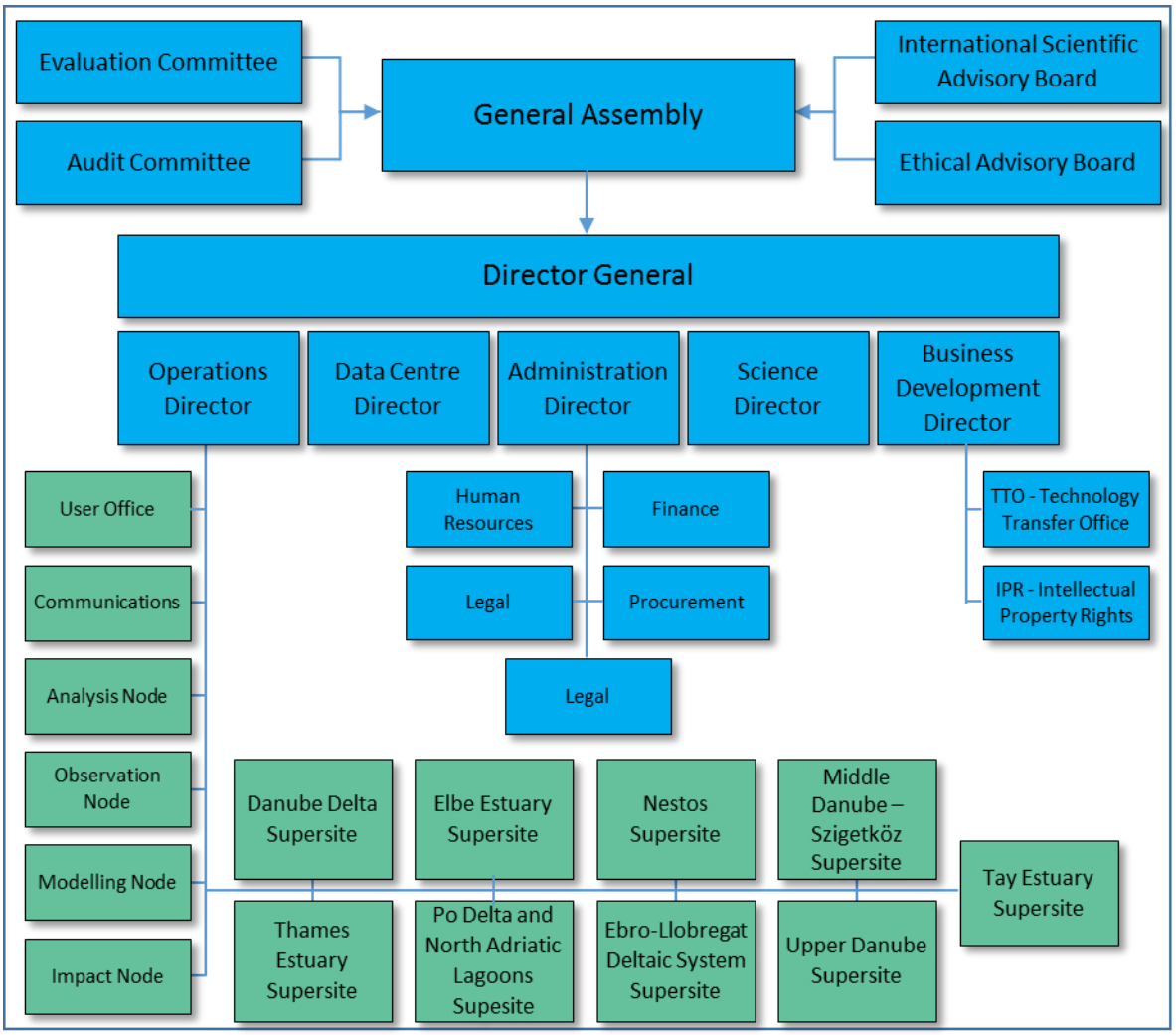

Figure 8.1 DANUBIUS-RI Governance and Management Organogram

Halfway through the Preparatory Phase, some grey areas remain in terms of responsibilities between the Hub and the different limbs of the Research Infrastructures. Even though efficiency calls for a centralisation of most administrative functions, heavy constraints and difficulties caused by the

existence of numerous national legal and fiscal contexts make it difficult to imagine that all administrative functions can be managed from a single location. There is therefore in each of the Nodes and Supersites a need for qualified administrative personnel. However, the fact that DANUBIUS-RI is a “brownfield” project, i.e. based on existing capacities and expertise developed by what DANUBIUS-RI partners call “hosting and leading institutions”, enables DANUBIUS-RI to count on the contribution of hosting/leading institution staff. For this reason, many Nodes and Supersites considered administrative profile FTEs to be less than 1.

This possibility to share the worktime of qualified personnel is, of course, not restricted to administrative personnel, and the tables below show that the best-defined HR plans seize such an opportunity fully for research and technical staff as well. In the process, hosting/leading institutions with a sound HR plan seize the opportunity offered by DANUBIUS-RI to complete their range of expertise. This is certainly one of the best features of being a Member of a pan-European, distributed Research Infrastructure.

9.2 Employment categories

Category	Code	Short definition
Administration	A4	Director
Administration	A3	Third level administrative staff, with minimum bachelor or license, and responsibilities in the organisation, e.g. Head of department
Administration	A2	Second level administrative staff, with minimum bachelor or license, e.g. Accountant
Administration	A1	First level administrative staff, with low qualifications, e.g. Clerk
Research	R4	Leading senior researcher, e.g. Research fellow
Research	R3	Established senior researcher
Research	R2	Junior researcher, Post-doc researcher
Research	R1	PhD student
Support	S4	Fourth level technical staff, with minimum Master level and responsibilities in the organisation, e.g. Engineer
Support	S3	Third level technical staff, with minimum Bachelor/License level
Support	S2	Second level technical staff, with professional qualifications
Support	S1	First level technical staff, with low or no qualifications

9.3 Recruitment status

Value	Meaning
Available	A person within the hosting institution has been identified as a matching profile. Whether this person is actually willing to work for DANUBIUS-RI may or may not have been assessed.
To be secured	A person within the hosting institution has been identified as a matching profile. However, the said person/people do not have a permanent position, and their leaving before the recruitment date is

	possible. Whether this person is actually willing to work for DANUBIUS-RI may or may not have been assessed.
To be recruited	No one within the hosting institution has been identified as a matching profile. A person from outside the organisation should therefore be recruited.

9.4 Hub Resource Requirements

The section below includes extracts from the Deliverable 5.4 “Hub”, to remind the reader of the mission and tasks of the Hub, in the context of a distributed research infrastructure that also counts four Nodes with specific areas of expertise.

9.4.1 Sampling and Sample Handling Laboratory

The Sampling and Sample Handling Laboratory is headed by a R4-class researcher.

Biota samples should be collected and analysed by qualified individuals using the appropriate equipment and procedures. Biota sample handling processes aimed at preventing or minimizing chemical or biological activity within the sample (water, soil and sediments, biota) after it has been collected. Preservation techniques are different, depending on sample characteristics. These techniques will be standardized within the DANUBIUS Commons. This laboratory will ensure the required equipment for primary preparation and proximate and immediate analysis of samples that permanent and temporarily relocated researchers will be taken from Danube Delta Supersite as well as from Lower Danube and Black Sea. The Sampling and Sample Handling Laboratory is subdivided into 2 sub-laboratories:

9.4.1.1 Water and Sediments Laboratory

The Water and Sediments Laboratory is headed by a R3-class researcher.

9.4.1.2 Biota laboratory

Biota samples should be collected and analysed by qualified individuals using the appropriate equipment and procedures. Biota sample handling processes aimed at preventing or minimizing chemical or biological activity within the sample after it has been collected. Preservation techniques are different, depending on sample characteristics. These techniques will be standardized within the DANUBIUS Commons. This laboratory will ensure the required equipment for primary preparation and proximate and immediate analysis of samples that permanent and temporarily relocated researchers will be taken from Danube Delta Supersite as well as from Lower Danube and Black Sea.

The Biota Laboratory is headed by a R3-class researcher.

9.4.2 Genomics and Genetics Laboratory

The Genomics and Genetics Laboratory will explore ways in which genetics can be used to manage natural resources. With the aim of ensuring the range sustainability and limit liability, research activities will be developed on the environmental genomics and ecosystems biology to find ways to protect ecological state of the Danube Delta area from chemical, physical and biological stressors, including existing and emerging contaminants, climate change and invasive species. The research team will be built so it will accomplish the aims by utilizing information derived from the genome and the expressed pattern genes, and from systems biology applications.

The Genomics and Genetics Laboratory is headed by a R4-class researcher.

9.4.3 Microbiology and Phycology Laboratory

The Microbiology and Phycology Laboratory will provide microbiological materials in support of teaching and research activities for undergraduate and postgraduate students and research staff. Working out of specially designed laboratories, the team will include specialists in microbiology, phycology and mycology, biomedicine, wastewater and environment protection, biochemistry, etc.

The Microbiology and Phycology Laboratory is headed by a R4-class researcher.

9.4.4 Bioanalysis Laboratory

The Bioanalysis laboratory aims in shaping global standards for bioanalysis and establishing the basis for guidance documents on conducting method validations and samples analysis in accordance with DANUBIUS Commons. The scientists will shape the evolving criteria that bring together both advanced scientific principles and bioanalysis knowledge. The proposed standards and globally acceptable criteria will be communicate to national and regional regulatory agencies with the aim of assisting them in the promulgation of guidance documents and of providing a scientific perspective on current and emerging bioanalysis methodologies.

The Bioanalysis Laboratory is headed by a R4-class researcher.

9.4.5 Environmental Toxicology

The Environmental Toxicology. The Danube Delta Supersite core activity is to provide systematic and quality assured observation, management and sustainable exploitation of the ecosystem services associated to the protected areas of Danube Delta. Thus, the Hub will ensure also facilities for toxicity testing of environmental media, as well as identification and evaluation of toxic compounds. Bioassay techniques will be developed and validated in DANUBIUS-RI's Hub for environmental compliance monitoring and assessment activities, including soil toxicity tests and aquatic tests especially at the fresh-marine water interface.

The Environmental Toxicology Laboratory is headed by a R4-class researcher.

9.4.6 Bioresources & Biodiversity Unit

The Bioresources & Biodiversity Unit is headed by a R4-class researcher and is subdivided in Aquaculture, Plant science and Bioprocesses and Biotechnical Development. The Bioresources & Biodiversity Unit aims of developing interdisciplinary studies on Danube Delta bioresources, especially aquatic and terrestrial biomasses. Microorganisms and plants are of interest in many research areas such as environmental protection (bio- and phytoremediation, wastewater treatment, etc.), sustainable agriculture and aquaculture, bioenergy, food processing (production, conservation, labelling and hangtags), enzymes industry, and pharmaceutical / cosmetically products discovery. The unit will house several laboratories ranging from identification (taxonomy, biological assay, natural product chemistry, etc.), utilization (pre-pilot scale production and testing facilities of valuable bioactive molecules to develop with the stakeholders' new bioproducts and biomaterials, and biotechnologies), preservation/conservation and legal management of bioresources.

This research unit will be the most advanced bioresources research unit in the Lower Danube Region, meant to involve researchers in different fields in order to scientifically manage biodiversity, with the aim of using biotechnology to explore novel enzymes and other valuable biological compounds.

9.4.6.1 Aquaculture

The Aquaculture Laboratory is headed by a R3-class researcher. The facility will be used by researchers and students to conduct experiments on the development of new aquaculture technologies with a special focus on the following areas: assessing the impact of the eutrophication effects on aquaculture in Danube Delta; intelligent aquaculture methods with low nitrogen and carbon level, including recirculating aquatic systems; Hydrobiology of applied aquaculture; Feeding with a reduced environmental impact; Biology and monitoring of native and invasive crustaceans species; Research on the reproduction of vulnerable species and their growth, including their reproduction and reintroduction into the natural environment.

9.4.6.2 Plant Science

The Plant Science Laboratory is headed by a R3-class researcher. Directly related to climate change and societal challenges, the Plant science laboratory will focus on restoring the wetland ecosystems functions and conservation, as well as on global food/feed security and bioenergy. Thus, metabolic paths developed by plants and soil biota as a response to climate change will be highlighted with the aim of a better management of the effect of environmental factors on primary and secondary metabolites involved in plant relationships. The research activities will be closely developed in collaboration with the other research laboratories of the Hub integrating the proteomics, metabolomics and genomics studies.

9.4.6.3 Bioprocess and Biotechnology development

The Bioprocess and Biotechnology Laboratory is headed by a R4-class researcher. Based on the fundamental research results the Bioprocess and Biotechnology development laboratory will focus on applied innovative and efficient solutions for sustainable bioprocesses/biotechnologies of interest for stakeholders.

9.4.7 Microscopy & Imaging Laboratory

The Microscopy & Imaging Laboratory focuses on molecular and biophysical characterizations and analytical spectroscopic imaging. The lab consists of a wide spectrum of analytical imaging devices with spectral imaging capabilities for both materials and living biological samples. Through high-performance computational tools, it will provide specific services for chemical biology and biomedical research, such as visualization and graphics of biomolecule, structure-activity relationships, dynamics simulation of biomolecular systems.

The Microscopy & Imaging Laboratory is headed by a R4-class researcher.

9.4.8 Environmental and Earth Science laboratory

The Bioanalysis Laboratory is headed by a R4-class researcher. The laboratories for the Environmental and Earth Sciences are the following:

9.4.8.1 Sedimentology Laboratory

Sedimentology Laboratory focusses on the study of the main characteristics and properties of sediments, including grain size parameters and morphometry of grains, as well of sediment dynamics and depositional environments and of sedimentary sequences structure. The laboratory includes special equipment for grain size analyses, equipment for reproducing the behaviour of sediments in river flow and within the depositional areas in the delta distributaries, interdistributary depressions, distributary mouth zones, coastal zones of the delta-front unit and in the offshore areas.

While the water and sediments laboratory above focuses on biological studies, the present sedimentology laboratory focuses on other studies.

9.4.8.2 Mineralogy Laboratory

The Mineralogy Laboratory consists of dedicated equipment for analysing the mineralogical composition of sediments from all the areas of the Danube Delta (recent to older sediment deposits) and offshore zones of the delta. This will allow the understanding of the origin and sources of sediments transported to the Danube Delta, their spatial distribution, ways of transport, accumulation and remobilization.

9.4.8.3 Tectonics and Structural Geology Laboratory

The Tectonics and Structural Geology Laboratory comprises equipment and dedicated software that will allow the measuring and understanding of the horizontal and vertical motion of the Earth crust influencing the Danube Delta and the delta front development, the subsidence and compaction processes and neo-tectonics along the active faults existing in the Supersite. It will also support the better understanding of the geometry of sedimentary bodies accumulated since the very first stage of the Danube Delta history, of the delta connectivity to neighbouring sedimentary systems and basins. This Lab – and its dedicated stations in the field (Danube Delta Supersite), positioned along the major active tectonic lines, will also be the connection point with the ESFRI ENV RI EPOS.

9.4.8.4 Geophysics Laboratory

Geophysics Laboratory will comprise dedicated equipment needed for the measurements of the Earth physical fields variations in the delta (magnetometry, gravimetry, radiometry). It will also comprise seismo-acoustics equipment, as major tools to investigate river-delta-coastal underwater morphology and morpho-dynamics.

9.4.8.5 Bio-optical Laboratory

The Bio-optical Laboratory for in-situ satellite Cal/Val activities is a facility strictly needed for the in situ calibration of remote sensing information (including COPERNICUS satellite data). This lab will have a major role in making the Danube Delta Supersite operational.

9.4.8.5 Hydrochemistry Laboratory

Hydrochemistry Laboratory will perform all analyses that will give information on the water quality and on the chemical contents (including pollutants) in the water (heavy metals, POP but also emerging pollutants).

9.4.8.6 Geochemistry Laboratory

The Geochemistry Laboratory will implement best standards of the DANUBIUS Commons and develop specific capabilities in the region for the better understanding of various classes of chemical compounds in sediments (from heavy metals to emerging pollutants). The lab will perform also some specific biogeochemical analyses related to the bio-chemical adsorption properties of very fine-grain particles of sediment.

9.4.8.7 Radiogenic Isotopic Laboratory for 14C, 210Pb and 137Cs sediment dating

The Radiogenic Isotopic Laboratory for 14C, 210Pb and 137Cs sediment dating will support the detailed understanding regarding the temporal evolution of the various zones of the Danube Delta Supersite. 16/18 O ratio determination and other isotope studies will allow conclusions about the environmental conditions during the delta lobes formation and timing. This major radiogenic Isotopic facility will also serve as a regional leading laboratory in isotopic geochemistry research in central and eastern Europe. This laboratory will fill a missing fundamental geo-scientific niche in Romania and neighbouring countries, but can also have a significant impact on other fields (from environmental sciences, archaeometry, food and drug provenance, etc.). The facility will consist of a state of the art clean laboratory, a solid source mass spectrometer (TIMS) for high precision measurements of Sr, Nd, Pb, Hf, Ca and other isotopes as well as a laser ablation inductively coupled plasma mass spectrometer (ICP-MS) for in –situ geochronology (U-Pb and Th-Pb) and geochemistry. These types of data represent the backbone of modern isotopic research in geosciences, form tracer studies to deep –time geochronology, from high temperature to low temperature processes.

9.4.8.8 Hydrology and Oceanology Laboratory

The Hydrology and Oceanology Laboratory will collect, process and elaborate on data regarding the hydrological and oceanographic parameters related to the water flow throughout the continuum Danube Delta freshwater – transitional interaction zone - marine environment. Studies and monitoring of the dynamics and quality of water masses in the Danube Delta offshore zone will be performed by stationary station/buoys with specific equipment and by field campaigns.

9.4.8.9 GIS and Image Analysis Laboratory

The GIS and Image Analysis Laboratory will group all information collected from the Supersite into databases built on GIS platform. The same laboratory will also provide connection with the Observation Node with regards for satellite / COPERNICUS missions/ ENSPIRE project data and information obtained from other Remote sensing tools (such as drones, etc.).

9.4.9 Other facilities

Scientific equipment design and construction, testing and maintenance laboratory and workshop will comprise all dedicated tools and equipment needed to work in the Supersite. It will ensure the maintenance – but also the possibility to test and develop new and more adequate tools to be used in transitional shallow environments.

Freeze storage room (two compartments for -40°C and for -4°C) for short storage/long term storage of biological, sedimentological and core samples. This will ensure the role of the Hub as repository of non-digital data and witness-samples from the Danube Delta Supersite. Sediment cores, for instance, are witnesses of the geological past of the delta – and the information they contain may be of use for

verifying results of former analyses or for new types of studies or analyses. All these non-digital data must be therefore preserved in dedicated facilities which will avoid their degradation.

The consolidated assessment will be made during the feasibility study that need to be run during the preparation of documentation for the approval by the European Commission for the selection of DANUBIUS-RI in Romania as a major project.

9.4.10 Management team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Research Infrastructure management level					
Ongoing discussions within the Consortium					
Research Infrastructure management staff					
Ongoing discussions within the Consortium					
Hub local management level (most tasks can be assumed by the research infrastructure management level and staff)					
DANUBIUS-RI Hub Manager	R3	Available	January 2022		1.0
DANUBIUS-RI Hub construction project assistant	A3	To be recruited	January 2020	December 2022	1.0
Hub local support staff (Assumptions: security and cleaning will be subcontracted, catering is internalised + contracts with a company for days of large attendance, guest house is internalised)					
Boat driver	A1	To be recruited	January 2023		1.0
Bus driver	A1	To be recruited	January 2020		1.0
IT specialist	A3	To be recruited	January 2023		2.0
Electricity/Plumbing specialist	A2	To be recruited	January 2022		1.0 in 01/2022 2.0 in 01/2023
Cafeteria staff	A1	To be recruited	January 2022		2.0
Guest house staff	A1/A2	To be recruited	January 2022		2.0 in 01/2022 5.0 in 01/2023
Gardener	A1	To be recruited	January 2023		2.0
TOTAL RI staff					**16.0-35.0 (est)**
TOTAL local staff					**14.0-17.0**
TOTAL					**30.0-52.0**

9.4.11 Research team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Researcher category #1	R4	1.0 Available 6.0 To be recruited	January 2020		7.0
Researcher category #2	R3	2.0 Available 29.0 To be recruited	June 2022		31.0
Researcher category #3	R2	34.0 To be recruited	June 2022		34.0
Researcher category #4	R1	33.0 To be recruited	January 2023		33.0
TOTAL					**105.0**

For biological studies (first seven laboratories), each of the seven R4-class researcher is in charge of one of the seven laboratories listed above. The other 49 researchers are split among those laboratories, with:

- Sampling and Sample Handling Laboratory: 9 FTEs
- Genomics and Genetics Laboratory: 5 FTEs
- Microbiology and Phycology Laboratory: 9 FTEs
- Bioanalysis Laboratory: 8 FTEs
- Environmental Taxicology: 5 FTEs
- Bioresources and Biodiversity Laboratory: 18 FTEs
- Microscopy Laboratory: 5 FTEs

For non-biological studies (next eleven laboratories), 46 researchers:

- Sedimentology Laboratory: 5 FTEs
- Mineralogy Laboratory: 5 FTEs
- Tectonics and Structural Geology Laboratory: 5 FTEs
- Geophysics Laboratory) 5 FTEs
- Hydrochemistry Laboratory: 5 FTEs
- Geochemistry Laboratory: 5 FTEs
- Mass Spectrometry Laboratory: 5 FTEs
- Hydrology and Oceanology Laboratory: 5 FTEs

- GIS and Image Analysis Laboratory: 5 FTEs

9.4.12 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Engineer	S4	4.0 To be recruited			4.0
Engineer	S3	1.0 5.0 To be recruited	Available		6.0
Technician	S2	31.0 To be recruited			31.0
Technician	S1	3.0 To be recruited			3.0
TOTAL					**44.0**

9.5 Observation Node Resource Requirements

9.5.1 Management team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Observation Node manager Lead (PML)	A4	To be recruited	January 2020	-	1.0
Project executive manager and outreach (USTIR)	A4	To be recruited	January 2020	-	1.0
TOTAL					**2.0**

Like the Thames estuary Supersite, the Observation Node relies on a duo of executives. An Observation Node manager, responsible to DANUBIUS-RI for carrying out the work at the Node, and a Project executive manager who is not due to leave after the implementation phase, but should remain to represent the Node, and possibly DANUBIUS-RI, among stakeholders beyond science.

9.5.1 Research team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Senior researcher (PML)	R3	Available	January 2020	-	1.0
Senior researcher (USTIR)	R3	To be recruited	January 2020	-	1.0
PhD students (PML)	R1	To be recruited	January 2020	-	1.0
PhD students (USTIR)	R1	To be recruited	January 2020	-	1.0
TOTAL					**4.0**

9.5.2 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Developer / data specialist (PML)	S3	Available	January 2020	-	1.0
Data specialist and data base manager (USTIR)	S3	To be recruited	January 2020	-	1.0
Technician for Training (PML)	S2	To be recruited	January 2020	-	0.5
Citizen science specialist (PML)	S2	To be recruited	January 2020	-	0.5
Field and instrument support Technician and training (USTIR)	S2	Available	January 2020	-	1.0
Lab and bio-geochemistry (USTIR)	S2	To be recruited	January 2020	-	0.5
TOTAL					**4.5**

With an important part of their activities dealing with remote-sensing and satellite observations, the technical staff of the Observation Node is composed of data specialists and developers. A special effort is made towards society (citizen science) and training of specialists.

9.6 Analytical Node Resource Requirements

9.6.1 Management team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Analysis Node Director	A4	to be recruited	2020/21	-	1.0
Scientific Coordinator	R2	to be secured	2021	-	1.0
Administrative Coordinator	A2	to be secured	2021	-	1.0
PR Manager	A3	to be recruited	2020/21	-	1.0
TOTAL					**5.0**

Executive responsibilities. As all other Nodes, the activities at the Analytical Node are under the responsibility of a manager – called Director in this instance. In leading the Node activities, the Director is assisted by a Scientific Coordinator and an Administrative Coordinator. The three profiles will feature different backgrounds. The ideal Node Director should have completed a PhD in Environmental Sciences, while the Scientific Coordinator is expected to have passed a PhD in Chemistry. The ideal Administrative Coordinator should have graduated in Business or Economics (Master level or higher).

Administrative tasks at the Analytical Node. As mentioned for other Nodes and Supersites, the exact administrative responsibilities of the Nodes and Supersites are not yet (May 2018) precisely defined. It remains therefore to be seen whether this last profile is actually needed, full time or part-time.

9.6.2 Research team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Scientist Ecotoxicology	R2	to be recruited	2020/21	-	1.0
Scientist Hygiene	R2	to be recruited	2020/21	-	1.0
Scientist Biology	R2	to be secured	2021	-	1.0
Scientist Chemistry	R2	to be recruited	2020/21	-	1.0
Scientist Geo HydroMorphology	R2	to be secured	2021	-	1.0
Scientist Hydrology	R2	to be recruited	2020/21	-	1.0
Scientist Geodesy	R2	to be recruited	2020/21		1.0
Scientist Social Science	R2	to be recruited	2020/21		1.0
Scientist Modelling/Data	R2	to be recruited	2020/21		1.0
Scientist Standardisation	R2	to be recruited	2020/21		1.0
Scientist Accreditation	R2	to be recruited	2020/21		1.0
Scientist Ecotoxicology	R4	Available	2021	-	1.0
Scientist Biology	R4	Available	2021	-	1.0
Scientist Biology	R4	Available	2021	-	1.0
Scientist Chemistry	R4	Available	2021	-	1.0
Scientist Geo HydroMorphology	R4	Available	2021	-	1.0
Scientist Hydrology	R4	Available	2021	-	1.0
Engineer Ecotoxicology	S3	to be recruited	2020/21	-	1.0
Engineer Hygiene	S3	to be recruited	2020/21	-	1.0
Engineer Biology	S3	to be recruited	2020/21	-	1.0
Engineer Chemistry	S3	to be recruited	2020/21	-	1.0
Engineer Geo HydroMorphology	S3	to be recruited	2020/21	-	1.0
Engineer Hydrology	S3	to be recruited	2020/21	-	1.0
TOTAL					23.0

Correspondance between the Analytical Node mission and HR needs. The profiles identified as necessary for the Analytical Node correspond to the part of the DANUBIUS-RI scientific programme in which the Analytical Node is expected to contribute significantly, but they also correspond to user support needs.

An important task of the Analytical Node is to conceive the protocols, norms, standards in all analytical aspects of DANUBIUS Commons. The Analytical Node should not only have all the expertise available in-house to carry out this task, but they should also have the training capacities in-house, for DANUBIUS-RI personnel and for DANUBIUS-RI users to be trained in the use of those Commons. This explains the wide range of expertise listed above, which correspond roughly to the expertise range required in analytical methods for river-sea system studies.

Flexibility. Several individuals at BfG fit with the available “scientist” profiles identified as necessary. For each profile, they altogether are estimated to assume a workload equivalent to 1 FTE. Having a

higher headcount than FTEs is an advantage in the management of Human Resources and is clearly one of the main advantages of a distributed pan-European Research Infrastructures that benefits from the pool of experts at the different institutions that participate to the RI project.

9.6.3 Research team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Infrastructure Administrator	A1		2021	-	1.0
Materials- and Project-Management Administrator	A1		2021	-	1.0
PR Manager	A3		2021	-	1.0
IT Support	A3		2021	-	1.0
TOTAL					**4.0**

9.7 Modelling Node Resource Requirements

9.7.1 Management Team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Modelling Node manager	R3	Available	January 2021	-	0.05
Administrative staff	A2	To be recruited	January 2021	-	0.4
TOTAL					**0.45**

The Modelling Node, like the Observation Node, is planning to make use of the existing expertise at the three institutions that compose the Italian component of DANUBIUS-RI: ISMAR-CNR, CORILA, and OGS.

9.7.2 Research Team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Senior Researcher	R4	Available	January 2021	-	0.15
Researcher	R3	Available	January 2021	-	0.15
Researcher	R3	To be secured	January 2021	-	0.1
Senior Post Doc	R3	To be recruited	January 2021	-	0.5
TOTAL					**0.9**

The research and technical teams are composed of profiles that are also to be found in the profiles needed at the Po delta – North Adriatic lagoons: the three institutions involved in the Modelling Node are also involved in this Supersite. The two researchers to be secured are specialists in environmental science, knowledge on modelling, activities for integrating modelling into Supersite researches and Quality check of modelling data, preparation of data for users (eventually, dealing also with data not in the modelling from the Supersite, i.e. observation/analysis) respectively.

9.7.3 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Expert technician	S3	To be recruited	January 2021	-	1.0
Expert technician	S2	To be recruited	January 2021	-	1.0
Expert technician	S3	To be recruited	January 2021	-	1.0
TOTAL					**3.0**

The three technical profiles are respectively Network specialist expert in data flow and data security; and expert in server Maintenanace and backup procedures; and an expert in procedures connected with continuous data flow to the data center and operational modeling activities.

9.8 Impact Node Resource Requirements

9.8.1 Management team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Impact Node manager	A4	Available	January 2021	-	0.1
Project executive manager (to assist in the construction and operation of the Node)	A4	Available	January 2021	-	0.4
Impact Node assistant	A2	Available	January 2021	-	0.4
TOTAL					**0.9**

Executive responsibilities. The Impact Node will be headed by a Node Manager, responsible to the DANUBIUS-ERIC for the efficient implementation of works at the Supersite. During the implementation phase, the Node Manager will be assisted by a Project executive manager in charge of insuring the interface between the hosting institution – Deltares – and the various providers/suppliers involved in the construction of the Node.

Elements of uncertainty. As we write this deliverable, it is not yet clear which administrative functions will be centralised at the Hub and which will be decentralised at Node or Supersite level. Deltares has therefore integrated into their HR plan an assistance to the management that takes the form of 0.4 FTE from an assistant (A2 class).

Availability of personnel. Deltares counts first and foremost on their staff to assume the work required in the context of DANUBIUS-RI. The partial secondment of Deltares employees to DANUBIUS-RI will only require a modification of their work contract and will not modify the benefits received by those individuals.

9.8.2 Research team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Knowledge entrepreneur (MSc/PhD)	R3	Available	January 2021	-	0.1
Senior researcher - Governance/Public administration	R3	Available	January 2021	-	0.2
Senior researcher - Social sciences	R3	Available	January 2021	-	0.2
Senior researcher - Economics	R3	Available	January 2021	-	0.2
Junior researcher - Public administration/Social Sciences/Economics	R2	Available	January 2021	-	1.0
PhD students - Public administration/Social Sciences/Economics	R1	NA	January 2021	-	1.0
TOTAL					**2.7**

Specificities of the Impact Node. The Impact Node is one of the DANUBIUS-RI features that make this RI stand out from other RI projects as it creates the bridge between “hard” sciences and human sciences. With the Impact Node, DANUBIUS-RI is able to tap into a vast pool of scientific expertise and turn hard data into valuable insights and recommendations for stakeholders beyond the scientific realm: policy-makers, natural site managers, critical infrastructure managers, etc. However, because of a lack of benchmark, the exact demand for this original and interesting feature remains to be quantified and will certainly need to be promoted before demand grows enough to justify an important staff. For this reason, Deltares suggests remaining modest at this stage. Human resources in the Impact Node will be re-evaluated as the exact interests from this category of stakeholders is gauged, within the next year and a half of the Preparatory Phase.

9.8.3 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
IT support staff member - Master in IT sciences	S2	Available	January 2021	-	0.2
Maintenance technician specialised in Hardware	S1	Available	January 2021	-	0.1
Finance & Legal counselor - MSc Finance/Law	S2	Available	January 2021	-	0.2
TOTAL					**0.5**

Maintenance concerns mainly in-house hardware, in particular the training platform envisaged as soon as 2015. A financial profile is nonetheless also perceived as possibly necessary, depending on the exact split of responsibilities between the Hub and the Nodes/Supersites.

9.9 Danube Delta Supersite Resource Requirements

The estimation of requested staff was made on the basis of needs to check and maintain the equipment to be installed in the Danube Delta Supersite.

Presumptions:

- All measurements, observation and analysis are supposed to be interdisciplinary – covering hydrological, sedimentological, biological, hydro and geo chemical processes, parameters and types of analysis.
- The Danube Delta Supersite is covering an area of around 6,000 km^2, and in case of urgent intervention there is a need for specialized staff to be able to check the existing stations/ gauges/ buoys in an efficient way, also in periods with extreme weather /hydrologic regime. Hence the need to have permanent stations in several parts of the Supersite (where primary sample preparation is also needed). Therefore, the need of staff trained in sample collection and primary preparation
- Since the stations in the Supersite (or most of them) are reachable by water, it is needed to have permanent positions for navigation engineers, boat maintenance
- Stations consist of a multitude of sensors, hence the need of engineers for their maintenance – and geophysicists (for dedicated sensors on water velocity, depth, turbidity etc).
- Most of the measurement stations will have real-time GSM emitters – and the data flow must be ensured and maintained as smooth as possible. Therefore, the need for an IT and Data specialist.
- Research staff must also reflect the interdisciplinarity of the work to be done in the Supersite and has to be ready to lead work for all categories of undergraduate and postgraduate students. The research staff is the one with main role in conducting research and presenting the scientific opportunities and challenges of the Daube Delta Supersite. The scientific presence at the Supersite must be continuous, therefore the need of having shifts (allowing the research staff to plan scientific missions in other Supersites or areas – maintaining in the meanwhile a permanence in the Supersite).

9.9.1 Management team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Danube Delta Supersite manager	A4	Available	April 2020	-	1.0
TOTAL					**1.0**

9.9.2 Research team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Senior researcher - geologist	S3	To be recruited	April 2020	-	1.0
Senior researcher - chemist	S3	To be recruited	April 2020	-	1.0
Senior researcher - hidrographer/oceanographer	S3	To be recruited	April 2020	-	1.0
Senior researcher - biologist	S3	To be recruited	April 2020	-	1.0
Junior researcher - sedimentologist	S2	To be recruited	September 2020	-	1.0
Junior researcher - geomorpholgist	S2	To be recruited	September 2020	-	1.0
Junior researcher - geochemist	S2	To be recruited	September 2020	-	1.0
Junior researcher - geophysicist	S2	To be recruited	September 2020	-	1.0
Junior researcher - oceanographer	S2	To be recruited	September 2020	-	1.0
Junior researcher - hydrologist	S2	To be recruited	September 2020	-	1.0
Junior researcher - benthic biologist (zoobenthologist)	S2	To be recruited	September 2020	-	1.0
Junior researcher - benthic biologist (phytobenthologist)	S2	To be recruited	September 2020	-	1.0
Junior researcher - phytoplankton specialist	S2	To be recruited	September 2020	-	1.0
Junior researcher - zooplankton specialist	S2	To be recruited	September 2020	-	1.0
Junior researcher - ecologist	S2	To be recruited	September 2020	-	1.0
TOTAL					**15**

9.9.3 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
MSc Science - User support, maintenance, samples	S2		April 2020	-	14.0
Technicians	S1		April 2020	-	14.0
Engineer - navigation, measurement	S2		April 2020	-	1.0
Engineer - equipment	S2		April 2020	-	1.0
Geophysicist - equipment	S2		April 2020	-	1.0
Junior researcher - geomorpholgist	S2	To be recruited	September 2020	-	1.0
TOTAL					**32.0**

9.10 Elbe-North Sea Supersite Resource Requirements

9.10.1 Management team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Supersite manager	R3	To be recruited	January 2020	-	1.0
Administrative officer - legal	A2	Available	January 2020	-	0.2
Administrative officer - financial	A2	Available	January 2020	-	0.2
Administrative officer - procurement	A2	Available	January 2020	-	0.2
TOTAL					**1.6**

Executive responsibilities. The Elbe-North Sea Supersite, like all other Supersites in DANUBIUS-RI, will be headed by a Supersite Manager, responsible to the DANUBIUS-ERIC for the efficient implementation of works at the Supersite.

Elements of uncertainty. As we write this deliverable, it is not yet clear which administrative functions will be centralised at the Hub and which will be decentralised at Node or Supersite level. The hosting institution of the Elbe-North Sea Supersite therefore plans the need for three different administrative profiles (legal, financial, procurement), should those functions be assumed, totally or in part, at the Supersite level. However, the Hub will most likely assume the bulk of the administrative work, and therefore only 0.2 FTE is planned for each of those administrative profiles at the Elbe-North Sea Supersite, presumably in charge of administrative work for which a knowledge of local laws and regulations is mandatory.

Availability of personnel. Except for the Supersite Manager, the administrative profiles needed are already available at the hosting institution (Helmholtz-Zentrum Geesthacht, Zentrum für Material- und

Küstenforschung), and are available long-term. Their partial secondment to DANUBIUS-RI will only require a modification of their work contract and will not modify the benefits received by those individuals. Therefore, we do not expect substantial difficulty for those people to accept their secondment. A Supersite Manager should however be recruited. Whether this manager should be paid directly by the ERIC – as a seconded employee from the Hub – or by the hosting institution from new, dedicated funds remains to be decided.

9.10.2 Research team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Senior scientist (ferry box, Node, AUV)	R4	To be recruited	January 2022	-	1.00
Junior scientist (ferry box, Node, AUV)	R2	To be recruited	January 2022	-	1.00
PhD Student (ferry box, Node, AUV)	R1	To be recruited	January 2022	-	0.67
Senior scientist (field campaigns, lander, moorings, CFA, EA's)	R4	Available	January 2020	-	1.00
Junior scientist (field campaigns, lander, moorings, CFA, EA's)	R2	To be recruited	January 2020	-	1.00
PhD Student (field campaigns, lander, moorings, CFA, EA's)	R1	To be recruited	January 2020	-	0.67
Senior scientist (MC-ICP-MS, pollutants)	R4	To be recruited	January 2020	-	1.00
Junior scientist (MC-ICP-MS, pollutants)	R2	To be recruited	January 2020	-	1.00
PhD Student (MC-ICP-MS, pollutants)	R1	To be recruited	January 2020	-	0.67
Junior scientist (modelling)	R2	Available	January 2020	-	1.00
PhD Student (modelling)	R1	To be recruited	January 2020	-	0.67
TOTAL					**9.66**

The DANUBIUS-RI research team at the Elbe-North Sea Supersite consists of four groups, with different areas of expertise and qualifications, which are required for autonomous measuring platforms, field equipment needed during campaigns, laboratory analysis of different samples and modelling. The different groups are further described in the following.

Ferry Boxes, Underwater Nodes & AUV. Automated measuring systems, which are currently considered for the Elbe-North Sea Supersite, are Ferry Boxes, Underwater Nodes and Autonomous Underwater Vehicles (AUVs). Ferry Boxes are automated, flow-through systems, which measure

surface water parameters continuously over long periods for example on ships of opportunity and/or at fixed stations on- and offshore. Although these systems are automated, they require regular maintenance in the field. Underwater Nodes are systems for long-term underwater observations of bottom waters and sediments. The maintenance of underwater observatories may further require personnel, who are certified divers. AUVs, such as gliders, can be used for survey missions from weeks to months. The gliders can dive and climb by changing their buoyancy. In this way, measurements of high temporal resolution and near real time data can be collected along three dimensional transects. All of these measuring systems mentioned here, can be equipped with a variety of sensors. The team is planned to be recruited by January 2022, two years later than the other teams due to the time needed to implement the Ferry Boxes and Underwater Nodes described above.

Field campaigns, lander, moorings, CFA, EA's. Regular field campaigns with a research vessel are planned along the Elbe-North Sea Supersite for obtaining in situ measurements and samples. Such field campaigns need to be thoroughly planned and prepared. At selected stations, equipment such as a lander and moorings may be deployed. A lander is an instrument frame for in situ measurements of processes on and in the seabed. The lander can be equipped with a variety of sensors and sampling devices, as well as a camera. Furthermore, benthic chambers can be used for in situ incubations at the sediment-water interface. Such a lander system may operate autonomously for hours or days. A Continuous Flow Analyzer (CFA) is used for nutrient analysis of water samples. Elemental Analyzers (EAs) are needed for measurements of dissolved organic carbon and nitrogen (DOC and DON), as well as for measurements of carbon, nitrogen and sulphur. The team is planned to be recruited by January 2020.

MC-ICP-MS, pollutants. Inductively Coupled Plasma - Mass Spectrometry (ICP-MS) can be used for elemental and species analysis of water, sediment and suspended particulate matter samples. After an analyte/matrix separation, isotope ratio measurements can be conducted with Multiple Collector - Inductively Coupled Plasma - Mass Spectrometry (MC-ICP-MS). These analyses allow a chemical fingerprinting of a sample in order to identify and characterise sources, transport pathways and sinks of geogenic and anthropogenic substances, hot spots of pollution and seafloor properties. Particularly, the sample preparation and analysis needs very skilled personnel. The team is planned to be recruited by January 2020.

Modelling. Observations obtained from the equipment and analysis described above can then be used to validate different kinds of models related for instance to hydrodynamic modelling, suspended particulate matter modelling, biogeochemical modelling and ecosystem modelling. However, models may also be used to estimate certain parameters for times and locations, when and where no observations are available. This team is planned to be recruited by January 2020.

9.10.3 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Engineer (ferry box, Node, AUV)	S2	To be recruited	January 2020	-	1.00
Technician (ferry box, Node, AUV)	S2	To be recruited	January 2020	-	1.00
Engineer (field campaigns, lander, moorings, CFA, EA's)	S2	Available	January 2020	-	0.50
Technician (field campaign, lander, moorings, CFA, EA's)	S2	Available	January 2020	-	0.50
Engineer (MC-ICP-MS, pollutants)	S2	To be secured	January 2020	-	0.50
Technician (MC-ICP-MS, pollutants)	S2	To be secured	January 2020	-	0.50
Data manager	S2	To be secured	January 2020	-	0.50
Total					**5.5**

As DANUBIUS-RI partners define more precisely the works and services offered at DANUBIUS-RI, the need for qualified support staff is becoming more precise. The definition of support staff needed at the Elbe-North Sea Supersite took into account a preliminary list of services offered to the user, and “internal” works, i.e. work considered necessary for the Supersite to remain fully operational. Those services and internal works include accessing, operating and maintaining automated measurement systems; planning, preparing and conducting field campaigns incl. in situ measurements, sampling, sample preparation, analysis and storage, as well as managing, storing and providing data (products). The profiles identified above have therefore been identified on the basis of qualifications and experience required to maintain equipment and provide an adequate level of supports to the future DANUBIUS-RI users requesting access to the Elbe-North Sea Supersite resources.

The profiles listed above are associated with a number of key Supersite components for which different qualifications and experience are required. In May 2018, the equipment considered at the Elbe-North Sea Supersite include Ferry Boxes, underwater Node(s), lander, CFA, EAs and MC-ICP-MS, which require regular maintenance and/or skilled personnel for operation.

9.11 Thames Estuary Supersite Resource Requirements

9.11.1 Management team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Thames Supersite manager	A3	Available	January 2019	-	1.0
Project executive manager	A2	Available	January 2019	December 2021	1.0
Total					**1.0**

Management. The Thames estuary Supersite is opting for a permanent, full-time Thames Supersite manager, assisted during the Implementation Phase, by an executive manager, i.e. a person with a significant experience of complex projects, if possible in the field of Research Infrastructure, playing a role of interface between research profiles (even though classified as Administrative, the Thames Supersite manager will most likely come from the ranks of researchers) and providers/suppliers.

9.11.2 Research team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Senior researcher (Nutrients)	R3	Available	January 2021	-	0.20
Senior researcher (Carbon fluxes and river metabolism)	R3	Available	January 2021	-	0.20
Senior researcher (sediment)	R3	Available	January 2021	-	0.20
Senior researcher (Microbiology)	R3	Available	January 2021	-	0.20
Senior researcher (Microbiology bioinformatition)	R3	Available	January 2021	-	0.10
Senior researcher (invertebrate ecologist)	R3	Available	January 2021	-	0.10
Junior researcher (Macrophyte ecologist)	R2	Available	January 2021	-	0.20
Senior researcher (Estuarine environments)	R3	To be recruited	January 2021	-	0.50
TOTAL					**1.7**

The Thames estuary Supersite is sufficiently defined to have identified the scientific disciplines for which it is most relevant; profiles were therefore defined with the idea to cover the range of expertise needed. The exact FTEs for each profile should be revised according to the expected demand from users.

9.11.3 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Laboratory Technician	S2	Available	January 2021		0.60
Laboratory Technician	S1	Available	January 2021		0.60
River Sampling Technician	S1	Available	January 2021		0.30
River Sampling Technician	S2	Available	January 2021		0.30
River Sampling Technician	S2	Available	January 2021		0.30
Invertebrate Identification Technician	S2	Available	January 2021		0.20
Specialist technician for high-frequency monitoring stations	S2	Available	January 2019		0.2 till 12/2019 1.0 till 12/2020 0.3 afterwards
Data specialist	A2	Available	January 2021		0.2
TOTAL					**2.8**

The technical support staff was defined with respect for the equipment to be installed in the estuary. The indicated qualifications and FTEs are considered sufficient to assist users in their field trips and carry out maintenance operations necessary for the equipment considered.

9.12 Ebro Llobregat Deltaic System Supersite Resource Requirements

9.12.1 Management team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
General Manager	A4	Available	2021	-	1.0
Administrative Staff	A1	1.0 Available 1.0 To be recruited	2021	-	2.0
TOTAL					**3.0**

9.12.2 Research Team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Scientific Coordinator	S4/Academia	Available	2021		0.9
Senior Researcher	S3	6.0Available 2.0 To be recruited	2021		8.0
Junior Researcher	S2	6.0 Available 6.0 To be recruited	2021		12.0
PhD Candidate	S1		2021		5.0
TOTAL					**25.9**

The Ebro Llobregat deltaic system Supersite has identified a number of individuals willing to participate to the implementation and operation of DANUBIUS-RI. More work is nonetheless required to characterise the scientific expertise needed to implement and operate the Supersite. However, with a 26-strong research team, this Supersite is expecting a significant part of the current scientific activities at the Polytechnic University of Barcelona to be placed under the DANUBIUS-RI banner.

9.12.3 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Technical staff	S4 to S1	2.0 Available 2.0 To be recruited	2021		4.0
TOTAL					**4.0**

9.13 Po delta and North Adriatic Lagoons Supersite Human Resources

9.13.1 Management Team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Director	R4	Available (CORILA)	01/01/2021	-	0.2
Researcher/ Project Manager	R3	Available (CORILA)	01/01/2021	-	0.5
Administrative	A2	To be recruited	01/01/2021	-	0.6
TOTAL					**1.3**

Executive responsibilities. The Po delta and North Adriatic lagoons Supersite, like all other Supersites in DANUBIUS-RI, will be headed by a Supersite Manager (called “Director” in this particular occurrence), responsible to the DANUBIUS-ERIC for the efficient implementation of works at this Supersite. The adequate person has been identified at CORILA, one of the three institutions involved. The profile can therefore be considered available to DANUBIUS-RI.

Research/Project Manager. The practical/day by day organization of the Supersite work will be held by the Project Manager, who will be in charge of the planning and supervision of the field activities related to the Supersite and the use of the DANUBIUS-RI's Facilities. The Project Manager will coordinate the relations among the communities of stakeholders, researchers and students which will be involved in the Supersite activities. The full professional profile will be defined once the RI structure and functioning will be established.

Administrative profile. Even if it is not yet clear which administrative functions will be centralised at the Hub and which will be decentralised at Node or Supersite level, an administrative profile is deemed necessary by the institutions involved in this Supersite. More precisions on the qualifications and experience required will be developed when the exact scope of Supersite responsibilities vis-à-vis the Hub are defined.

9.13.2 Research Team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Senior Researcher	R4	Available (ISMAR-CNR)	01/01/2021	-	0.05
Senior Researcher	R4	Available (OGS)	01/01/2021	-	0.05
Senior Researcher	R4	Available (CORILA)	01/01/2021	-	0.05
Researcher	R3	Available (ISMAR-CNR)	01/01/2021	-	0.05
Researcher	R3	Available (ISMAR-CNR)	01/01/2021	-	0.1
Researcher	R3	Available (OGS)	01/01/2021	-	0.2
Senior Post Doc	R3	To be recruited	01/01/2021	-	0.5
TOTAL					**1.0**

Senior researchers (R4). The Senior researchers are called upon to participate to the DANUBIUS-RI Supersite Scientific Committee. As the Supersite is run in consortium between CORILA, ISMAR-CNR and OGS, there is one senior researcher per institution. An estimated 0.2 FTE per senior researcher is considered necessary for those activities. Individuals matching the requirements of the profile have been identified in each of the three institutions involved.

Interface with the Modelling Node (R3). A specific R3-class profile for taking over tasks related to the link with the Modelling Node is planned at the Po delta and North Adriatic lagoons Supersite. The identified profile corresponds well with one current researcher at ISMAR-CNR, the profile can therefore be considered available.

Researchers (R3). Researcher profiles correspond to Environmental scientists, with knowledge on modelling and activities for integrating the three institutions involved (CORILA, ISMAR-CNR, OGS) into research activities in the Susi. Those profiles are available at each of the three institutions involved and can be seconded to DANUBIUS-RI.

Quality control (R3). The need for a Senior Post-Doc to take responsibility for data quality control, preparation of data for users (eventually, dealing also with data not in the modeling Node, i.e. observation/analysis) has been identified. This sort of profile does not exist at the three institutions

involved or cannot be seconded to DANUBIUS-RI. It is therefore considered necessary to carry out an *ad hoc* recruitment to fill this gap.

9.13.3 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Expert technician	S3	To be recruited	01/01/2021	-	1.0
Expert technician	S2	To be recruited	01/01/2021	-	1.0
Expert technician	S2	To be recruited	01/01/2021	-	1.0
Expert technician	S3	To be recruited	01/01/2021	-	1.0
TOTAL					**4.0**

Technicians. The largest HR gap at the future Po delta and North Adriatic lagoons Supersite is arguably to be found in the technical support staff. While competences in network, data flow, data security, instrumentation maintenance, laboratory analysis and lab maintenance, and sailors have been identified, there is currently no staff available to assume those tasks at the three institutions. There is therefore a need for 4 new FTEs.

9.14 Middle Danube- Szigetköz Supersite Resource Requirements

9.14.1 Management team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Supersite Manager	R4	To be recruited	January 2021	-	1.0
Managing director	A4	Available	January 2021	-	1.0
Finance and legal management	S2	To be recruited	January 2021	-	1.0
Clerks & secretary	A3	To be recruited	January 2021	-	1.0
TOTAL					**4.0**

9.14.2 Research team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
To be defined					

9.14.3 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
To be defined					

9.15 Nestos Supersite Resource Requirements

9.15.1 Management team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Nestos Supersite director	A4	Available	June 2021	-	1.0
Project executive manager	A3	To be recruited	June 2021	-	1.0
Paranesti facility manager	A3	To be recruited	June 2023	-	1.0
Nestos Delta facility manager	A3	To be recruited	June 2021	-	1.0
Administrative assistant (Paranesti)	A1	To be recruited	June 2023	-	1.0
Administrative assistant (Delta)	A2	To be recruited	June 2021	-	1.0
Administrative assistant	A1	To be recruited	June 2021	-	1.0
TOTAL					**7.0**

The Nestos Supersite is composed of two different sites, in the Nestos delta and upstream (Paranesti). It remains however to be seen whether this should translate by two distinct administrative staffs.

9.15.2 Research team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Senior academic researcher/Modeling	Academic	Available	June 2021	-	1.0
Senior academic researcher/Hydrology	Academic	Available	June 2021	-	1.0
Senior researcher/Biogeochemist	R4	Available	June 2021	-	1.0
Senior researcher/Coastal Oceanography	R4	Available	June 2021	-	1.0
Senior postdoc/Isotope Geochemistry	R3	To be recruited	June 2023	-	1.0
Senior postdoc/Isotope hydrology	R3	To be recruited	June 2023	-	1.0
Postdoc/Aquatic biology/Genetics	R2	To be secured	June 2021	-	1.0
Postdoc/Marine Biology	R2	To be secured	June 2023	-	1.0
Senior Postdoc /Environmental Microbiology	R3	To be recruited	June 2021	-	1.0
Postdoc/Geologist/ Sedimentologist	R2	To be secured	June 2023	-	1.0
Senior Postdoc /Environmental Chemistry	R3	To be secured	June 2021	-	1.0
Doctoral Candidate	R1		June 2021	-	6.0
TOTAL					**17.0**

An in-depth review of the expertise range needed at the Nestos Supersite has been carried out but synergies with experts from local universities are still under discussion. As a result, the table above displays all profiles as 1 FTE. The next one year and a half should be the opportunity to investigate the possibility of administrative, technical and scientific synergies possible.

9.15.3 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Field Technician	S2	To be recruited	June 2023	-	1.0
Field Technician	S2	To be recruited	June 2021	-	1.0
Technician (IT/Communications)	S3	To be secured	June 2021	-	1.0
Technician (IT/Data)	S3	To be secured	June 2021	-	1.0
Laboratory Technician	S4	To be recruited	June 2021	-	1.0
Laboratory Technician	S4	To be recruited	June 2021	-	1.0
Laboratory Technician	S4	Available	June 2023	-	1.0
TOTAL					**7.0**

9.16 Upper Danube Supersite Resource Requirements

9.16.1 Management team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Upper Danube Austria & pre-alpine network of tributaries Supersite manager	A4	Available	January 2021	-	0.2
Project executive manager	R4	To be recruited	January 2021	-	0.5
Admin. Support	S2	Available	June 2021	-	0.25 till 12/2021 0.2 afterwards
TOTAL					**1.0-1.2**

The hosting/leading institution for the Upper Danube Supersite exploits the possibilities of synergies between their staff and DANUBIUS-RI's: the Supersite manager is expected to come from BOKU. Administrative and legal support is also expected to come from the hosting institution.

9.16.2 Research team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Senior researcher	R3	To be recruited	January 2021	-	1.0
Senior scientist data management and data analyses	R3	To be recruited	June 2021	-	0.75
Junior scientist (ESR)	R2	To be recruited	June 2021	-	0.75
Junior scientist	R2	To be recruited	January 2022	-	1.0
TOTAL					**3.5**

9.16.3 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Technician core site maintenance laboratories and river observatories	S3	To be recruited	January 2021	-	1.0
Technician experimental facilities	S2	???	January 2022	-	0.5
TOTAL					**1.5**

9.17 Tay Catchment Supersite Resource Requirements

Note: Tay catchment Supersite is one of four Supersites recently approved in DANUBIUS-RI (May 2018). The HR need assessment carried out is necessarily less developed than the more long-standing Supersites.

9.17.1 Management team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Tay catchment Supersite manager	A4	To be recruited	2020	-	1.0
Project executive manager	A4	To be recruited	2020		1.0
TOTAL					**2.0**

A preliminary assessment indicates that the combination Supersite manager plus a project executive manager is suitable during the implementation phase. Further investigation, however, is needed to see whether the project executive manager for the Observation Node or for the Tay estuary Supersite could not take over the role on a part-time basis.

9.17.2 Research team

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Senior researcher	R3	Available	2020		1.0
Junior researcher	R2	Available	2020		1.0
PhD students	R1	To be recruited	2020		1.0
TOTAL					**3.0**

This will be fed by a number of ongoing projects and existing staff may be able to take on both the Senior and Junior researcher positions. We estimate that there may be at least one PhD associated with the Tay, but it is likely that there will be several depending on funding opportunities.

9.17.3 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Technician	S2	To be recruited	2020		1.0
Technician	S2	Available	2020		0.5
TOTAL					**1.5**

The Second technician will be split between the Supersite and the Observation Node requirements – specifically for in-situ and satellite calibration/validation associated activities.

9.18 Technology Transfer Office

9.18.1 Support staff

Profile	Employment class	Recruitment status	Recruitment date	Termination date	FTE
Technology Transfer Office manager	A3	To be recruited	January 2023	-	1.0
Commercial engineers	A3	To be recruited	January 2023	-	5.0
Business development specialists	A3	To be recruited	January 2023	-	3.0
TOTAL					**9.0**

10 Bibliography

1. Van Noorden, R., *Global scientific output doubles every nine years*. Nature. 2014. http://blogs.nature.com/news/2014/05/global-scientific-output-doubles-every-nine-years.html
2. Cyranoski, D., N. Gilbert, H. Ledford, A. Nayar, and M. Yahia, *Education: The PhD factory*. 2011. p. 276-279. http://www.nature.com/news/2011/110420/full/472276a.html
3. Europa.eu, *Framework agreement on fixed-term work: Working Conditions - Fixed-Term Work*. 1999. http://ec.europa.eu/social/main.jsp?catId=706&langId=en&intPageId=199
4. European Commission, *Researchers in the European Research Area: One profession, multiple careers*. 2003. https://ec.europa.eu/research/fp6/mariecurie-actions/pdf/careercommunication_en.pdf
5. Euraxess, *The European Charter & Code for Researchers*. 2005. https://www.euraxess.ie/jobs/charter
6. European Commission, *European Framework for Research Careers EFRC*. 2011. http://ec.europa.eu/euraxess/pdf/research_policies/Towards_a_European_Framework_for_Research_Careers_final.pdf
7. Nature Editor, *The plight of young scientists*. 2016. http://www.nature.com/news/the-plight-of-young-scientists-1.20870
8. Powell, K., *The future of the postdoc*. 2015. http://www.nature.com/news/the-future-of-the-postdoc-1.17253
9. ETUCE, *Working Group on Higher Education of the European Sectoral Social Dialogue in Education*. Trade Union Committee for Education. 2010. http://www.csee-etuce.org/images/Statements2014/HE_employers_Seminar_Report.pdf
10. Euraxess, *The Human Resources Strategy for Researchers*. 2012. https://euraxess.ec.europa.eu/jobs/hrs4r
11. European Commission, *Reinforced European Research Area Partnership for Excellence and Growth*. COM(2012) 392 final. 2012. https://ec.europa.eu/digital-single-market/en/news/reinforced-european-research-area-partnership-excellence-and-growth
12. European Commission, *MORE2-Working conditions and career paths of early career researchers- cross country report- WP3*. Austrian Institute of Economic Research, WIFO, iFQ, Institute for Research Information and Quality Assurance, CHEPS, Center for Higher Education Policy Studies, University of Twente, LaSapienza - University of Rome, CFA, Danish Center for Research and Research Policy, Aarhus University. 2013. https://cdn3.euraxess.org/sites/default/files/policy_library/report_on_case_study_of_working_conditions_and_career_paths_of_researchers.pdf
13. MORE2, *MORE2 -mobility patterns and career paths of researchers*. European Commission Research Directorate-General. Austrian Institute of Economic Research (WIFO), Institute for Research Information and Quality Assurance (iFQ), Center for Higher Education Policy Studies, University of Twente (CHEPS), LaSapienza University of Rome, Danish Center for Research and Research Policy (CFA) Aarhus University, University of Wolverhampton, Loft33, CheckMarket,

Interago. 2013. https://cdn4.euraxess.org/sites/default/files/policy_library/final_report_0.pdf

14. Franzoni, C., G. Scellato, and P. Stephan, *Foreign Born Scientists: Mobility Patterns for Sixteen Countries*. National Bureau of Economic Research US. 2013. http://www.nber.org/papers/w18067.pdf

15. Science Europe, *Comparative Benchmarking of European and US Research Collaboration and Researcher Mobility*. Science Europe and Elsevier's SciVal Analytics'. 2013. http://www.scienceeurope.org/wp-content/uploads/2014/05/SE_and_Elsevier_Report_Final.pdf

16. Science Europe, *Workshop on Intersectoral mobility*. 2013. http://icorsa.org/wp-content/uploads/2016/02/Science-Europe_CROSS_SECTORAL_REPORT_FINAL.pdf

17. Science Europe, *Intersectoral Mobility Schemes in Science Europe Member Organisations*. 2017. http://www.scienceeurope.org/wp-content/uploads/2017/01/SE_Intersec-Mobility_Survey_Report.pdf

18. Vandevelde, K., *Intersectoral Mobility - Report from the 2014 ERAC mutual learning workshop on Human Resources and Mobility*. Ghent University & ECOOM Centre for R&D Monitoring, Belgium. 2014. https://cdn1.euraxess.org/sites/default/files/policy_library/report-intersectoral-mobility.pdf

19. European Commision, *Mobility of Researchers between Academia and Industry*. 2006. http://ec.europa.eu/euraxess/pdf/research_policies/mobility_of_researchers_light.pdf

20. Hristov, H., M. Slavcheva, K. Jonkers, and K. Szkuta, *Intersectoral mobility and knowledge transfer*. Joint Research Centre (JRC). 2016. https://rio.jrc.ec.europa.eu/en/file/9811/download?token=YK3hPfTm

21. Veugelers, R., *Countering European brain drain.* Science, 356(6339): 2017.

22. Scellato, G., C. Franzoni, and P. Stephan, *Crossing borders along an endless frontier - Mobility Researchers.* Science, 356 (6339): 2017.

23. Stephan, P., G. Scellato, and C. Franzoni, *Migrant Scientists and Internationsal Networks*. Andrew Young School of Policy Studies, Georgia State University and National Bureau of Economic Research. 2014. http://www.kdi.re.kr/upload/10152/Paper_7.pdf

24. Degener, J., *Does mobility boost early scientific careers?* Euroscientist. 2016. https://www.euroscientist.com/mobility-boost-early-scientific-careers/

25. Pain, E., *Pan-European pension fund for scientists leaves the station*. Science Mag. 2016. http://www.sciencemag.org/news/2016/07/pan-european-pension-fund-scientists-leaves-station

26. European Commision, *New pan-European pension fund to boost researcher mobility*. 2014. http://europa.eu/rapid/press-release_IP-14-1063_en.htm

27. Kelly, E., *European Commission launches international pension scheme for researchers*. 2015. https://sciencebusiness.net/news/76855/European-Commission-launches-international-pension-scheme-for-researchers

28. Ottawa, B., *Resaver: Researchers in cross-border test*. OPE.com. 2016. https://www.ipe.com/pensions/pensions/briefing/resaver-researchers-in-cross-border-test/10014045.article

29. King, A., *Mobility more attractive due to new pan-European pension pot*. 2015. https://www.euroscientist.com/mobility-more-attractive-due-to-new-pan-european-pension-pot/

30. Euraxess, *Access to and portability of grants*. ERA Steering Group on Human Resources and Mobility. 2012. https://cdn1.euraxess.org/sites/default/files/policy_library/access_to_and_portability_of_grants_may_2012.pdf

31. Fleetwood, D. *3 Reasons Why Online Research Communities Are Dominating the Research World*. 2016. https://www.questionpro.com/blog/online-research-communities/

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Preparatory Phase for the pan-European Research Infrastructure DANUBIUS–RI "The International Centre for advanced studies on river-sea systems"

European Commission

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 739562