

Proceeding Paper

# RIS Internship–Sustainable and Structured Internship Programme for Raw Materials Master’s Students and Organizations from RIS Regions <sup>†</sup>

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**Abstract:** The deficit of graduates working in the core raw materials sectors will significantly impact raw materials organizations in European RIS regions. The RIS Internship programme aims to improve professional opportunities for RIS raw materials students, familiarize the future young professionals with the work environment and real-life challenges, and trigger their intrinsic interest for the development of a future career in the sector. The overall objectives of the programme are to increase the students’ entrepreneurial and business skills, boost the employment of the RM graduates within the hosting organizations, and leverage the regional brain drain. Eligible students and organizations are coming from core raw materials professions: mining, geosciences and geotechnology, geosciences, material science, extractive waste management, and metallurgy and recycling, all belonging to the STEM area. The territorial coverage includes European RIS countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Italy (southern part) Latvia, Lithuania, Montenegro, North Macedonia, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Turkey, and Ukraine. The programme was implemented via the recorded pretraining webinars of students and supervisors, the development of an RIS Internship guide for successful RIS Internship implementation, and an on-line matchmaking platform, making it structured and sustainable with minimum future investment.

**Keywords:** STEM internship; RIS regions; raw materials



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## 1. Introduction

The number of STEM positions (STEM = Science, Technology, Engineering, Mathematics) in the industrial, research, and technological sectors in Europe is permanently growing at a magnitude of 8% annually [1], whereas Higher Education Institutions (HEI) Europe-wide are struggling to enrol students into their existing or new STEM-related programmes [2]. The deficit of STEM graduates in Europe can further increase if the students’ interest in pursuing a career in a STEM area after graduation is not appropriately triggered. The downstream raw materials industry is frequently located in remote areas, where infrastructure, social, cultural, and civic community segments are usually underdeveloped; therefore, the challenge of maintaining students’ interest in the sector is significant. One of the aims of the RIS Internship programme is for student-interns to gain innovation, research, field, and/or technology-related work experience for the duration of the study and develop positive attitudes toward their future workplace. The final outcomes are raising the interest of the students in their field of study and enlarging the STEM talent pool in deficit industrial, research, and development sectors.

The RIS Internship programme is focused on RIS countries. RIS countries are moderate or modest innovators, defined by the European Innovation Scoreboard, that benefit from the Regional Innovation Funding Scheme within the EIT (European Institute of Innovation and Technology) [3]. Eligible EU member states are Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, and Spain, while eligible Horizon Europe-associated countries are Montenegro, Republic of North Macedonia, Serbia, Turkey, and Ukraine. Aside from being moderate or modest innovators, RIS countries suffer from significant brain drain, as elaborated in recent publications [4]. Considering the raw materials sector, Southeastern Europe (Tethyan metallogenic belt) and Southern Europe (Iberian metallogenic belt) are also regions with high primary and secondary raw materials potential [5]; thus, raw materials industries from those regions are specifically sensitive to sectorial graduates' brain drain.

The aims and objectives of this manuscript are to (1) present the development of the ADRIA and the succeeding RIS Internship programme for the benefit of the RIS raw materials sector; (2) provide insight on the implemented pretraining of students and supervisors; (3) present a succession of processes under the RIS Internship matchmaking platform; and (4) present and discuss current RIS Internship results.

## 2. Background

### 2.1. The ADRIA Internship [6] Pilot Programme

The ADRIA Internship [6] Programme was launched in 2019 as a pilot programme aiming to meet the following objectives: (1) to improve professional opportunities for the students of sector-related studies in the ADRIA region (Albania, Bosnia and Herzegovina, Croatia, Kosovo, Montenegro, North Macedonia, Serbia, and Slovenia), (2) to enable early cooperation between the students and the industry, thus familiarising the future young professionals with real-life challenges, and (3) to establish valuable connections between the educational institutions and the industry, thus helping to build more market compliant educational programmes in the future. During the two-year (2019–2020) pilot implementation period, the following elements of the Programme were developed and implemented:

- (1) Learning outcomes,
- (2) Online application procedures for students and organisations,
- (3) The evaluation and selection procedures, evaluation phases, rating system, checklists, and procedures related to the communication with the applicants,
- (4) Webinars with instructions for participants (supervisors and interims),
- (5) Textual instructions for the supervisors within host organisations,
- (6) Programme implementation monitoring system, reporting procedures and templates for the Interns, feedback surveys for Interns and supervisors,
- (7) Database of students and organisations in the ADRIA region.

### 2.2. The RIS Internship Programme [7]

Following the success of the previous pilot, the RIS Internship project upgraded the ADRIA Internship programme in terms of territorial coverage, number of interns, and the host organisations:

- (1) The territorial coverage of the project tripled in size. Six ADRIA countries (Albania, Bosnia and Herzegovina, Croatia, Montenegro, North Macedonia, Serbia, and Slovenia) and Italy initially participated out of all the European RIS countries, including Bulgaria, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia, and it expanded to Spain, Portugal, Ukraine, and Turkey.
- (2) The expected results in terms of the number of students and organisations included in the programme increased 5–6 times. During the project, it is expected that 370 students will conduct an internship in 300 companies. Train-the-trainer activities focused on 270 industry supervisors, and 370 interns will additionally increase the entrepreneurship/business skills of interns before the beginning of the Internship.

The RIS Internship programme updated the learning outcomes, developed new webinars with instructions for participants (supervisors and interims), built a database of organisations (Pool of organisations) with user-friendly filters containing 100+ companies from RIS countries, and developed and implemented an online automated matchmaking platform for connecting students and organisations. The call for organisations remains permanently open, and recruitment is continuously ongoing, whereas the call for students reopens at the beginning of each project year.

### 3. RIS Internship Programme Development

#### 3.1. Pretraining for Students [8]

Preparation for effective participation in the internship depends on a number of elements: intern preparation to acquire soft and social skills and competencies; expected norms of behaviour at the internship site; application of the occupational health and safety requirements at the internship site; environmental and ethic norms; recommended solutions to manage conflicts; management of intercultural differences during an internship abroad; time management schemes during internship and in the preparation period and appropriate decision making.

Therefore, a pretraining webinar for students was prepared, integrating several elements:

- What is an internship, internship features,
- Role and responsibilities of the Intern,
- Learning goals/outcomes of the internship,
- EIT Raw Materials internship policy,
- Effective participation in the internship,
- Establishing the right relationship between the intern and the internship trainer,
- Conflict management, intercultural and inter-generational issues,
- Time management issues,
- Evaluation and feedback.

#### 3.2. Pretraining for Supervisors [9]

Success in the implementation of the internship also depends on the training of supervisors in order to be able to (i) define a proper work assignment for the intern in a structured way, (ii) apply the theoretical background for defining proper intended learning outcomes, (iii) direct the intern towards reaching learning outcomes defined for the Programme, (iv) describe appropriate personal skills and socio-civic competences to be developed by the intern, (v) apply competence assessment schemes to the evaluation of student's performance, (vi) build proper solutions to manage potential conflicts, (vii) explain to the intern the working culture/environment of the organisation, and manage intercultural issues during the internship.

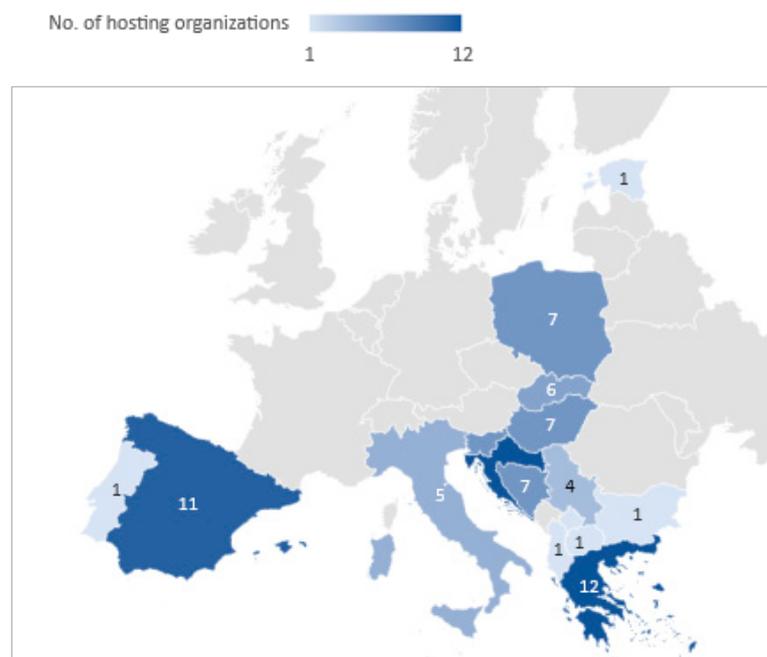
The mentioned components are built into the pretraining webinar for supervisors, which encompasses the following elements:

- What is an internship, internship features,
- Designing an Intern position,
- Role and responsibilities of the Trainers,
- Learning goals/outcomes of the internship,
- EIT Raw Materials internship policy,
- Effective participation in the internship (company perspective),
- Establishing the right relationship between the mentor and the mentee,
- Conflict management, intercultural and intergenerational issues,
- Evaluation and feedback.

### 3.3. RIS Internship Matchmaking Process

Implementation of the RIS internship consists of a succession of the following processes:

- (1) Opening of the Call for application of the companies, which includes the following steps: company application → eligibility check → admission of the company to the Pool of hosting organisation (Figure 1)



**Figure 1.** Total number of companies per RIS country in the RIS Internship Pool of organizations; total number of organisations = 84 (status June 2023).

- (2) Opening of the annual call for applications for students, which includes the following steps: student applications (selection of hosting organisations from the Pool) → eligibility check → matchmaking → training of the intern and supervisors → contracting → implementation of internships → evaluation, reporting, and feedback.

Interactive online matchmaking platform [10] following the above processes was developed and launched in February 2023, simultaneously with the opening of the Call for students' applications for 2023.

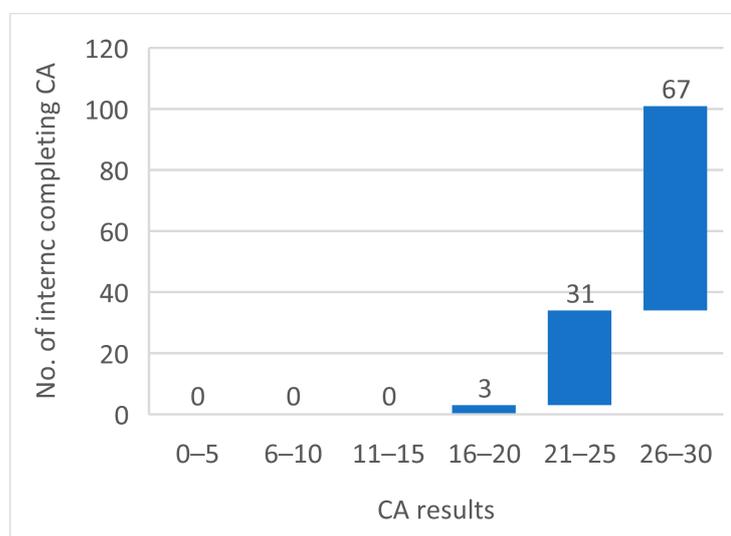
The platform operates on the RIS Internship website [7]. Once a student submits an application through the platform, the program coordinator receives an automatic e-mail notification to run an eligibility check (confirmation point 1). After the student is confirmed, the platform runs an automated matchmaking process by forwarding the application of the student to the organisation of the student's first choice, and after feedback of the first-choice organisation (or the response due time), it continues with the organisation of the second choice or, in the case of a positive match, the contracting procedure. The matchmaking process repeats for three selected hosting organization, and if unsuccessful, the student is directed to restart the process by selecting the next three organisations from the Pool. The platform is set to monitor the matching: (1) between the student's field of study and the selected fields for Intern positions at the hosting organisation, (2) the number of requested vs. offered internship months (1, 2, or 3), as well as (3) the preferable time (month in current year) for internship conduction. Organisations are instructed to set an online interview with students prior to confirmation (confirmation point 2). After the match, both intern and supervisor are forwarded to conduct pretraining webinars for interns/supervisors and undertake evaluation. Selection of elements for the creation of

the internship–scholarship agreement is the next confirmation point (3), from where a signing procedure and the upload of necessary student documents prior to the start of the internship follows. The internship final reporting and evaluation documentation are delivered to interns and supervisors by the platform once the contracts are signed and are to be uploaded to the platform several days after the end of the internship.

## 4. Results

### 4.1. Pretraining of Students (February–June 2023)

The total number of students (internship candidates) who applied to the RIS internship programme between February and June 2023 was 147. Out of the total number, 102 students successfully completed the mandatory pretraining and underwent competency assessment, achieving 50% of the correct results (Figure 2). Most participants reached a high score (30 points for 16 participants). The average score was 26, the median value was 27, and the standard deviation was 2.991. Students mostly struggled with questions on defining their tasks and choosing the learning outcomes of the upcoming internships.



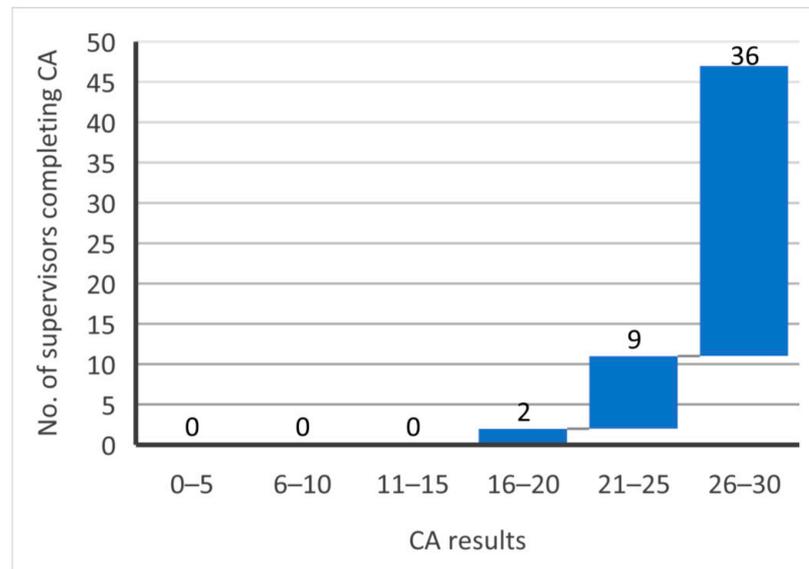
**Figure 2.** Competency Assessment (CA) results for internship candidates collected from February to June 2023 (RIS Internship matchmaking tool).

From the 45 remaining students who did not access the training, six were evaluated as noneligible, and nineteen applied more than once (training already conducted). For fourteen students, the application was pending verification due to incomplete documentation, and six students were delayed.

Altogether, eight students implemented their internship by the end of May and were able to complete the final evaluation report. All students evaluated the statements related to supervision, overall internship experience, and programme support with the highest grades.

### 4.2. Pretraining of Supervisors (February–June 2023)

From February until June 2023, 46 supervisors completed the pretraining webinar and competency assessment (Figure 3). The maximum score was 30 points. Of 46 participants, 9 achieved more than 27 points (>90% score). The average score was 26.4, the median value was 27, and the standard deviation was 3.4. The criteria to pass the training was a minimum of 50% of the correct answers. Only two supervisors achieved a score of 17 points (57% score).

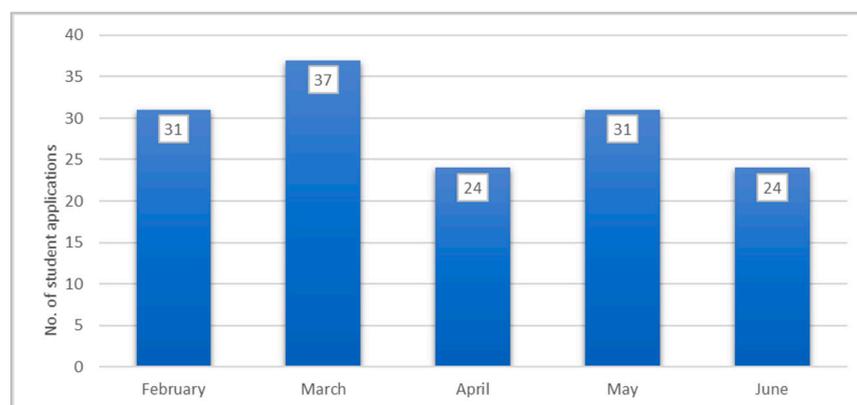


**Figure 3.** Competency Assessment (CA) results for supervisors collected from February to June 2023; RIS Internship matchmaking tool.

As the final step of the training methodology, evaluation reports were completed also by all eight supervisors participating in internships implemented by the end of June. All interns were positively graded by their supervisors regarding their work performance, collaboration, and independence. What could be improved are interns’ preparation of the reports and the general impact of the internship on the organisation, as stated by 30% of supervisors.

**4.3. RIS Internship Matchmaking Process**

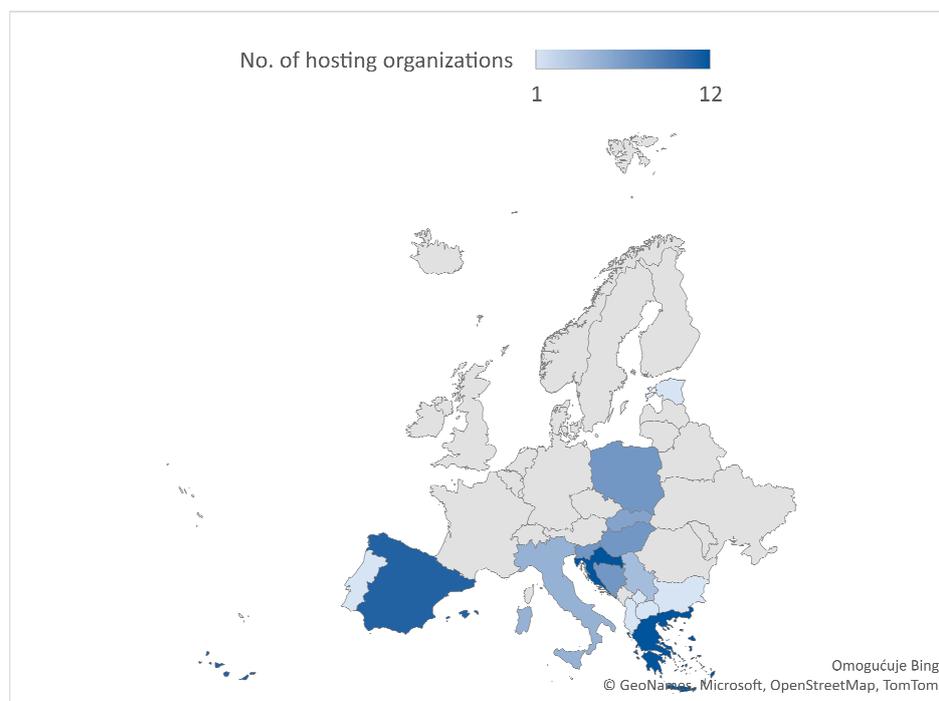
By the end of June 2023, 235 users were registered on the platform (147 students and 84 hosting organisation representatives). Student applications were consistent with the recruitment activities that had started mid-February and reached 147 by June (Figure 4). The overall number of placement positions offered for internships by 84 organisations (Figure 1) was 190; out of which 55 placement positions were provided by 20 organisations that joined the programme in 2023.



**Figure 4.** Monthly number of students applying for an internship via RIS Internship online match-making platform from February to June 2023.

The total number of internships created by June 2023 was 57. Compared to the total number of internship candidates (147), approximately 40% of students who applied were successfully matched in the 4 months of project implementation in 2023.

The distribution of created internships per country of host organisation (Figure 5) was in favour of Greece and Spain with the highest number of hosting organisations in the pool (13 per country) and the largest number of open positions for students. International mobility was the highest towards the Spanish organisations, where eight such internships were created. Together, 29 international and 28 national internships were created in 11 RIS countries participating in the project.



**Figure 5.** Distribution of created internships per RIS country (February–June 2023); total no. of created internships = 57; national internships = 28; international internships = 29.

## 5. Discussion and Conclusions

### 5.1. National vs. International Internship

The profiles of the raw materials hosting organizations that had joined the RIS Internship Pool of organisations are highly variable. On one hand, large multinational companies, research institutes, or industrial associations favoured international internships. The internal policy of these organisations is directed toward multicultural and multidisciplinary work environments, and when recruiting interns, they were guided by student motivation and background education rather than place of residence.

However, in many cases the raw materials industry in the RIS region is working in small to medium-sized mining/extracting/recycling sites and often dealing with low-value commodities that are placed at local markets. These institutions were in favour of national students with the appropriate background education, and they had joined the program in order to recruit future employees.

### 5.2. Critical Role of Pretraining

Regardless of the hosting institution's motivation toward national or international students, pretraining was shown to be a necessity for both interns and supervisors. Supervisors, being outside of the educational process, sometimes found it hard to set a proper time–workload scheme for interns and, at the same time, imbed intern obligations with the lifecycle and regulations of the company. Interns, on the other hand, mainly had their first working experience under the programme. Many had struggled to understand their role and the hosting institution expectations and, at the same time, tried to follow unfamiliar procedures. For that reason, pretraining webinars were a useful tool for the

preparation of students and supervisors for internship implementation, now supplemented with the RIS Internship Supervisors and Students guide for successful RIS Internship implementation [11,12], which was prepared and published [7].

### 5.3. Facilitation of the Matchmaking Process

The RIS Internship matchmaking platform was a success. Multidimensional communication between numerous users (>280 users in June 2023) now is run by the platform, and the monitoring and implementation of the RIS Internship is running smoothly. The duration of the matchmaking process, from the initial application to contacting continues for a maximum of 60 days, if three companies are chosen by the student. In the majority of the cases, the matchmaking process ends in 30 days. The platform offers data exporting and analytics, additionally supporting the implementation process.

### 5.4. Expected Benefits for the RIS Raw Materials Sector

The RIS Internship is focused on European RIS raw materials organisations and students. Targets set for the three years of RIS Internship implementation (2022–2024) include 300+ students pretrained and conducting an internship in RIS raw materials organisations. It is expected that the interns will significantly improve their understanding of the work environment and the real-life challenges of the Raw Material sector and develop an interest in future careers in the sector. A large number of hosting organisations in the Pool of organisations are recruiting. First, job opportunities for interns at the hosting organisations are attractive for both a successful intern and an organisation. Although many hosting organisations are located remotely, the traditionally higher wages in the raw materials sector and the affordability and availability of housing are beneficial for selecting job opportunities. Therefore, it is expected that the RIS Internship programme will subsequently positively impact the recognised RIS brain drain.

### 5.5. Sustainability of the Programme

Several elements of the RIS Internship programme were implemented in order to minimise future investment in maintenance:

- (1) Recorded pretraining webinars for students and supervisors that are available online and free of charge [8,9],
- (2) Development of the RIS Internship guide for successful RIS Internship implementation [11,12], also available online and free of charge,
- (3) An automated online matchmaking platform [10] for monitoring and communication between students and hosting organisations.

The matchmaking platform has several checkpoints and needs 0.5 full-time equivalent of the administrator, which is a minimum pre-condition for the continuation of the RIS Internship programme after 2024. However, without student scholarship funds, the attractiveness of the programme will decrease significantly, and other sources of funding should be additionally utilised in order to continue with the RIS Internship programme.

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