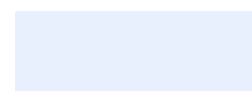


Study on the future development of the European Master in Official Statistics

Final Report

9 February 2024



CONTENTS

Executive summary	4
Glossary	8
1. Introduction	10
2. Methodology	11
2.1. Task 1: Analysis of the context and educational landscape	11
2.2. Task 2: Expert analysis	11
2.3. Task 3: Presentation to the EMOS Board	12
2.4. Task 4: Qualitative study (interview programme).....	12
2.5. Task 5: Quantitative study (survey)	13
2.6. Task 6: Development of scenarios and options for future EMOS	15
3. Current trends and developments	17
4. EMOS state of play	31
4.1. Implementation of EMOS as a quality label.....	31
4.2. EMOS governance	36
4.3. EMOS network	38
4.3.1. Social network analysis.....	38
4.3.2. Motivation to participate: HEIs	46
4.3.3. Motivation to participate: Non-academic network partners.....	46
4.4. Analysis of EMOS-labelled master’s programmes	49
4.4.1. Awareness and perception of the EMOS-labelled master’s programmes	49
4.4.2. Motivation to choose an EMOS-labelled programme	51
4.4.3. Student experience	54
4.4.4. EMOS courses and curriculum	55
4.4.5. Innovative pedagogies.....	57
4.4.6. Internships.....	60
4.4.7. Mobility opportunities	65
4.4.8. Supporting EMOS activities	68
4.5. Graduate employability	71
4.5.1. Skill needs	77
4.5.2. Challenges in graduate employability	80
5. Scenarios for future EMOS	84
5.1. EMOS as a quality label.....	84
5.2. EMOS as joint programme.....	85
5.3. EMOS as a certificate.....	85
5.4. Comparative overview of the future scenarios for EMOS	86

LIST OF FIGURES

Figure 1. EMOS (potential) student and graduate survey respondents by country	14
Figure 2. EMOS (potential) Stakeholder and employer survey sample by country	15
Figure 3. Network 1: EMOS collaborations (coloured by country)	40
Figure 4. Network 2: EMOS collaborations (by modularity class).....	41
Figure 5. Network 3: all collaborations of EMOS partner HEIs (coloured by country)	42
Figure 6. Network 4: all EMOS collaborations (by modularity class)	43
Figure 7. What are the benefits of being in the EMOS network for your organisation? (non-HEI network partners only)	47
Figure 8. What are the challenges of being in the EMOS network for your organisation?	48
Figure 9. How did you find out about EMOS?	50
Figure 10. Did EMOS label influence your choice of the Master's programme?	50
Figure 11. What were the main reasons you chose an EMOS programme?	52
Figure 12. What are the most important elements when choosing a study programme?	53
Figure 13. How would you evaluate your overall study experience in an EMOS programme (so far)?	55
Figure 14. How satisfied are you with the courses offered under the emos specialisation track?	56
Figure 15. Were any innovative pedagogies applied under emos specialisation track? (please select all that apply) ...	59
Figure 16. What was/will be the duration of your internship?	61
Figure 17. How satisfied are you with your overall internship experience?	62
Figure 18. Was the internship useful for your career development?	63
Figure 19. Did the internship influence your career choice?	63
Figure 20. Did you undertake or plan to undertake any EMOS mobility opportunities during your studies?	65
Figure 21. Did you participate in any of the following supporting EMOS activities?	69
Figure 22. Have you heard of the following supporting EMOS activities?	69
Figure 23. If the following activities were offered by your university/study programme, would you be interested in taking them?.....	71
Figure 24. What is the most common qualification level of employees working in the primary activity of your organisation?	72
Figure 25. What are the most common educational backgrounds of employees working in the primary activity of your organisation?	73
Figure 26. In Which type of organisation are you employed?	75
Figure 27. What prevented you from getting a job in the field of official statistics?	76
Figure 28. Which data and statistical skills are most commonly used in your organisation (consider skills required for your organisation's primary activity)?.....	77
Figure 29. Which soft skills are most important for the work done in your organisation (consider skills required for your organisation's primary activity)?.....	78
Figure 30. Which data and statistical skills do you expect to be most in demand in the coming 5-10 years?	79
Figure 31. What are the main difficulties your organisation faces when searching for prospective employees?	82

LIST OF TABLES

Table 1. Interviews completed as part of the qualitative study	12
Table 2. Overview of survey responses	13
Table 3. Opportunities, challenges, and risks of big data for official statistics	20
Table 4. Selected case studies	22
Table 5. Selected case studies	26
Table 6. Comparison EMT, EMOS and EIT Label	33
Table 7. Comparative overview of the future scenarios for EMOS	87

Executive summary

Purpose of the study

The aim of this study was to assess the implementation, achievements and challenges of the European Master's in Official Statistics (EMOS) ten years since the quality label currently awarded to over 30 European higher education institutions by the European Statistical System Committee has been launched. The study also examined recent trends and developments in European higher and statistics education to identify any opportunities or risks for EMOS. The overall purpose of the study was to assess whether EMOS as a quality label is still fit for its purpose, whether it fulfils its objectives, and to propose scenarios for its future development, including short- and long-term solutions to the challenges EMOS is currently facing.

Methodology

The study consisted of several tasks and methodological approaches to data collection and analysis including:

- Analysis of the current trends and developments in European higher education and (official) statistics education, including twelve case studies of European transnational collaboration initiatives, and programmes specialising in official statistics education,
- Expert analysis of EMOS-labelled master's programmes, their profiles, structures and implementation by partner universities, including a social network analysis of the partnerships within EMOS network,
- Qualitative study building on interviews with 84 EMOS-labelled programme coordinators, potential EMOS partner universities, current and potential students, graduates and current and potential non-academic EMOS network partners,
- Quantitative study as part of which online surveys were conducted with potential and current EMOS students and graduates (389 responses), as well as with non-academic potential and current EMOS network partners and stakeholders (189 responses),
- Co-creation workshop with over 70 EMOS stakeholders as part of the EMOS workshop in Prague where the participants brainstormed ideas for future EMOS using an applied design sprint methodology and building on the problems and challenges identified during the earlier stages of the study.

Current trends and developments in European higher and (official) statistics education

Recent trends and developments in European higher education bring internationalisation and fostering closer and deeper collaboration between European higher education institutions to the fore, also emphasising digitalisation, synergies between education, research, innovation and service to society. In this context, the EMOS network is well-placed to better develop its international and collaborative potential. The network could find synergies with and benefit from several recent EU initiatives, namely the Erasmus Mundus Joint Master Degrees, Marie Skłodowska Curie Doctoral Networks, the European Universities initiative and the upcoming European Degree (label).

Official statistics and official statistics education have been challenged by recent technological changes and the need to adapt to increasing use of new data sources in official statistics production. This does not only point towards a need for new computing and programming skills to process and analyse the data, but the increasing relevance of profiles in ethics and data protection, as well as social sciences to cater for the growing demand for evidence-based policy making and objective information in an increasingly statistically literate society. Globalisation, and especially the integration of European official statistics data within the developing European Statistical System, highlights the need for international collaboration. These developments underline the need for diversification and adaptability in official statistics education to keep up with the fast-changing data landscape and societal needs.

The case studies provided valuable insights into existing collaboration arrangements in the field of official statistics and in European higher education. They were useful for deriving recommendations on how EMOS could be improved with regard to implementation as a quality label, network size and scope, delivery of the curriculum and supporting activities.

Implementation of EMOS as a quality label

The analysis of EMOS implementation as a quality label revealed that it is largely suitable considering the current size and composition of the EMOS network. Many challenges EMOS is currently facing, such as limited visibility, untapped international potential, difficulty attracting students and retaining graduates in the public sector, could successfully be addressed while continuing to implement EMOS as a quality label.

However, a comparison of EMOS with other similar labels (European Master's in Translation and European Institute of Innovation and Technology label) revealed that EMOS requirements are rather demanding and require considerable adaptation and effort from the master's programmes to obtain the label. Making the requirements for the official statistics curriculum more flexible could help expand the EMOS network to a wider range of programmes and higher education institutions, and foster interdisciplinarity.

Furthermore, the visibility and reputation of the EMOS label could be increased if it was awarded by Eurostat rather than the European Statistical System Committee.

EMOS governance

The EMOS board received largely positive feedback for how decisions are made and tasks including label application assessment and re-labelling exercise are performed. However, the fact that the board is very hands-on also means a considerable workload for the board members and lack of time for work on strategic development of EMOS. The workload could be better shared by structuring the board into thematic working groups that could involve other network members as thematic experts, boosting their engagement in EMOS activities. Furthermore, some administrative tasks could be delegated to external experts when necessary. Having an elected rather than appointed board could be considered to boost commitment and engagement of the board members.

EMOS network

Many EMOS network partner indicated that belonging to the network brings useful collaborations between academia, national statistical institutes and other partners, and increases their visibility and reputation. However, a social network analysis of collaborations within the EMOS network revealed considerable fragmentation and suggested that the international potential should be better exploited. While some

EMOS-labelled programmes have developed joint degrees or share teaching activities among each other, others only collaborate with their respective national statistical institutes as traineeship hosts.

There is definitely space for more collaboration in teaching, development of joint degrees, learning mobility and cross-border traineeships to expand and strengthen relationships between the network partners. Interactions within the EMOS network could also be improved through an interactive online platform. Joint study visits, summer schools or similar events bringing EMOS students from different higher education institutions together would also be beneficial for community building.

Analysis of EMOS-labelled master's programmes

Analysis of the implementation of EMOS-labelled master's programmes building on annual reports, interviews and survey data has shown that student satisfaction with EMOS curriculum and internships is high, but promotion of the label and its supporting activities could be improved. Students mostly tend to find out about EMOS from their professors, peers or employers, followed by information on the university websites, suggesting that the EMOS could be more actively promoted outside the labelled programmes and universities. Students predominantly choose an EMOS programme based on their interest in (official) statistics and assign less importance to the label itself, hinting that the prestige and visibility of the EMOS network and label could be improved.

EMOS students and graduates are largely satisfied with the content and relevance of EMOS curricula, and with the opportunity to apply their theoretical knowledge in practice during an internship. However, they are less aware of or engaged in the supporting activities. About one third have attended EMOS webinars, but fewer were aware of or took part in EMOS workshops, European Big Data Hackathon, or the Master's Thesis Competition. They also showed limited interest in mobility opportunities and cross-border internships. Better integration of these activities in the curricula by, for example, awarding credit points for participation, or coordinating teaching and exam content and periods between higher education institutions to facilitate mobility could raise the student interest.

Graduate employability

Representatives of official statistics producers that hired EMOS graduates are usually highly satisfied with the specific skillset they bring to the workplace, allowing them to seamlessly integrate and add value. However, employing and retaining graduates at national statistical institutes or other public organisations producing or working with official statistics data is one of the main challenges EMOS is currently facing. Student survey results have shown that employment prospects in the public sector are an important motivator to select the EMOS track, but less than a half of surveyed graduates were working for a national or regional statistical institute, other national authorities or national ministries. One third were employed by private companies, citing lack of job openings, complex hiring procedures and unattractive salaries as the main reasons to not work in the field of official statistics. Qualified statisticians and data scientists are also in high demand in the public sector, hinting that national statistical institutes and similar organisations should address their hiring hurdles to make the best use of the pool of EMOS graduates.

Potential scenarios for future EMOS

Integrating the contextual and EMOS-specific study findings, we propose three possible scenarios for the future implementation of EMOS.

1. EMOS as a quality label

EMOS could continue being delivered as a quality label, since it is a suitable format for a network of its current scope and size, allowing for potential growth in the number of partners. Many challenges EMOS is currently facing such as untapped international potential, difficulty to attract students and retain graduates in the public sector, costly implementation of the curricula, could be addressed under a quality label. It would allow considerable flexibility and it would not prevent development of joint degrees among network partners, delivery of EMOS at bachelor's or doctoral levels, or development of professional training opportunities.

The changes that should be considered are the reformulation of EMOS label requirements and objectives to make the label easier to obtain by (potential) partner higher education institutions, and to communicate its benefits broadly and clearly.

2. EMOS as a joint programme

EMOS could develop into a joint programme rather than a quality label. This would entail a consortium of several higher education institutions awarding a degree in official statistics under the coordination of Eurostat. As opposed to a quality label, a joint programme would foster closer collaboration between the partners and strengthen the pan-European dimension of official statistics as an academic discipline.

This scenario would increase the visibility and reputation of EMOS as an academic programme and official statistics as a discipline but would have implications for the current set-up of the EMOS network considering that a joint programme is not feasible among over 30 universities. This means that the network might become fragmented through the development of several joint programmes, or that less active members might withdraw.

3. EMOS as a certificate

Under this scenario, the mode of delivery of EMOS could be changed to a certificate issued by Eurostat in cooperation with higher education institutions and national statistical institutes in each country where it is offered, introducing a learner-centred approach. Both students and practitioners could obtain the certificate, EMOS then covering both academic and professional training and having the potential to develop into the leading training provider in official statistics in Europe, likely in synergy with the European Statistical Training Programme.

This scenario would greatly expand the pool of (potential) EMOS students and learners but come with significant adjustments and a high burden to the authority awarding the certificate, entailing development and oversight of a complex quality assurance system. It might also decrease the academic orientation of EMOS.

Glossary

BA	Bachelor's is an academic degree awarded for an undergraduate programme of typically three to four years.
EBDH	European Big Data Hackathon is an event organised by Eurostat every two years. Teams from all over Europe gather to compete for a statistical challenge by developing innovative approaches, applications and data products combining official statistics and big data that can inform policy makers in pressing policy questions facing Europe.
ECTS	European Credit Transfer and Accumulation System is a tool of the European Higher Education Area for making studies and courses more transparent. It facilitates learning mobility between countries and recognition of academic qualifications and study periods abroad. The system awards credits for qualifications obtained that are comparable across different higher education systems across the EU and collaborating European countries.
ESAC	European Statistical Advisory Committee ensuring that user requirements and costs borne by information providers and producers are taken into account for the coordination of the strategic objectives and priorities of the EU statistical information policy. IT consists of 12 members appointed by the European Commission representing users of European statistics, 11 members appointed by and representing EU bodies and institutions, and the Director-General of Eurostat.
ESS	European Statistical System is a partnership between the EU statistical authority (Eurostat), National Statistical Institutes, and other national authorities in each EU country and the European Free Trade Association that are responsible for the development, production, and dissemination of European Statistics.
ESSC	European Statistical System Committee is the body providing professional guidance to the ESS.
ESTP	European Statistical Training Programme aims at providing European statisticians with the opportunity to participate in international training courses, workshops and seminars at postgraduate level in order to meet the challenges of comparable statistics at European and international level.
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations.

Flipped classroom	Also known as inverted classroom is an instructional approach reversing the traditional model of teaching and learning where typical activities of classroom lectures and homework are reversed. Students familiarise themselves with the lecture material on their own and use the classroom time for discussions, problem-solving exercises, group projects and other engaging activities aimed to apply concepts ahead of the class.
HEI	Higher education institution.
IO	International Organisation.
JRC	Joint Research Centre of the European Commission
MA	Master's is an academic degree awarded for a graduate programme of typically one to two years following a BA degree.
NCB	National Central Bank
NGO	Non-governmental organisation
NSI	National statistical institute
Learning:	
<i>Blended</i>	Combination of traditional face-to-face instruction with online learning activities and digital resources. The hybrid model can also integrate short-term learning mobility providing students with a flexible and personalised learning experience.
<i>Challenge-based</i>	Framework for learning by solving real-world challenges
<i>Mobility</i>	Movement of individuals (students, educators, or professionals) across different geographical locations to pursue educational or training opportunities. International learning mobility entails moving to a different country. Next to physical, learning mobility can also be blended (a mix of short-term physical and virtual mobility) or virtual (fully online).
ONA	Other National Authority
<i>Online</i>	Instruction/classes delivered fully through various multimedia and internet platforms and applications.
<i>Student-centred</i>	An educational approach placing the learner in the centre of the educational process through allowing them to define their learning pathway, personalise the learning experience based on their needs and interests and choose what and how they want to learn by allowing a selection of topics, projects, learning resources and learning pace.
NTTS conference	Conference of New Techniques and Technologies for Statistics taking place in Brussels every two years.

1. Introduction

This draft final report synthesises the findings of the Study of the future development of EMOS and concludes with potential scenarios for its future development. Ten years after the initial feasibility study on EMOS was conducted, we collected qualitative and quantitative data to assess the current state of implementation of the EMOS label, identified the key achievements and challenges in the context of current trends and developments in European higher and official statistics education, and propose three strategic directions that EMOS could take in the future.

The report is structured as follows:

- Section 2 outlines the methodology of the study and provides an overview of the data collected and used for the analysis.
- Section 3 outlines the key trends and developments in European higher education and (official) statistics, illustrating them with twelve case studies. We have added two case studies of European collaboration initiatives in other disciplines, the European Master's in Translation, and the European Joint Master's in Strategic Border Management to explore their modes of implementation and draw lessons for EMOS. The case studies are submitted as Annex A.
- Section 4 reviews the implementation of the EMOS label, the main challenges, and achievements, including the mode of implementation, EMOS governance, an analysis of the EMOS network and the implementation of EMOS-labelled master's programmes by partner higher education institutions. The section also delves into EMOS graduate employability and the needs and profiles of potential EMOS students.
- Section 5 proposes three possible implementation modes for future EMOS building on the synthesis of the study findings.

The scenarios described in section 5 propose three strategic directions for EMOS by indicating alternative modes of implementation while idea boxes throughout the report suggest immediate or intermediate improvements for EMOS that could be implemented under either of the scenarios.

2. Methodology

2.1. Task 1: Analysis of the context and educational landscape

Task 1 builds on desk research including a review of policy documents, strategies, study reports and academic literature, and several case study interviews. It includes:

- 1a. An analysis of current and future trends in the educational landscape, including specific developments in the field of (official) statistics, and more general EU policy developments;
- 1b. Five case studies of existing collaborations in education programmes in statistics and other relevant or related disciplines;
- 1c. Seven case studies of transnational collaboration initiatives within academia or between academia and employers in other disciplines with a focus on European level initiatives.

The findings are reported in Section 3.

2.2. Task 2: Expert analysis

The Expert analysis aims to provide an in-depth, critical review of EMOS as it is currently designed and implemented, identify the potential for improvement and implementation of further actions, and assess the level of harmonisation of the different EMOS curricula and the potential for deeper integration and collaboration. The expert analysis included a comparative programme analysis and a social network analysis (SNA).

As part of the **comparative programme analysis**, we have assessed all the 34 EMOS-labelled programmes implemented until 2023 in 18 countries.¹ The analysis built on a review of applications and annual reports (2021-2022 and 2022-2023 if available) of EMOS-labelled master's programmes. We complemented the information with interview findings and additional desk research on programme websites. The analysis allowed us to gain a thorough understanding of how EMOS is implemented by different HEIs, obtain quantitative information on student and intern numbers and their dynamics over time, and identify the main achievements and challenges highlighted throughout this report. We systematised all the data obtained in a comparative overview of all EMOS-labelled master's programmes and individual factsheets for each of the programme to be submitted with the final study report.

The **SNA** of the EMOS network showcases its size, structure, and interactions between the different network partners. The SNA building on information from HEI applications and 2022 annual reports is presented in Section 4.3.1.

¹ Including two HEIs not reapplying for the label that expired in 2023

2.3. Task 3: Presentation to the EMOS Board

PPMI presented the study design and the initial findings of Tasks 1 and 2 to the EMOS board to collect feedback and co-create the next steps. The meeting took place on March 7th, 2023, in Brussels back-to-back to the Conference on New Techniques and Technologies for Statistics.²² Findings of the qualitative study along with preliminary options for the future development of EMOS were also presented to the board at the EMOS workshop in Prague in October 2023.

2.4. Task 4: Qualitative study (interview programme)

We have conducted semi-structured interviews with 86 respondents as part of the qualitative study. The interviews served to collect first-hand stakeholder insights on the current state of implementation, challenges, opportunities, and the future development of EMOS. Table 1 provides a breakdown of interviewees by target group and the number of interviews planned and conducted.

TABLE 1. INTERVIEWS COMPLETED AS PART OF THE QUALITATIVE STUDY

STAKEHOLDER GROUP	STAKEHOLDERS	INTERVIEWS PLANNED	INTERVIEWS COMPLETED
Students	EMOS students	15	3
	EMOS graduates		8
	Potential EMOS students		4
Higher education institutions	EMOS-labelled programme coordinators	30	31*
	Potential EMOS members		5
(Potential) EMOS network partners and employers	European Commission, Eurostat, ESS	5	6
	NSIs, ONAs, regional statistical offices	10	11
	International organisations	3	3
	Line ministries	5	3**
	Central banks	5	5
	Private sector	5	5
	Research organisations	3	2
TOTAL:		81	86

Source: Prepared by PPMI. *Two written responses received; **We also spoke to one EMOS graduate working for a ministry

There are discrepancies between the number of planned and completed interviews with representatives of line ministries and international organisations due to difficulties in reaching out to potential respondents, but we have compensated for the gap by including more stakeholders from other groups.

The interviews were conducted using videoconferencing tools and guided by pre-defined questionnaires for each stakeholder group developed in consultation with Eurostat. The data was coded using qualitative analysis software to build a single thematically organised database where information on a specific topic could be extracted from all the interview notes. The approach ensured that all data and information were available to the whole study team and nothing was left out while preparing reports.

2.5. Task 5: Quantitative study (survey)

Two distinct survey questionnaires were developed in consultation with Eurostat for the quantitative study. The first survey targeted EMOS students, graduates and potential students, and the second was sent to current and potential EMOS network partners and employers. Both surveys included several filter questions to ensure that the respondents only receive questions relevant to their profile and based on answers to previous questions to minimise survey fatigue. We did not survey coordinators of EMOS-labelled master’s programmes or EMOS board members since we interviewed most of them as part of the qualitative study.

The survey ran for several weeks in September – October 2023. Due to an initially low response rate, we sent multiple reminders, web-scraped additional contacts, and were assisted by Eurostat’s communications team disseminating the survey links on their social media. Table 2 lists the numbers of survey respondents that we planned to reach, and the responses received by stakeholder group. We did not reach all the targets for the stakeholder survey, but the student survey gathered more responses than expected.

TABLE 2. OVERVIEW OF SURVEY RESPONSES

QUESTIONNAIRE	STAKEHOLDER GROUP	PLANNED RESPONSES	RESPONSES AFER DATA CLEANING (PARTIAL)	
Students	EMOS students	50	128 (58)	
	EMOS graduates	50	112 (27)	
	Potential EMOS students	100	149 (44)	
(Potential) EMOS network partners and employers	Private sector	50	24 (1)	
	NGOs	20	7 (1)	
	European System of Central Banks	3	0*	
	International organisations	5	11 (2)	
	Central Banks	20	16 (15)	
	Research organisations	10	72 (7)	
	NSI, other national authorities, Regional Statistics Offices	50	40 (7)	
	Line ministries	30	5	
	European Statistical Advisory Committee	2	3	
	European Commission	20	2	
	Other			9
		TOTAL:	410	578 (162)

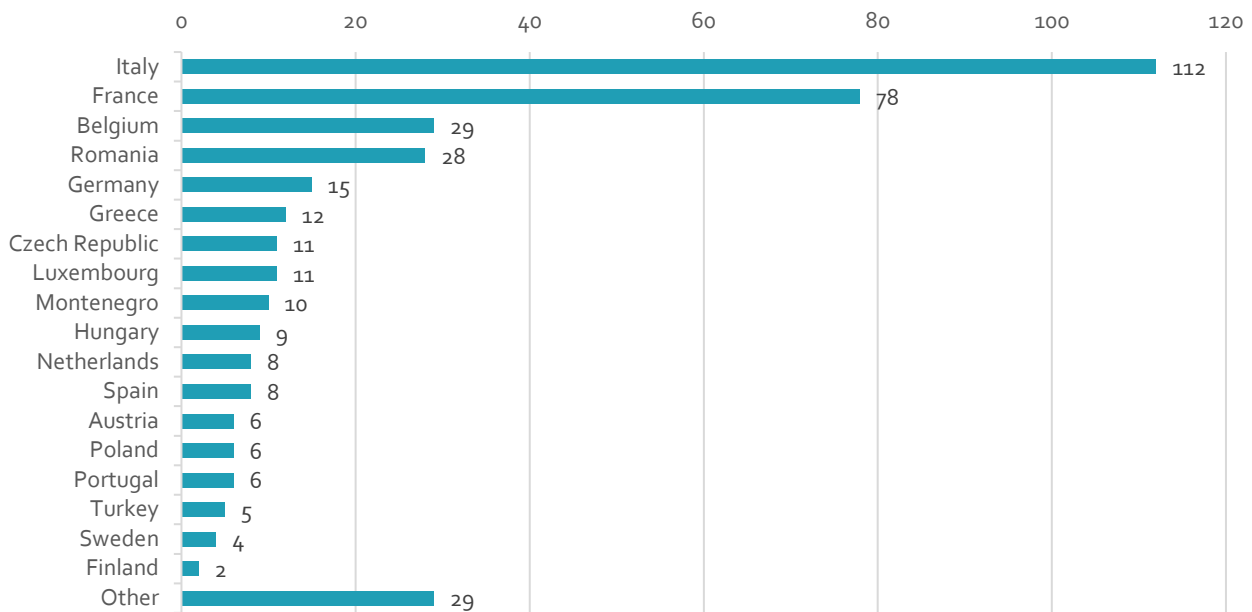
Source: prepared by PPMI based on survey results. *Covered by Central Banks and 4 ECB respondents

We opted to **use partial survey responses in the report**. This means that if a respondent answered any question that went beyond providing personal data (status, country, organisation represented, or similar), the response was included in the analysis. We use this approach to maximise the utilisation of survey data, since breaking surveys off before completion but after providing some answers is fairly common. This, along with the filtering logic, is why the sample sizes (n) indicated for each survey question in the report differ.

We have also cleaned the data after closing the survey removing responses that did not provide any information beyond personal data, duplicates, several student and graduate responses indicating a HEI that does not have an EMOS-labelled master’s programme and reviewing and (if needed) reclassifying any qualitative responses.

Figure 1 depicts the EMOS (potential) student and graduate survey respondent distribution by country. Almost half (49%) come from France and Italy, which is unsurprising considering that these countries have either the largest or the most EMOS-labelled master’s programmes. However, Germany and Poland appear rather underrepresented considering the number of EMOS-labelled master’s programmes. This can, to an extent, be explained by low number of students as well as the common practice of not tracking EMOS students before they graduate in Germany.

FIGURE 1. EMOS (POTENTIAL) STUDENT AND GRADUATE SURVEY RESPONDENTS BY COUNTRY



Source: Survey of (potential) EMOS students and graduates. $n=389$. Countries with no EMOS-awarding HEIs and fewer than 5 responses are aggregated under "Other".

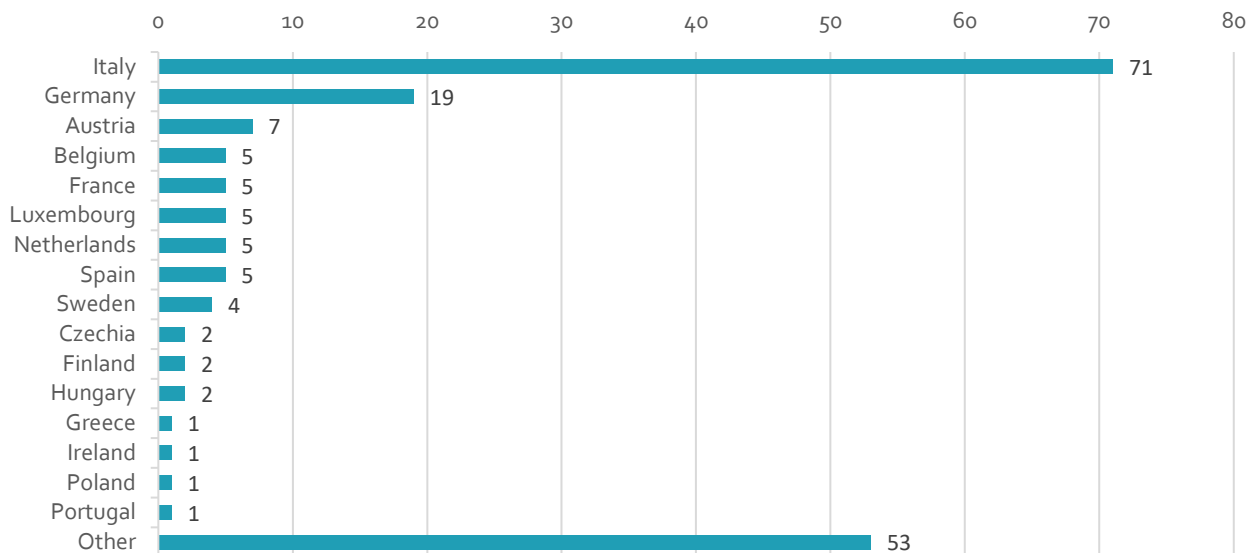
At the institutional level, we received responses from 25 out of 33 EMOS-labelled master’s programmes (including ELTE Budapest, a former EMOS network partner). The sample does not include responses from Aristotle University in Thessaloniki, University NOVA Lisbon, Leiden University, University College Dublin, Gdansk University of Technology, Warsaw University of Life Sciences, University of Bamberg, University of Mannheim, and University of Trier.²

The distribution of the (potential) EMOS network partner and employer survey sample exhibits both similar and different trends than those of the student survey, as seen in Figure 2. Similar as in the case of students, Italy was the most active country. However, we only received five responses from France. German stakeholders were relatively more active, which might be influenced by the fact that the European Central Bank (ECB) is based in Germany. The distribution of the sample might be explained by the fact that our personalised dissemination strategy worked better than random sampling, and several stakeholders from

² We interviewed EMOS-labelled Master’s programme coordinators from Gdansk University of Technology, University of Bamberg, University of Trier, University NOVA Lisbon, but were unable to reach the others.

Italy whom we interviewed (FAO, ISTAT, JRC, Bank of Italy) disseminated the survey link among their colleagues.

FIGURE 2. EMOS (POTENTIAL) STAKEHOLDER AND EMPLOYER SURVEY SAMPLE BY COUNTRY



Source: Survey of (potential) EMOS network partners and employers. $n=189$. Countries with no EMOS-awarding HEIs and fewer than 5 responses are aggregated under "Other".

2.6. Task 6: Development of scenarios and options for future EMOS

Considering the options for the future development of EMOS, we heavily built on challenges and ideas identified as part of tasks 1-5, combining EMOS-specific challenges and achievements with the current trends and developments in European higher and official statistics education. The ideas, or smaller-scale options for the future development of EMOS are highlighted throughout this report, and the three broader scenarios touching upon the mode of implementation are discussed in Section 5.

Furthermore, we organised a co-creation workshop as part of the EMOS workshop in Prague on the 27th of October 2023 to gather further insights and ideas on how EMOS could be improved in the future. It engaged more than 70 coordinators of EMOS-labelled master's programmes, network members, students, graduates, and potential partners. We applied an adaptation of the design sprint methodology, building eleven teams of participants, presenting them with a challenge EMOS is currently facing developed based on the study findings, and inviting them to build, test, and present solutions for it.

The ideas developed and proposed by workshop participants included:

- Providing students and graduates with more job and/or internship opportunities by setting up an EMOS information, **internship and job market platform**, an interactive information platform, career day, and similar events;
- Setting up an EMOS **alumni network**, with regular events such as conferences or workshops to raise awareness of the international potential of EMOS and **build a stronger community**;

- Making **internship requirements more flexible** to enable engagement of working students; strengthening partnerships with private sector and other public institutions to increase internship offers for students;
- Using EMOS to **upskill public sector staff** (ministries along with NSIs), providing flexible opportunities for professional training using existing staff but strengthening collaboration between academics, practitioners and students and the practical orientation of the programme;
- **Expanding the EMOS network** to other organisations in addition to NSIs, ONAs and NCBs to showcase its **European and international potential**. These could include private sector, public sector and international organisations;
- **Engaging NSIs more**: NSIs could provide a more attractive internship or graduate apprenticeship offer to EMOS students. NSI staff could be motivated by monetary or non-monetary rewards for their engagement with EMOS. Funding for joint research projects or joint positions at university/NSIs could be considered;
- **Creating incentives for HEIs to join the EMOS network** through information provision, subsidies for establishing an EMOS curriculum, double degree programmes, teacher training and fairs;
- Student-centred EMOS: The **label could be awarded for specific qualifications obtained, regardless of whether the institution is an EMOS network partner or not**. This could be complemented with a centralised online EMOS curriculum.

3. Current trends and developments

3.1. Relevant trends and developments in the educational landscape

3.1.1. Trends and developments in European higher education

Driven by the need to adapt to new societal, technological, economic, and demographic trends and challenges, transnational cooperation and the ensuing internationalisation of higher education have been at the heart of the EU education agenda for the past decades, with a particular focus on strengthening the links and collaboration between higher education institutions (HEIs) in Europe. As identified by the Commission Communication on achieving the European Education Area by 2025, the key strategic objectives of the European education area in the field of higher education include:

- **Closer and deeper cooperation** between HEIs, leading to more joint curriculum development and common courses;
- A common policy framework across borders that allows for **seamless transnational cooperation**;
- HEIs as central actors of the “**knowledge square**”: education, research, innovation and service to society;
- Automatic **recognition of qualifications** and study periods abroad for further learning and quality assurance of joint transnational activities;
- A stronger focus on specialised education programmes in **advanced digital skills**.³

These strategic goals are strongly in line with the key values and principles of the **Bologna Process** launched 20 years ago and the **European Higher Education Area (EHEA)** created in 2010, which also strongly emphasise the need of strengthening the quality assurance mechanisms and increasing staff and students' mobility to facilitate employability⁴. These policy initiatives have triggered in-depth changes in the EU higher education landscape. Key transformative processes include:

- The establishment of instruments enabling **more transparency and removing obstacles to the recognition of qualifications** between the Member States, such as the European Credit Transfer and Accumulation System (ECTS), the Diploma Supplement, the Lisbon Recognition Convention, the European Qualifications Framework, and the U-Multirank tool to access the profiles and ranking of EU higher education institutions⁵. The issue of automatic mutual recognition of foreign qualifications was addressed in a designated Council Recommendation,⁶ suggesting to adopt the principle by 2025. On the institutional side, the European Network for Information Centres in the

³ Communication from the Commission <...> on achieving the European Education Area by 2025. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0625>

⁴ <https://www.ehea.info/>

⁵ European Commission (2018): *The EU Support of the Bologna Process*, Publications Office of the European Union, Luxembourg. Available at: https://publications.europa.eu/resource/cellar/e437d57d-5e32-11e8-ab9c-01aa75ed71a1.0001.01/DOC_1

⁶ Council Recommendation of 26 November 2018 on promoting automatic mutual recognition of higher education and upper secondary education and training qualifications and the outcomes of learning periods abroad. Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H1210\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H1210(01)&from=EN)

European Region (ENIC) and the National Academic Recognition Information Centres in the European Union (NARIC) aim to facilitate learning mobility in the EU by providing information on the procedures to follow for the recognition of foreign qualifications.⁷

- The development of a common **framework for external quality assurance** through the European Approach for the Quality Assurance of Joint Programmes, adopted in 2015 with the support of the European Association for Quality Assurance (ENQA), and the European Quality Assurance Register for higher education (EQAR). The project JOQAR also explored quality assurance issues in the context of joint degrees, trying to promote single accreditation procedures.⁸
- The **European Student Card initiative**⁹ aims to facilitate seamless mobility and credit transfer between European HEIs. A recent communication calls for deploying a unique European Student Identifier available to all mobile students in 2022 and to all students in universities in Europe by mid-2024.¹⁰
- The **European approach to micro-credentials**, accessible to all types of learners through their flexible and short-term nature, is currently being developed within the framework of the European Skills Agenda. Micro-credentials should significantly facilitate the recognition of flexible lifelong learning and provide a driving force for the development of flexible, specialised short-term learning offer.¹¹ A proposal for a Council Recommendation on micro-credentials for lifelong learning and employability has been published in May 2022.¹²
- The Commission’s Communication on the ‘**Digital Education Action Plan (2021-2027)**’ underlines the impact of the COVID-19 pandemic on teaching and learning practices in the EU and highlights the importance of supporting a strong and high-quality digital education in Europe through transnational cooperation. The Commission plans to establish a **European Digital Education Hub**, a network of national advisory services and to launch a **European Digital Skills Certificate (EDSC)** that would indicate the degree of digital literacy in a standardised way across Europe.¹³

Facilitated by the abovementioned strategic goals, tools and initiatives, there has been a multiplication of **university partnerships and joint programmes** over the past decades:

- The **Erasmus Mundus Joint Master Degree (EMJMD)** launched in 2014 is part of the Erasmus+ Key Action 1. It constitutes a prestigious, integrated international study programme lasting between one to two years, delivered by an international consortium of HEIs. So far, 535 Erasmus Mundus projects have been funded.¹⁴
- The **Marie Skłodowska Curie Doctoral Networks** funded by Horizon 2020 implement doctoral programmes carried out in partnership of organisations from different sectors across Europe and beyond.¹⁵

⁷ European Commission (2018): *The EU Support of the Bologna Process*.

⁸ European Commission, PPMI, AIT, Lukas Bischof Hochschulberatung (2018): *Study to evaluate the progress on quality assurance systems in the area of higher education in the Member States and on cooperation activities at European level*, Publications Office of the European Union, Luxembourg. Available at: <https://op.europa.eu/en/publication-detail/-/publication/80cf98f3-1e01-11e9-8d04-01aa75ed71a1/language-en>

⁹ Communication from the Commission <...> “Building a stronger Europe: the role of youth, education and culture policies”, 2018, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0268&from=EN>.

¹⁰ https://ec.europa.eu/commission/presscorner/detail/en/IP_22_365

¹¹ Orr, D., Pupinis, M., and Kirdulytė, G. (PPMI) (2020): *Towards a European approach to micro-credentials: a study of practices and commonalities in offering micro-credentials in European higher education*, NESET report, Luxembourg: Publications Office of the European Union. Available at: https://nesetweb.eu/wp-content/uploads/2020/12/NESET_AR2-2020_Full-Report.pdf

¹² Council of the European Union (2022): *Proposal for a Council Recommendation on a European approach to micro-credentials for lifelong learning and employability*. Available at: <https://data.consilium.europa.eu/doc/document/ST-9237-2022-INIT/en/pdf>

¹³ European Commission (2020): *Communication on the Digital Education Action Plan 2021-2027: Resetting education and training for the digital age*. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0624>

¹⁴ European Commission/EACEA/Eurydice (2020): *Implementing Joint Degrees in the Erasmus Mundus action of the Erasmus+ programme*, Publications Office of the EU, Luxembourg. Available at: <https://op.europa.eu/en/publication-detail/-/publication/6e06043f-2f96-11eb-b27b-01aa75ed71a1/language-en>

¹⁵ <https://marie-sklodowska-curie-actions.ec.europa.eu/actions/doctoral-networks>

- **The European Universities initiative** is one of the flagships of the European strategy for universities.¹⁶ It refers to ambitious transnational alliances of higher education institutions developing long-term structural and strategic cooperation. The European Commission has announced plans to **expand to 60 European Universities** uniting more than 500 HEIs by mid-2024, with an Erasmus+ budget totalling €1.1 billion for 2021-2027.¹⁷ The European Universities are set to pilot innovation in education (teaching and learning methods such as student-centred or challenge-based learning) and research, develop joint curricula and transform the European higher education through strategic transnational cooperation.
- Some European Universities alliances are currently piloting a **legal statute for alliances of higher education institutions** to allow them to pool resources, capacities and strengths.¹⁸
- With joint programmes and transnational partnerships being promoted in several policy documents of the European Commission¹⁹ over the last few years, there are efforts to develop a **joint European degree** to recognise the value of transnational experiences and cut the red tape for delivering joint programmes.²⁰ The joint European degree is currently being piloted by several European Universities alliances, the pilots are set to complete in spring 2024.

Transnational collaboration in European higher education does not remain without challenges.²¹ However, the strategic focus on internationalisation, increasing digitalisation and a number of recent or upcoming tools and initiatives open new venues to explore when thinking of the future of a European master's degree, both in terms of its design and deliver, and funding opportunities.

3.1.2. Current trends and developments in official statistics (education)

Some of the key trends and developments in official statistics over the past decade include technological change and growing availability and use of administrative and big data sources in the production of official statistics, providing both opportunities and challenges to NSIs and other official statistics producers. In addition, globalisation increases the complexity and scope of data and indicators typically used in official statistics production.²² On the demand side, growing need for evidence-based decision- and policymaking, new public management and “quantitative turn in governance” create a powerful driving force in addition to a growing demand for comprehensive, objective and detailed information in societies with increasing data literacy.²³

The main implication of **increasing use of administrative and new data sources for official statistics** is the shift from data sources and production to interactive and responsive data acquisition and management

¹⁶ European Commission (2022): Commission Communication on a European Strategy for Universities.

<https://education.ec.europa.eu/document/commission-communication-on-a-european-strategy-for-universities>

¹⁷ https://ec.europa.eu/commission/presscorner/detail/en/IP_22_365

¹⁸ https://ec.europa.eu/commission/presscorner/detail/en/IP_22_365

¹⁹ Council of the EU (2022): Council Recommendation on building bridges for effective European higher education cooperation. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022H0413%2801%29>, as well as European Strategy for Universities (2022)

²⁰ European Commission, Burneikaitė, G., Pocius, D., Potapova, E. et al. (2023): *The road towards a possible joint European degree – Identifying opportunities and investigating the impact and feasibility of different approaches : final report*, Publications Office of the European Union, Available at:

<https://op.europa.eu/en/publication-detail/-/publication/2844365b-649f-11ed-92ed-01aa75ed71a1/language-en/format-PDF/source-287006302>

²¹ For an outline, consult European University Association (2020): The future of the European Universities Initiative: The sector's perspective.

<https://www.eua.eu/resources/publications/926:the-future-of-the-european-universities-initiative>; European University Association (2020): International strategic institutional partnerships and the European Universities Initiative, Results of the EUA Survey.:

<https://eua.eu/downloads/publications/eua%20international%20partnerships%20survey.pdf>

²² https://ec.europa.eu/commission/presscorner/detail/en/IP_22_365

²³ MacFeely S. (2014): The continuing evolution of official statistics: Some challenges and opportunities. *Journal of Official Statistics*. 2016; 32: 789-810.

²⁴ Rademacher, W. (2020): *Official Statistics 4.0: Verified Facts for People in the 21st Century*, Springer, p. 122; MacFeely, S. (2014)

systems, and from design-based to model-based statistics also referred to as Trusted Smart Statistics.²⁴ The need to control procedures, quality assurance, ensuring interoperability of information and neutrality or impartiality emerge next to traditional data production methods (e.g. survey design or sampling strategies).²⁵ Data from administrative and new data sources is made available to statisticians rather than designed by them, and so it does not follow the same sampling or collection methods typically used to ensure reliability and representativeness of official statistics. Furthermore, the vast amount of information requires specific methodological skills and technological capacities to process and store. In addition, collection and use of new data sources blurring the line between data producers and consumers brings privacy and data protection issues and regulations as well as ethical and political concerns to the foreground. While it can be cheaper, faster and more detailed than official statistics known to date, legal changes and adjustments to methodological skillset of statisticians are necessary to benefit from this opportunity without risking the credibility and reputation of official statistics.²⁶ Table 3 summarises the main opportunities, challenges and risks of Big Data for official statistics.

TABLE 3. OPPORTUNITIES, CHALLENGES, AND RISKS OF BIG DATA FOR OFFICIAL STATISTICS

OPPORTUNITIES	CHALLENGES	RISKS
<ul style="list-style-type: none"> - Complement, replace, improve, and add to existing datasets; - Produce more timely outputs; - Compensate for survey fatigue of citizens and companies; - Complement and extend micro-level and small area analysis; - Improve quality and ground truthing; - Refine existing statistical composition; - Easier cross-jurisdictional comparisons; - Better linking to other datasets; - New data analytics producing new and better insights; - Reduced costs; - Optimisation of working practices and efficiency gains in production; - Redeployment of staff to higher value tasks; - Greater collaboration with computational social science, data science, and data industries; - Greater visibility and use of official statistics 	<ul style="list-style-type: none"> - Forming strategic alliances with big data producers; - Gaining access to data, procurement and licensing; - Gaining access to associated methodology and metadata; - Establishing provenance and lineage of datasets; - Legal and regulatory issues, including intellectual property; - Establishing suitability for purpose; - Establishing dataset quality with respect to veracity (accuracy, fidelity), uncertainty, error, bias, reliability and calibration; - Technological feasibility; - Methodological feasibility; - Experimenting and trialing big analytic; - Institutional change management; - Ensuring inter-jurisdictional collaboration and common standards 	<ul style="list-style-type: none"> - Mission drift; - Damage to reputation and losing public trust; - Privacy breaches and data security; - Inconsistent access and continuity; - Resistance of big data providers and the population; - Fragmentation of approaches across jurisdictions; - Resource constraints and cut-backs - Privatisation and competition

Source: Kitchin R.(2015): Big data and official statistics: Opportunities, challenges, and Risks. Statistical Journal of the International Association of Official Statistics; 31: 471-481.

²⁴ Ricciato, F., Wirthmann, A., Giannakouris, K., Reis, F., Skaliotis, M. (2019): Trusted smart statistics: Motivations and principles; Statistical Journal of the IAOS, pp. 589-603, also Ricciato, F., Wirthmann, A., Hahn, M. (2020): Trusted Smart Statistics: How new data will change official statistics; Data & Policy, 2, E7.

²⁵ Rademarcher (2020), p. 126

²⁶ Daas, P., Puts, M., Buelens, B., von den Hurk, P. (2015): Big Data as a Source for Official Statistics. Journal of Official Statistics, Vol. 31, No. 2, 2015, pp. 249-262.

Artificial intelligence (AI) provides a useful tool to process and analyse data from new sources. Methods and techniques such as machine learning, data mining and natural language processing allow statisticians to use the potential of AI for extracting valuable insights and spotting patterns in large amounts of data. However, the same privacy, transparency and reliability concerns apply as to the use of new data sources in official statistics.²⁷

Globalisation is not a new but nevertheless another current trend changing the landscape of official statistics. Increasing global trade and economic activity as well as migration and regional integration (e.g. the deepening integration of the European Union) make national states increasingly interdependent and pose a challenge to national statisticians to account for cross-border flows of goods, capital and labour, to mention just a few key economic indicators.²⁸ National statistics are barely ever national anymore. This trend calls for increasing interoperability of national systems and indicators through emergence of global and regional statistical governance through bodies and partnerships such as the European Statistical System (ESS),²⁹ United Nations Economic Commission (UNECE),³⁰ or Paris21, among others.³¹

Fostering data, statistical literacy and communication are crucial for official statistics to fulfill one of its core missions, namely, to accurately inform citizens in democratic societies about the situation of society and give them the means to assess the success of the overall public policies.³² Quality official statistics can contribute to strengthening democratic society and ensuring accountable governance. Official statistics do not only need to be produced but also promoted and made accessible in a comprehensive manner aligning with principles of open data and contributing to data co-design and co-production and to bridging the gap between the public, the data, and the statisticians.³³ To name just one example, the importance of statistical literacy, transparent communication and reliability of data has become very evident during the recent COVID-19 pandemic through public reactions to contact and travel restrictions the governments were imposing based on various interpretations of COVID-19 case count.

All of the abovementioned trends and developments have **implications for official statistics education** and highlight the need to diversify the curricula. Most notably, the changing data and methodological landscape lets new skills needed in official statistics emerge, namely computer science skills including but not limited to mining and analysing massive data sets, high-performance computing and Data Science³⁴ (the Expert Analysis (Task 2) will show that these subjects are already finding their way into the curricula of EMOS-labelled programmes). Furthermore, data protection and ethics, legal aspects concerning the use of new data sources and AI, and methods to ensure quality, reliability and representativeness of new data sources become crucial knowledge. Finally, growing statistical literacy and the importance of informing society as well as evidence-based policymaking highlight the need for the development of communication and data presentation skills. However, as new data sources are unlikely to entirely replace the current practices of official statistics data production, the classical statistical methods such as survey design or sampling should not be left out. This

²⁷ Luan, H., Geczy, P., Lai, H., Yang, S., Ogata, H., Baltes, J., Guerra, R., Li, P., Tsai, C. (2020): Challenges and Future Direction of Big Data and Artificial Intelligence in Education. *Frontiers in Psychology*, 11:580820.

²⁸ Radermacher (2020), pp. 128-133; MacFeely, S. (2014).

²⁹ <https://ec.europa.eu/eurostat/web/european-statistical-system>

³⁰ <https://unece.org/>

³¹ <https://www.paris21.org/>

³² Wirthmann, A., Giannakouris, K., Reis, F., Skaliotis, M., Ricciato, F. (2018): Trusted Smart Statistics: A reflection on the future of (Official) Statistics; European Conference on Quality in Official Statistics, p. 4

³³ Radermacher (2020), pp. 133-135

³⁴ Daas et al (2015), p. 258

also hints for a need of upskilling opportunities and training on the job either equipping statisticians with data science skills, or data analysts with skills in official statistics.

3.2. Analysis of existing collaboration cases in education programmes in statistics

We selected five case studies as part of the analysis of collaboration cases in education programmes in statistics and other relevant and related disciplines and in statistics-related professional training programmes. We aimed to identify a mix of academic degrees and professional training programmes in either official statistics specifically or related disciplines. Table 4 on the next page outlines our case study selection for Task 1b.

Thematic coverage

In task 1b we sought to include programmes that were as thematically related to EMOS as possible. The programmes more closely related to official statistics are: MSc in Population, territories and official statistics; MSPPM Data Analytics; and MDataGov. The BDMA programme in the field of Big Data and Data Analysis, has intense collaboration between HEIs and with industry, but it is not specifically focused on official statistics, and has no courses dedicated to this topic in the curriculum. The Joint Programme in Survey Methodology is not fully dedicated to official statistics, but is jointly delivered by Westat, a private research firm that works as a contractor of the federal agencies for official statistics assignments.

TABLE 4. SELECTED CASE STUDIES

	BDMA: MA in Big Data Management and Analytics	Joint Programme in Survey Methodology	MSc in Population, territories, and official statistics	MSPPM: Data Analytics	MDataGov: MSc in Data Analytics for Government
Themes	Statistics and deep learning; Business intelligence; Big data; Large-scale analytics; Process analytics; Decision support & data analytics.	Social Sciences, Survey Statistics, Data Science	Populations, territories and living conditions; Producing official statistics.	Machine learning, Computer programming and analytics, Policy methods and ethical frameworks	Data Science and Big Data Models, Advanced Machine Learning, Distributed Systems Data Visualisation, Time Series, Survey Fundamentals, Statistical Programming, Statistics in Government
Level	Masters	Masters	Masters, with a PhD on the same topic	Masters, with the same department offering a joint Ph.D. in Statistics & Public Policy in collaboration with the Dietrich college of humanities and social sciences.	Masters, with the possibility of postgraduate diploma or certificate, and standalone courses for professional development
Location	Europe	US	Brazil	US	UK
Language	English	English	Portuguese	English	English
Collaboration	Erasmus Mundus Joint Masters Degree.	Delivered by the University of Maryland faculty, with associated faculty from the University of Michigan, and Westat (a private research firm that is also a contractor of the federal	The MSc in Population, territories and official statistics is delivered by the Brazilian NSI, that created a university to train graduates that would be equipped to work in the national	The programme has one optional track where students spend one year in Washington DC working full time in partner universities.	Joint initiative between the Office for National Statistics (ONS) Data Science Campus and four universities across the UK, available to all public sector employees. University partners deliver

	BDMA: MA in Big Data Management and Analytics	Joint Programme in Survey Methodology	MSc in Population, territories, and official statistics	MSPPM: Data Analytics	MDataGov: MSc in Data Analytics for Government
		agencies for official statistics assignments).	statistic system and related line ministries.		their programmes separately.
Delivery	On-site	On-site	On-site	On-site	On-site / Hybrid / Online
Dedication	Full-time	Full-time /part-time	Full-time	Full time, with an option for fast-track (1 semester less)	Full-time /part-time
Degree	The programme delivers three degrees from ULB, UPC, and the university of specialisation, as well as a joint BDMA Certificate.	Masters	Masters	Masters	The programme offers different certificates depending on which track the student follows: Master's degree, postgraduate diploma or certificate, and standalone courses for professional development.
Curricula	Compulsory mobility to at least three different countries. Three different specialisation tracks for students to choose from. All students participate in the European Business Intelligence and Big Data Summer School (eBISS).	The programme offers 3 tracks. Students need to complete a set of general core courses, track-specific core courses, and elective courses. The program also requires students to complete a 3-month summer internship or work in a job related to survey methodology to satisfy the internship requirement.	The second year of the programme should be fully dedicated to the master's thesis. The programme has cooperation agreements with the Health Ministry and with the Tourism Ministry where students can act as consultants and write their theses on related topics.	Students take courses on Machine learning, Computer programming and analytics, and on policy methods and ethical frameworks. Additionally, all students complete a mandatory summer internship.	Each of the four partner universities creates their own separate curriculum.

Source: Prepared by PPMI

Level of studies

All the programmes analysed are at the master's level, but many of them are connected to programmes at other levels of study. The joint programme in survey methodology is connected to a PhD in Survey and Data Science, as well as an undergraduate Minor in Survey Methodology, and several professional development short courses. The school of the MSc in Population, territories, and official statistics, for example, offers a Bachelor's degree in Statistics, with courses on official statistics connected to the NSI. The MDataGov programme offers different certificates, depending on which track the student follows: Master's degree, postgraduate diploma or certificate, and standalone courses for professional development.

While some programmes had related bachelor's degrees, none of them were specialised in official statistics. This suggests that the topic of official statistics is too narrow or specialised for a full degree at the Bachelor level. However, the existence of two PhD degrees related to official statistics can be interpreted as a positive sign for EMOS to expand to the PhD level.

Collaboration arrangements

The types of collaboration in the programmes analysed are very varied. Still, most of them involve some non-HEI partner, particularly NSIs and other public organisations related to statistics. MDataGov is a joint initiative between the Office for National Statistics (ONS) Data Science Campus and four universities across the UK, available to all public sector employees. University partners deliver their programmes separately. The

MSc in Population, territories and official statistics is delivered by the Brazilian NSI, that created a university to train graduates that would be equipped to work in the national statistic system and related line ministries. In the Joint Programme in Survey Methodology, students are fully enrolled in either University of Maryland or University of Michigan. Teaching staff participates in both programmes, and some courses are delivered by a private research firm.

Despite collaborating with HEI and non-HEI partners, four out of the five programmes analysed award graduates with a single degree/certificate. BDMA is the exception, being an Erasmus Mundus programme delivered by five partner HEIs, leading to a double degree.

Geographical coverage

Most of the programmes selected are not in EU countries, with two located in the US, one in Brazil, and one in the UK. BDMA is the only programme hosted in EU countries and is also a part of the Erasmus Mundus funding scheme offered by the EU.

In four out of the five programmes selected, the focus is on the national level, with little international collaboration. Only in the case of BDMA, a programme not focused on official statistics, there is inherent mobility and collaboration between universities from different countries. This might suggest a challenge in approaching the topic of official statistics at an international level, given the close connection of the topic with national governments, and specific data sources that are often not harmonised. Still, official statistics could be internationalised when considering its contributions to create international standards and definitions and considering that European statistics have common methodological bases.

Language

With one exception, all programmes analysed had English as the main language of instruction. Since three out of the five programmes selected were in English-speaking countries, that is to be expected. BDMA is not located in any English-speaking country, but it has strong mobility aspects, with students mandatorily moving to at least three different countries during their studies. To accommodate for this embedded mobility, all courses within BDMA are taught in English. The only programme offered fully in another language is the MSc in Population, territories, and official statistics, which is taught in Portuguese. The exclusive use of the national language is consistent with the programme's focus on the development of the Brazilian statistical agency.

Dedication and workload

Two programmes offered full-time and part-time options to students (Joint programme in survey methodology and MDataGov). This flexibility is particularly important when programmes aim to attract working students who want to upskill or re-skill. However, scholarship and funding arrangements are often not accommodating to part-time students which was the main reason why the other programmes were only offered full time. The MSc in Population, territories, and official statistics is offered only as a full-time programme due to the scholarship rules of Brazilian funding agencies. Similarly, BDMA is offered as an Erasmus Mundus programme, and therefore must comply with Erasmus+ scholarship and funding rules that do not accommodate for part-time students.

Given the wide geographical distribution of the programmes analysed, it is hard to compare their workloads. Credit systems are not unified, and conversion is not always accurate. However, considering that the master's

degrees included would take 2 years on a full-time basis, it is possible to say that their workload is somehow comparable. Postgraduate certificates and professional development courses within MDataGov have a much smaller workload that varies from 5 to 60 ECTS.

Mode of delivery

While most of the analysed programmes are delivered only in-person, MDataGov offers hybrid and online options. The programme is implemented by four different universities. As in EMOS, each partner implements the curriculum independently, if they meet the requirements of the Office for National Statistics Data Science Campus. The University of Glasgow delivers the programme completely online and Oxford Brookes University delivers it online and hybrid (mix of face-to face and online).

Curricular components and pedagogical aspects

Most programmes have some aspect of flexibility in the curriculum, with students being able to choose between different specialisations (BDMA and Joint Programme in Survey Methodology) or select certain elective or semi-elective courses to shape their study journey (MSc in Population, territories, and official statistics).

BDMA is the only programme with a mandatory mobility component, and the only programme with a mandatory Summer School. All BDMA students attend the European Business Intelligence and Big Data Summer School (eBISS) where they attend industrial presentations and present a poster on their own research.

Most programmes also include an internship or research assignment (thesis). In the Joint programme in Survey Methodology, students must complete a 3-month summer internship or work in a job related to survey methodology to satisfy the internship requirement. At the MSc in Population, territories, and official statistics, students dedicate the full second year of the programme to their master's thesis, which can be completed in collaboration with several Brazilian ministries that have agreements with ENCE. In particular, the programme has cooperation agreements with the Health Ministry and with the Tourism Ministry where students can act as consultants and write their theses on related topics.

Student support and communication

One important aspect of programmes' success is their communication with students (prospective current and alumni), and the support offered to current students. To increase communication, BDMA launched a student ambassadors programme, and published a detailed student guide with information on all study destinations and partner HEIs.

To ensure that students are supported during their studies, the MSc in Population, territories, and official statistics developed partnership with national research organisations, ministries and NSI, and is now able to offer full scholarship for living costs for at least 85% of its students. Still, for the past 4-5 years, the programme has been facing difficulties in attracting students. The programme attributes this to the low value paid in scholarships and to a decrease in employment opportunities in the public sector (including the NSI) due to political changes in the past five years in Brazil. One initiative to increase interest in and the number of applicants to the MA programme was the inclusion of a module on demography in ENCE's Bachelor programme, where professors from the MA come to present and discuss issues related to official statistics.

3.3. Analysis of existing relevant collaboration initiatives in other disciplines

We expanded task 1c by two additional case studies with the aim to broaden the scope of the benchmarking exercise and bring ideas from collaborative programmes in various disciplines. Table 5 outlines the seven selected case studies and their main aspects.

TABLE 5. SELECTED CASE STUDIES

	GLOCAL	YUFE STUDENT JOURNEY	EIT DIGITAL MASTER SCHOOL	1: 1 MSC PROGRAMME IN SUSTAINABLE ENERGY TECHNOLOGY	SELECT MASTERS (EIT INNOENERGY)	EUROPEAN MASTER IN TRANSLATION	EJM STRATEGIC BORDER MANAGEMENT
Themes	Processes and experiences of globalisation.	European identity and responsibilities in a global world, Citizen's well-being, Digital societies, Sustainability and other	Autonomous Systems; Cyber Security; Embedded Systems; Cloud and Network Infrastructures; Data Science; Fintech; Human-Computer Interaction and Design.	Sustainable Energy, Energy Conversion and Storage.	Sustainable energy conversion, renewable energy, and ways of ensuring minimal human impact on the environment.	Competences and skills in translation studies.	Border management, coast guard activities, leadership, and organisational development.
Level	Masters	Not specified	Masters	Masters	Masters	Masters	Masters
Location	Europe UK Japan Colombia	Europe UK	Europe	Europe	Europe	23 countries, mainly Europe.	Europe
Language	English	English and languages of all partner universities (Spanish, Croatian, German, Dutch, Finnish, French, Polish and Greek)	English	English Danish Dutch	English	Diverse languages	English
Collaboration	Erasmus Mundus Joint Masters Degree.	Programme of YUFE European University Alliance.	EIT Digital + 15 HEIs	Joint programme of the EuroTeq universities alliance.	SELECT is one of six masters programmes run by EIT Innoenergy Master School.	Directorate-General for Translation (DGT) of the European Commission, EMT Board and Board of the Language Industry.	European Agency for the Management of Operational Cooperation at the External Borders (FRONTEX) and six HEIs.
Delivery	On-site	On-site/Online/Hybrid	On-site	On-site	Hybrid	Not specified	Blended
Dedication	Full-time	Full-time	Full-time	Full-time	Full-time	Not specified	Full-time
Degree	Jointly Conferred International Master, or International Master from the University of Glasgow + separate master's	Diploma Supplement	Students receive a degree from both universities in their individual study plan (double degree), and an EIT Label Certificate.	Students obtain an MSc degree from the university where they are enrolled as full degree students and receive a certificate from both universities.	Students receive a degree from each of their chosen universities (double degree), a certificate from ESADE Business School and the EIT Label.	Master's degree according to each HEI of the network.	European joint master's degree awarded by six HEIs.

	GLOCAL	YUFE STUDENT JOURNEY	EIT DIGITAL MASTER SCHOOL	1:1 MSC PROGRAMME IN SUSTAINABLE ENERGY TECHNOLOGY	SELECT MASTERS (EIT INNOENERGY)	EUROPEAN MASTER IN TRANSLATION	EJM STRATEGIC BORDER MANAGEMENT
	degrees from other universities.						
Curricula	Students choose between 7 Study Tracks. All students spend their first semester in Glasgow, the second semester in either Barcelona or Uppsala, and then choose between Rotterdam, Göttingen, Los Andes or Kyoto for their 3rd Consortium Partner University. A week-long Summer School takes place at the end of students' first year.	Rewards courses taken at other YUFE partner universities. Flexible learning pathways that allow students shape their own curriculum. Opportunities for language learning, civic engagement, and work experience.	All students complete a Minor in innovation and entrepreneurship and are awarded an EIT label for that. All seven EIT Digital Master School programmes follow the same scheme: Students spend one year at an 'entry' university and one year at an 'exit' university.	Students spend one year at DTU and one year at TU/e.	A special module on 'Entrepreneurship and Innovation' is taught by ESADE Business School. During the second year, students choose one of seven specialisation tracks. Students study in at least two countries. Mandatory hybrid component, with all students joining some online courses from partner universities.	Defined by the EMT Competence Framework in five main areas of competence: Language and culture, Translation, Technology, Personal and interpersonal, and Service provision.	Delivered over three stages: Stages 1 and 2 contain 10 taught modules, with 5 modules onsite and 5 online. Stage 3 is a dissertation.

Source: Prepared by PPMI

Thematic coverage

The goal of task 1c was to expand the thematic scope and try to find interesting cases of collaboration in other disciplines, as they may also be useful benchmarks for the future development of EMOS. Two of the programmes analysed focus on the field of sustainability and green transitions (SELECT and 1:1 MSC programme in Sustainable Energy Technology). The GLOCAL programme is focused on economics and humanities, having globalisation as the main topic. EJMSBM is focused on border management. YUFE's student journey covers a wide variety of topics, ranging from European identity to digital societies. The EIT Digital Master school is the most thematically related to EMOS. It includes master's degrees in seven different topics of digital innovation, and one of them is a master's in data science. Finally, the European Master in Translation (EMT) operates as a quality label for the field of translation studies and has been granted to 70 master programmes in Europe and beyond.

Given the ample thematic scope of this task, we often gave preference to programmes that had other aspects in common with EMOS, such as the level of study or geographical distribution, to facilitate the analysis of the transferability to EMOS.

Level of studies

Six out of the seven programmes selected are at the Masters level. The only exception is YUFE's student journey, which is open for students from all levels. As it is an add-on to students' regular programmes, it can be done by students at the Bachelor, Master or PhD level.

Collaboration arrangements

Most collaboration arrangements involve HEIs offering joint programmes. There are simpler collaboration arrangements between two universities, and very complex collaborations where many partners offer flexible study paths, and each student goes on their own individualised journey (GLOCAL, SELECT, EIT Digital and YUFE). As a complex model of collaboration, EJMSBM offers a Joint degree that includes six partner universities with equitable responsibilities under the coordination of FRONTEx (European Agency for the Management of Operational Cooperation at the External Borders). In smaller-scale collaborations such as the 1:1 MSc programme in Sustainable Energy Technology, both partners have equal roles and responsibilities. In larger collaboration arrangements, one partner is normally assigned a coordination role. However, their collaboration mechanisms remain horizontal. This can lead to challenges in decision-making, as consulting multiple partners and reaching a consensus takes time. In the case of EMT, the Directorate-General for Translation (DGT) of the European Commission coordinates the label and network partners participating in the EMT Board and the Board of the Language Industry.

Two of the programmes analysed (YUFE and 1:1 MSc programme in Sustainable Energy Technology) are part of European University Alliances. These alliances were created following the European Council conclusions of 14 December 2017³⁵ which announced their specific goal to create joint study programmes: *“bottom-up networks of higher education institutions across the EU which will enable students to obtain a degree by combining studies in several EU countries”*.

One of the most interesting collaboration arrangements, which can bring transferable aspects to EMOS, is of the programmes relating to the EIT label. The EIT Label³⁶ is a certificate of quality awarded only to excellent educational programmes that meet the following criteria:

- The EIT Overarching Learning Outcomes (EIT OLOs);
- Robust entrepreneurship education;
- Highly integrated, innovative ‘learning-by-doing’ curricula;
- Mobility, the European dimension and openness to the world;
- Outreach strategy and access policy.

These programmes are organised by one of the EIT’s communities, who select HEIs to implement master programmes and award the EIT label. The EIT communities make sure each programme fulfils the learning outcomes necessary for the label. We have selected two of these programmes but approached them from different perspective. For EIT Digital, we were looking at the perspective of the organising institution, not of the HEIs that execute the master’s and fulfil the label requirement. It is the equivalent of analysing Eurostat’s role and perspective of EMOS. For the SELECT master, organised by EIT Innoenergy, we focused on a single programme’s perspective, and how they see the relation with EIT Innoenergy.

Geographical coverage

While the programmes analysed for Task 1b were in several different countries and continents, all of the programmes analysed here are based in Europe, with some of them also including non-EU partners. GLOCAL has seven HEIs as full partners, including one based in the UK, one in Japan and one in Colombia. YUFE has

³⁵ Available at: <https://www.consilium.europa.eu/media/32204/14-final-conclusions-rev1-en.pdf>

³⁶ <https://eit.europa.eu/our-activities/education/eit-label>

10 partner universities, with one of them based in the UK. EMT has 68 HEIs, including one in Lebanon and two in Switzerland,

Language

All the programmes analysed have a strong presence of courses taught in English. In five of them, English is the only language of instruction (GLOCAL, EIT Digital, SELECT, and EJMSBM). In the two other programmes (YUFE and the 1:1 MSc programme in Sustainable Energy Technology), English classes are mixed with elective courses offered in local languages (German/Danish/Dutch). By contrast, EMT programmes have been developed in multiple languages.

Mode of delivery

The most unique programme regarding its mode of delivery is SELECT, which is the only with a mandatory hybrid component, while it also has mandatory mobility components (on-site mobility). YUFE also brings interesting components, offering students the opportunity to conduct their studies fully online. The other programmes, SELECT, EIT Digital, 1:1 MSc programme in Sustainable Energy Technology, and EMT are offered as on-site study programmes., while EJMSBM also includes blended learning components.

Curricular components and pedagogical aspects

All the programmes analysed had very strong international profiles, with mandatory student mobility. This was a big part of each of those programme's identity and attractiveness. Still mandatory mobility does not come without its challenges. Programmes reported that limited time and funding would act as barriers for students to engage in mobilities. Additionally, differences between grading systems at partner institutions caused some administrative burden for participating HEIs.

Many of them also had mandatory on-site events where they gather students going for different specialisations or staying at different host universities (SELECT, EIT Digital, GLOCAL). These range from summer/fall/spring schools to kick-off events or joint graduation ceremonies. They are particularly important for programmes where students spend a large amount of time in smaller groups for their specialisations, or when several programmes run in parallel, and their students do not meet regularly.

One important challenge for the programmes is to keep the relevance of the curriculum in a fast-changing environment. This was particularly important for EIT Digital, as their programmes are strongly affected by constantly evolving technologies.

From a different perspective, the EMT frames the programmes in a Competence Framework with five dimensions: disciplinary knowledge, technical and technological skills, soft skills, and employability skills. Inside each dimension, the EMT Competence Framework introduces specific standards that labelled programmes must meet.

Student support and communication

Most of the programmes analysed involve partnership with many HEIs, and mandatory mobility components. It is therefore paramount to ensure communication and support to students throughout their learning journey. The programmes analysed have very detailed websites, that are visually appealing and display the information in a simple yet attractive manner. GLOCAL, EIT Digital and the SELECT programme do a

particularly good job in their communications, with several video testimonials, active social media profiles, and several webinars to potential students. GLOCAL also adopted an innovative approach by launching a student-led blog, which is accessible via the programme website, but completely run by students and alumni.

From the perspective of the HEIs, the EMT label offers support activities for their network members such as the Translating Europe Forum, Translating Europe Workshops, Visiting Translator Scheme, shared research projects, access to e-translation (machine translation system used by the European Commission), and internships for students.

Degree type and recognition of studies

YUFE is the only programme on this list that does not award a degree. The YUFE Student Journey includes 12 ECTS that students can add to their regular study programmes and that are recognised in the Diploma Supplement. From a broader perspective, the EMT label acts as an external quality recognition for master's degrees in translation across diverse countries that fulfil a set of quality standards defined by the EMT Competence Framework.

Except for YUFE and EMT, all other programmes analysed are degree-awarding joint programmes. However, joint programmes do not always lead to joint degrees. Due to different accreditation procedures, some joint programmes opt to issue two (or more) full degrees, one from each partner university, instead of a single joint degree. This approach is not always unified in the programmes. At GLOCAL, depending on the study track students choose, they might receive a joint or double degree since different partners have different procedures. In the case of the 1:1 MSc programme in Sustainable Energy Technology students receive a single degree, and their mobility is recognised only with a certificate issued by both partner universities. In two cases, besides receiving a joint or multiple degree, students also receive diploma supplements or certificates that recognise specific learning outcomes. For EIT programmes (SELECT and EIT Digital), students are awarded double degrees plus an EIT Label Certificate, which recognised learning outcomes regarding innovation and entrepreneurship.

4. EMOS state of play

4.1. Implementation of EMOS as a quality label

EMOS was conceived as a quality label according to the 2011 Ex-Ante Evaluation Document: "The main goal of this project is to establish a quality label for university 'European Official Statistics' programmes that meet agreed standards in education."³⁷ To get the label, EMOS programmes must implement the EMOS learning outcomes in their curricula (corresponding to at least 50 ECTS of the programme), cooperate with their respective NSI, and have undergone an assessment process carried out by the EMOS Board and EMOS Secretariat at Eurostat. Hence, EMOS is a quality label for master programmes in statistics and/or data science offering specialisation in official statistics.

However, EMOS has diverse meanings for its stakeholders, it is seen as a “network of programmes”, a “programme path”, or a “certification”. HEIs and NSIs often refer to EMOS as a “network of master programmes providing post-graduate education in the area of official statistics at the European level”³⁸. Other organisations define EMOS as an educational master’s programme: “EMOS is an additional programme path for master's studies, mainly in economics, covering widely understood statistical issues”³⁹. Additionally, other HEIs refer to EMOS as a certification that proves statistical knowledge in the field of public official statistics⁴⁰.

In higher education quality assurance, a “label” is a quality seal awarded after an external evaluation that evidences that an institution or programme meets certain quality standards or criteria⁴¹. Labels respond to the need for HEIs to differentiate among themselves by acquiring additional accreditation labels or labels from renowned institutions, organisations, agencies, associations, etc.⁴² Thus, higher education uses quality labels as a reputational mechanism for differentiation. External quality assurance has a positive impact on the continuous improvement of programmes and HEIs because it introduces international and/or professional standards and recommendations for improvement. However, there is a lack of current research distinguishing the characteristics of diverse quality schemes or strategies to enhance quality in higher education such as labels, quality certificates, and quality seals, among others. Kotarska compared several quality assurance strategies from the perspective of language education and concluded that commercial and educational benefits compete in the diverse current quality assurance strategies, which casts several questions on the effects of these accreditation strategies on the actual quality of education.⁴³

³⁷ Ex-Ante Evaluation Document for the project, May 2011.

³⁸ Hellenic Statistical Authority. (N.D.). EMOS. <https://www.statistics.gr/en/emos>, and ENSAI. (2023). EMOS Label renewed for ENSAI. <https://ensai.fr/en/label-europeen-pour-le-master-evaluation-et-decision-publiques/>

³⁹ Statistics Poland Information Portal. (N.D.). EMOS - European Master in Official Statistics. <https://emos.stat.gov.pl/en/>

⁴⁰ University of Bamberg. (2023). EMOS-Certification in the context of the Master's degree Survey Statistics at the Bamberg University. <https://www.uni-bamberg.de/en/miss/miss-translate-to-1-english-european-master-in-official-statistics-emos/>

⁴¹ Sanyal, B., and Martin, M. (2007). Quality assurance and the role of accreditation: An overview. In Report: Higher Education in the World 2007: Accreditation for Quality Assurance: What is at Stake? <http://hdl.handle.net/2099/8095>

⁴² Directorate General for Internal Policies, Policy Department B: Structural And Cohesion Policies. (2015). University Quality Indicators: A Critical Assessment. [https://www.europarl.europa.eu/RegData/etudes/STUD/2015/563377/IPOL_STU\(2015\)563377_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2015/563377/IPOL_STU(2015)563377_EN.pdf)

⁴³ Kotarska, L. (2019). Accreditation: A Commodity or a Quest for Quality?. In: Staub, D. (eds) Quality Assurance and Accreditation in Foreign Language Education. Springer, Cham. https://doi.org/10.1007/978-3-030-21421-0_5

The European approach to external quality assurance is specified in the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG)⁴⁴. According to the ESG, external quality assurance should be carried out by external bodies through evaluations, reviews, audits, assessments, accreditations or similar activities at the programme or institutional levels. The process should be based on predefined criteria and involve stakeholders in its design and continuous improvement. The process typically consists of a self-assessment or equivalent, an external assessment normally including a site visit, a report of the external assessment, and a follow-up.

EMOS currently complies with ESG guidelines through its assessment processes. First, the EMOS Board involves the stakeholders: HEIs, NSIs, the National Central Bank, the European Statistical Advisory Committee, and Eurostat. Second, EMOS has developed a set of learning outcomes that aspiring programmes must meet to be awarded the label⁴⁵. Third, aspiring programmes conduct a self-assessment of the implementation of EMOS through the EMOS Application Form, in which they provide evidence that they meet EMOS learning outcomes. Fourth, the EMOS Board and the EMOS secretariat in Eurostat evaluate the admissibility criteria. Fifth, aspiring programmes receive feedback in the format of a three-point scale. Finally, programmes are monitored through continuous reporting of their activities.

Like EMOS, the European Master in Translation (EMT) and the European Institute of Innovation and Technology (EIT) Label are external quality assurance seals for higher education programmes. EMT “is a quality label for MA university programmes in translation. The Directorate-General for Translation (DGT) awards it to higher education programmes that meet agreed professional standards and market demands”⁴⁶. EIT Label “is a quality seal awarded to higher education degree programmes, irrespective of their level (master’s / doctoral). It is a certificate of quality education in entrepreneurship and innovation and is provided by the EIT following an external and independent review”⁴⁷. The study team also selected an independent quality assurance agency (European Council for Theological Education, ECTE) and a quality certificate (Certificate for Quality in Internationalisation, CeQuint) to contrast the characteristics of these quality certification strategies. Table 6 presents a comparison of the five quality strategies for higher education.

⁴⁴ ENQA et al. (2015). Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). EURASHE. https://www.enqa.eu/wp-content/uploads/2015/11/ESG_2015.pdf

⁴⁵ EMOS. (2019). Learning Outcomes of the EMOS programmes. https://wayback.archive-it.org/12090/20221109175011/https://ec.europa.eu/eurostat/cros/content/learning-outcomes-emos-programmes_en

⁴⁶ EMT. (N.D.). European Master's in Translation (EMT) explained. https://commission.europa.eu/resources-partners/european-masters-translation-emt/european-masters-translation-emt-explained_en

⁴⁷ EIT. (2021). “Quality for learning” EIT Quality Assurance and Learning Enhancement Model. https://eit.europa.eu/sites/default/files/eit_label_handbook_degree_programmes_-_final.pdf

TABLE 6. COMPARISON EMT, EMOS AND EIT LABEL

	EUROPEAN COUNCIL FOR THEOLOGICAL EDUCATION (ECTE)	EUROPEAN MASTER'S IN TRANSLATION (EMT)	EUROPEAN MASTER IN OFFICIAL STATISTICS (EMOS)	EUROPEAN INSTITUTE OF INNOVATION AND TECHNOLOGY (EIT) LABEL	CERTIFICATE FOR QUALITY IN INTERNATIONAL EDUCATION (CEQUINT)
Organisational information					
Creation	1979	2006	2014	2015	2015
Type	Accreditation agency	Quality Label	Quality Label	Quality Label	Quality Certificate
Awarding authority	ECTE Council	Directorate-General for Translation (DGT)	European Statistical System Committee (ESSC)	European Institute of Innovation and Technology (EIT)	European Consortium for Accreditation in higher education (ECA)
Objective	To assist theological education in Europe to become and to be 'fit for purpose'.	To improve the quality of translator training for enhancing the labour market integration of young language professionals.	To include official statistics in statistical curricula, meeting training and recruitment needs in the ESS and creating a recruitment pool of highly educated professional statisticians for the ESS and the European System of Central Banks (ESCB).	To increase the entrepreneurial and innovation capacity of higher education across Europe by promoting and supporting institutional change in HEIs and the integration of HEIs into innovation ecosystems.	To offer programmes and institutions the means to have their internationalisation assessed by a quality assurance agency.
Governance	ECTE is a not-for-profit association, governed by a General Assembly and by a Board, led by a management team and serviced by a staff team.	-EMT Board (10 representatives from member universities and 2 from DGT). -The LIND (Language INDustry) Expert Group.	-EMOS Board (6 members from universities, 5 from NSIs, 1 from a National Central Bank, 1 from ESAC, and 1 from Eurostat acting as Chair).	-EIT Governing Board (15 experts from higher education, research, business, and innovation). -Executive Committee (EIT Governing Board Chairperson and 3 members of EIT Governing Board). -One European Commission Observer.	Administered by the European Consortium for Accreditation in higher education (ECA)
Scope of action					
Level of action	Post-secondary level evangelical theological programmes.	Master's programmes in translation.	Master's programmes providing graduate education in official statistics at the European level.	Master and PhD programmes based on the knowledge triangle and focused on innovation, entrepreneurship, creativity, and leadership.	Higher education programmes or institutions.
programmes	30	70	33	71	67
Accreditation process					
Application calls	On a rolling basis	Every five years	Permanently open call with annual cut-off dates	Annual	On a rolling basis
Accreditation criteria	-Delivery of Christian faith tradition education. -Fulfilment of Standards and Guidelines. -Payment of fees.	-EMT Competence Framework. -Programme structure. -Sustainability. -Career support and monitoring.	-EMOS learning outcomes. -Cooperation with the respective NSI. -90 ECTS masters (50 ECTS for EMOS).	-EIT Label Framework. -EIT Overarching Learning Outcomes (EIT OLOs). -Entrepreneurship education.	-Fulfilment of CeQuint standards & criteria.

	EUROPEAN COUNCIL FOR THEOLOGICAL EDUCATION (ECTE)	EUROPEAN MASTER'S IN TRANSLATION (EMT)	EUROPEAN MASTER IN OFFICIAL STATISTICS (EMOS)	EUROPEAN INSTITUTE OF INNOVATION AND TECHNOLOGY (EIT) LABEL	CERTIFICATE FOR QUALITY IN INTERNATIONALISATION (CEQUINT)
			-Teaching capacity and qualifications.	-Integrated innovative curricula. -Mobility -Outreach strategy and access policy.	
Review process	Application, authorisation, self-evaluation report, site visit, review report, and decision.	Application, internal review, and decision.	Application, internal assessment, and decision.	Application self-assessment, external review, recommendations, and decision.	Application, self-evaluation, site visit, assessment report, and decision.
Duration of the accreditation	5 years	5 years	5 years	Unlimited period	Not specified.
Benefits					
Benefits <i>(As stated on the website)</i>	-Interchange with fellow institutions sharing common values. -To remain updated with developments, standards and trends in theological education. -Connection with a faith-based agency. -Participation in shared projects. Recruitment -Opportunities through the ECTE newsletter.	-Partnership with DGT. -Short-term trainings for students. -Resource sharing. -Access to EMT forum -Enhanced visibility and reputation.	-Experience sharing. -Deeper collaborations. -EMOS activities (paid cross-border internships, sponsored conference attendance, webinars, workshops, bi-annual Master Thesis Competition).	-Alignment with EIT Overall Learning Outcomes. -Increased visibility. -Networking in funded bi-annual meeting. -EIT Label Certificate for students. -Access to EIT Alumni Network -Participation in support for innovation and entrepreneurship.	-To facilitate comprehensive approaches to Internationalisation. -To share and learn from good practices. -Support for the assessment of internationalisation.

Source: Prepared by PPMI, based on the information available on the websites of the reviewed accreditations.

EMT, EIT and EMOS labels share their typology (quality labels), higher education domain, and European scope. The four main relevant differences are the scope of objectives, accreditation criteria, benefits generated, and governance model.

First, by comparing the objectives of EMT, EMOS, and the EIT Label, we concluded that the EMOS objective is narrower. While EMT and the EIT Label focus on improving the quality of their field of action in higher education, EMOS focuses on including official statistics in programme curricula to generate a pool of highly educated professional statisticians. The narrow objective prevents it from evidencing the main benefits generated for HEIs, students and the field of official statistics often quoted by interview and survey respondents: Networking opportunities, collaboration between NSIs and academia, and development of official statistics as a discipline.

Second, the EMOS and EIT Label accreditation criteria are more complex than that of EMT. Both labels require programmes to have at least 90 ECTS. For the EIT Label, programmes must dedicate 30 ECTS to mobility. For EMOS, 50 ECTS must be dedicated to the EMOS curriculum and activities. EMOS is more rigid and provides less flexibility for programmes to allocate EMOS learning outcomes through diverse strategies. In a sense, EMOS stands halfway between a joint master's programme and a quality label. The requirement of a specific curriculum and specific learning outcomes with ECTS allocation is usually a characteristic of a joint master's

degree. Quality labels typically act at the framework level and programmes are free to comply in diverse ways. Hence, EMOS should determine whether a joint master's programme or a quality label better fit its strategic objectives and adapt the accreditation criteria accordingly.

Third, from a different perspective, the ECTE is an independent accreditation agency based in Germany that provides theological education accreditation. This comparison suggests a high similarity between the characteristics of the labels, showing that benefits are focused on the programme and not on the students. The ECTE is an awarding authority registered with the European Quality Assurance Register (EQAR), a member of the International Network for Quality Assurance Agencies in Higher Education (INQAAHE), an Affiliate of the European Association for Quality Assurance in Higher Education (ENQA), an Affiliate Member of the European Evangelical Alliance (EEA), and a Charter Member of the International Council for Theological Education (ICETE). Registration and membership with accreditation authorities ensures that they comply with diverse European-level accreditation standards for accreditation bodies, ensuring their value and recognition. The value and recognition of EMOS and EMT come from its awarding organisations (ESSC and DGT), which are authorities in the respective fields of study.

Fourth, from the perspective of a certificate, CeQuint provides quality certifications for internationalisation in higher education. The CeQuint certificate provides benefits similar to those of the labels and the accreditation agency. However, the focus of the benefits is highlighted as concentrated on higher education institutions and programs, rather than on the students. In the case of labels, there are direct benefits for students stated on their websites. Additionally, the criteria for awarding the certificate are less intensive than those of the label, since the certificate acts as a consultancy for developing strategic elements in a programme/institution (internationalisation). Despite the lack of research on quality schemes or strategies in higher education that provides comparisons for quality labels, agencies, and certifications, there is a trend toward developing quality labels in Europe. For example, the Horizon 2020 project PEGASUS (Partnership of a European Group of Aeronautics and Space Universities) created a roadmap for defining a European quality label for aerospace-related higher education degrees⁴⁸. This label aims to complement existing national or European accreditation systems, providing added value to the internal and/or external quality assurance processes that are in place in most EU countries. Currently, the EACEA is testing the development of a European joint degree label⁴⁹. This would be a complementary certificate to the qualifications obtained when graduating from joint programs in the context of transnational cooperation between several HEIs. These recent developments show that the "quality labels" in higher education go beyond the aim of ensuring quality. They play a strategic role in enhancing the field of study, such as the label for aerospace education, or in promoting high-level goals, such as ensuring effective cooperation among HEIs in the case of the European joint degree label.

Delivering a 'quality label' seems to be the most suitable strategy for EMOS to play a role in the field of official statistics. Quality assurance agencies or certification strategies focus on the assurance of quality, mostly at the managerial level of programmes/institutions, playing a consultancy/advisory role. On the contrary, the 'quality labels' embed additional strategic objectives from other higher-level organisations which allow them to add value beyond quality assurance. Labels also allow for more hands-on interactions with students and external stakeholders, since their requirements and standards can go beyond pure quality assurance requirements.

⁴⁸ Bernelli-Zazzera, F., Martín-Prats, M.A., Marulo, F., Hanus, D., Melkert, J.A., Guglieri, G., Bauer, P., Pantelaki, I., Wasser, I., Deconinck, H., Boşilcă, R.L., & Saari, H. (2018). Proposal for a EU quality label for aerospace education. INCAS BULLETIN. DOI: 10.13111/2066-8201.2018.10.2.2

⁴⁹ <https://education.ec.europa.eu/news/erasmus-funding-will-test-european-degree-label-and-new-cooperation-between-higher-education-institutions>

In the case of EMT and the EIT Labels, their benefits cover complete programmes and provide reputational enhancement at the programme level. In contrast, EMOS benefits are largely associated with students. To enhance the reputation and attractiveness of the label, EMOS could consider the following:

- Define the most reputable authority to award the label (ESSC, ESS or Eurostat);
- Emphasising the benefits that HEIs and programmes get by joining EMOS, making the Label attractive and beneficial for the entire programme, which may incentivise other programmes to join;
- Offer benefits beyond curricular activities to students (career tracking, alumni networks, career support, exclusive job portals, graduate networking events, etc.).

EMOS label is currently awarded by the ESSC. However, twelve out of 33 EMOS-labelled programme websites already now promote EMOS as a label awarded by Eurostat while only six mention the ESSC (the remaining 15 do not mention the awarding body or have no information on EMOS on their websites). Since Eurostat manages the label and the supporting activities, and acts as the contact point for the label coordinators at partner universities, it is not surprising that the visibility and awareness of the ESSC as an awarding body is limited. Changing the awarding body to Eurostat could increase the visibility, attractiveness and reputation of the label, since the institution is better known to the wider public and has an established brand in European official statistics and as an EU institution.

Extending EMOS benefits to the programmes and HEIs can help to increase engagement of the network partners, since they would also contribute to programme and institutional reputational building. This could help attract new HEIs and increase network satisfaction with the label.

The governing model of EMT has a particular advantage because it collaborates with the LIND expert group. The LIND expert group provided support for the DGT and the selection of EMT programmes. This guarantees direct involvement of industry stakeholders in the board of the label. However, EMOS and EIT Label involve these stakeholders directly in the composition of their governing boards.

Overall, implementation of EMOS as a quality label appears to be suitable for a network of its current size. However, comparison with other similar labels shows that the requirements to obtain EMOS label are rather demanding and closer to those of a joint programme. If EMOS should continue as a quality label, a review of the requirements and objectives would be in place, and the benefits of the label should be more clearly communicated to potential partner HEIs.

4.2. EMOS governance

EMOS is governed by a board of fourteen members appointed for a period of three years. The board consists of six representatives from universities, five from NSIs, one from a national central bank and one from the European Statistical Advisory Committee (ESAC). In addition, one representative from Eurostat acts as chair. The EMOS board is rather hands-on and is responsible for a range of tasks from strategic development of the label, quality monitoring, to review of label award and renewal applications.

Overall, EMOS network partners are largely satisfied with how the label is governed and with the work done by the EMOS board. Partner HEIs that are not directly involved in EMOS governance provided positive feedback about clear communication, procedures and guidelines, timely support and constructive feedback provided by the board during their EMOS application or relabelling process. However, some coordinators of

EMOS-labelled programmes noted that more transparency about and better communication of the decisions and activities of the board would be desired. Furthermore, the reporting procedures, despite being clear, were occasionally identified as too burdensome.

Several network partners interviewed as part of the qualitative study expressed an interest to get more involved in the board's activities and EMOS governance, even if not at full capacity. They emphasised a lack of time and capacity as the factors preventing them from getting fully involved. However, they noted that regular (for instance, bi-annual) meetings of all coordinators of EMOS-labelled programmes from universities could be a welcome addition and strengthen the ownership of the label among the network partners.

Current and former board members provided an overall positive assessment of EMOS governance and board structure. However, they also pointed out **several deficiencies and challenges**. It was unclear to some why HEIs who are not EMOS members or NSIs that do not directly engage with EMOS HEIs are part of the board since their involvement in the programme and potential contribution to its further development is limited. More active and interactive NSI engagement in EMOS governance and network as a whole was frequently called for by HEI representatives. Furthermore, the board was seen as too large, diverse and too overburdened by operational tasks such as monitoring and re-labelling of EMOS programmes to have the capacity to provide timely strategic guidance and focus on higher-level developments related to EMOS. Changes of board members every three years were seen as disruptive to the continuity of work. Considering that attractiveness to students is one of the main challenges EMOS is currently facing, no representation of students in EMOS governance was criticised. Finally, a generational change in EMOS was mentioned as a challenge: the board members that were involved in the set-up of the label and showed significant engagement and dedication are retiring or moving on to different positions and it might be difficult to replace them with similarly experienced and enthusiastic people from the highly specialised but relatively small academic and professional community of official statisticians.

Suggestions for improvement of the EMOS governance include setting up an EMOS student council that could delegate a representative to the board. Furthermore, electing (as done by EMT where 10 board members are elected from the 70 participating HEIs) rather than delegating board members within different stakeholder groups could ensure that dedicated candidates get the position, and more network members are involved in forming the board, making the governance of the label more democratic and inclusive. As an alternative, HEI and NSI board members could rotate to ensure equal and balanced participation.

Furthermore, downsizing the board or creating a smaller core group responsible for the strategic direction of the programme could facilitate swift and targeted decision-making. Operational tasks such as the evaluation of (re-) labelling applications or selection of Master Thesis Competition winners could be delegated to ad-hoc or permanent working groups, which at the same time would allow more network members to engage in the governance to some extent. The option to participate in the board activities at a lesser capacity would also address the issue of lack of time to engage which was expressed as the main obstacle by many HEI representatives.



Idea for EMOS

Restructuring the EMOS board

The EMOS board could be reformed to both facilitate the making of strategic decisions and be more inclusive. Two levels of governance could be established. The strategic board could be downsized from the current one and entail a **small group of active and engaged elected members representing different groups of stakeholders**, potentially including a student representative. A priority task for the board would be formulating a 2030 strategy for EMOS underpinned by a roadmap of actions. In addition, **ad-hoc bodies or working groups** could be set up to tackle tasks such as re-labelling, evaluation of applications or selection of Master Thesis Competition winners. This would allow to both share the burdens of currently very hands-on EMOS board and engage a broader group of stakeholders who would be willing to get more actively involved, increasing the ownership of the label.

Impact: Redistribution of tasks among board members would ensure that strategic decisions are made faster and more resources are available to implement various initiatives.

Implementation horizon: Medium-term.

The EMT, for example, outsources tasks like evaluation of label (renewal) applications to external evaluators and allows the board members to set up ad-hoc working groups on specific topics based on the needs. This decreases the administrative burden on the board members and enables an involvement of larger number of stakeholders in the governance of the label. Another example of collaboration is the German EMOS network composed of HEIs, NSI and regional statistics institutes meeting regularly. The network members recognise the benefits of the additional exchanges within the smaller group and reported that one German member on the EMOS board sufficiently represents their interests, providing evidence of how restructuring the workload of the board into smaller thematic areas might increase the effectiveness and lessen the administrative burden within EMOS governance.

Finally, our survey results did not provide significant qualitative insights on EMOS governance. However, more than a half of the 168 respondents answering the question on whether their organisation was involved in EMOS governance, and 17 out of 31 of those who also indicated to collaborate with EMOS, stated that they were not aware of this involvement, hinting that the visibility of the EMOS board could be improved.

4.3. EMOS network

4.3.1. Social network analysis

We compiled the information for the social network analysis (SNA) from EMOS label applications and 2022 annual reports submitted by EMOS-labelled master's programmes. We present four networks on the subsequent pages:

1. **EMOS collaborations:** A network showcasing collaboration between EMOS partner HEIs, traineeship host institutions and institutions from which EMOS teaching staff came, as well as co-teaching arrangements and joint degrees between EMOS partners. With a few exceptions, this network draws on information from 2021-2022.⁵⁰ Apart from joint degrees, the collaborations displayed in this network are quantifiable in the sense that they show individuals moving between the institutions.

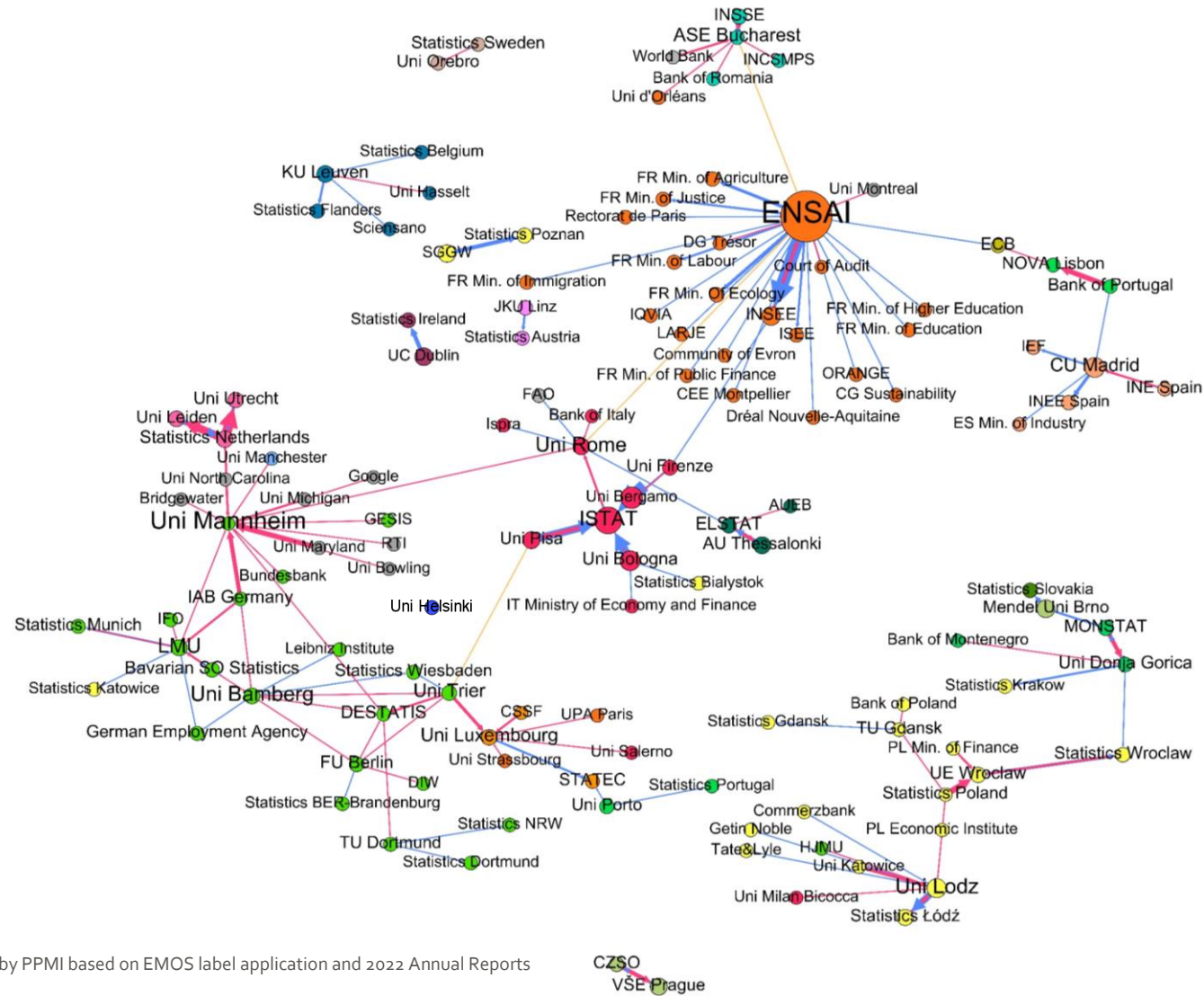
⁵⁰ With the exception of ENSAI/Rennes, FU Berlin, Universities of Luxembourg, Donja Gorica, Wroclaw and KU Leuven who did not provide a breakdown of teachers with their 2022 assessment. Data from applications (2014 – 2018) was used instead.

2. **EMOS collaborations by modularity class:** Modularity is a measure of the structure of the network used in SNA. It measures the extent of network division into distinct clusters or communities that exhibit stronger ties among each other than to the rest of the network.
3. **All collaborations of EMOS partner HEIs:** A broader network including all national and international collaborations of EMOS network partners that could be identified in EMOS applications and 2022 annual reports. This network includes co-teaching, joint degrees, Erasmus+ agreements and partnership or support agreements between EMOS HEIs and any other HEIs, institutions or networks. Data from EMOS label applications was used to complement this network and so it should be viewed with some caution, since we do not know whether the information is still up to date or whether Erasmus+ mobilities, traineeships or other collaboration activities actually took place.
4. **All collaborations of EMOS partners classified by modularity** (as network 2) showing the distinct communities identified in the network, as under the second option.

The subsequent pages present the four networks. For better readability, the names of the institutions that the nodes represent are shortened. The following parameters are important for interpreting the networks:

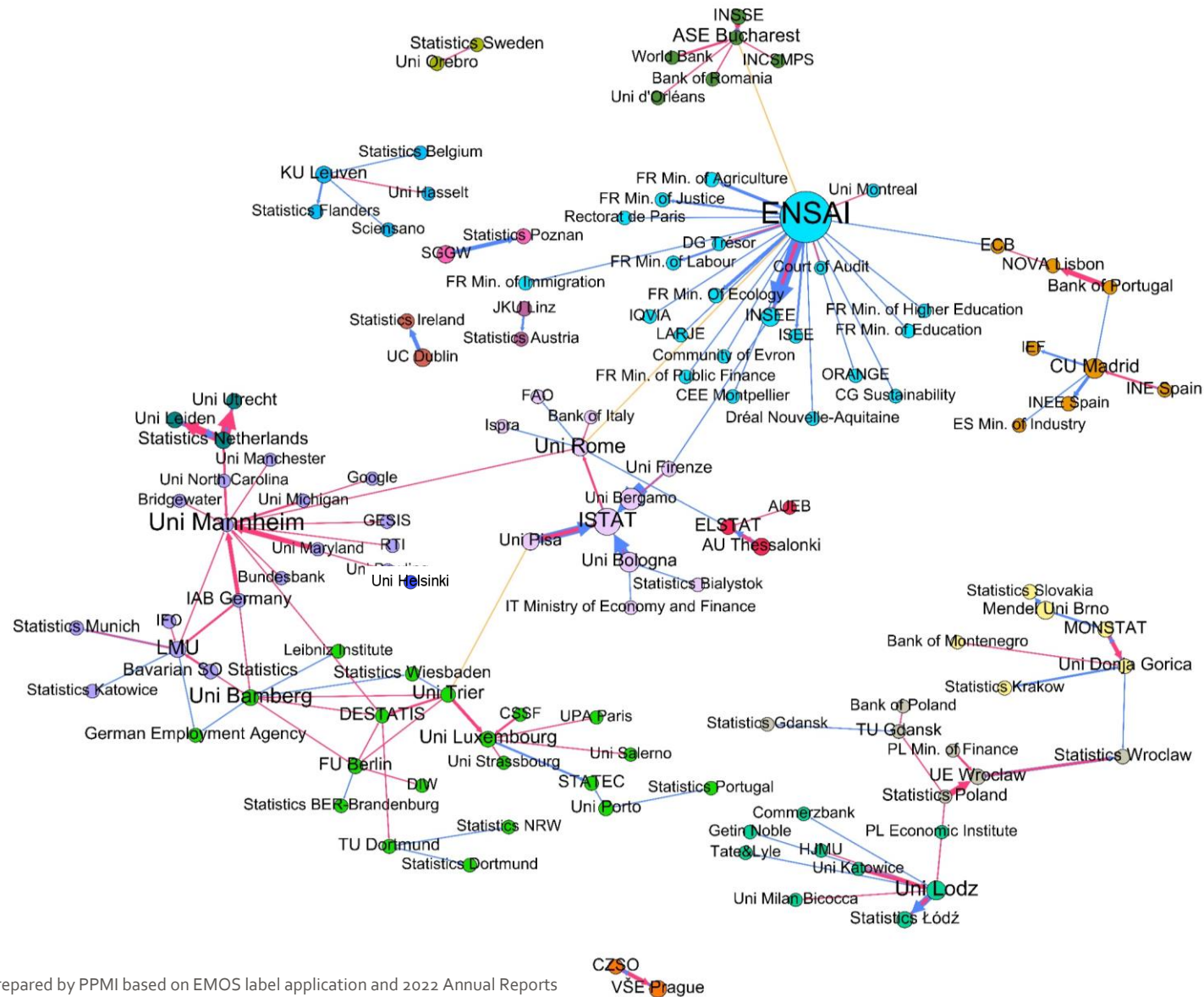
- **Node colour** represents the country in networks 1 and 3 (**light grey** stands for “Other” meaning not EU, UK or Montenegro, **dark grey** represents international organisations or networks and **blue** stands for EU or European institutions or networks). In networks 2 and 4 node colour represents the modularity class, or the community the node belongs to meaning that it is more connected to the nodes of the same colour than to the rest of the network.
- **Node size** represents the number of (estimated) EMOS graduates and trainees hosted in 2021-2023. The larger the node, the more EMOS trainees or graduates the institution had, ranging from none at University of Mannheim or Athens University of Economics and Business and 92 at the ENSAI/University of Rennes.
- **Edge colour:** **blue** depicts traineeships, **red** stands for teachers of the source node teaching EMOS curriculum at the target node, **orange** represents joint degrees between the institutions, **green** depicts Erasmus+ agreements between the institutions and **grey** stands for collaboration agreements, memoranda of understanding or other support agreements between the nodes. Networks 1 and 2 do not include green or grey nodes, since they focus on specifically EMOS-related collaborations.
- **Edge weight** (thickness) is only used in networks 1 and 2 depicting quantifiable collaborations stands for the number of either trainees or teachers going from source to target institution. The thicker the edge, the more individuals were engaged between the institutions either as teachers or trainees. For better readability, edges are not weighted in networks 3 and 4.
- **Arrows** point from source to target node showing from and to which institution the exchange took place (i.e., teaching nodes point to HEIs and traineeships from HEIs to NSIs and others).
- **Label size** stands for degree of connectedness to the network. The larger the label, the more edges, or network partners, the respective node has.

FIGURE 3. NETWORK 1: EMOS COLLABORATIONS (COLOURED BY COUNTRY)



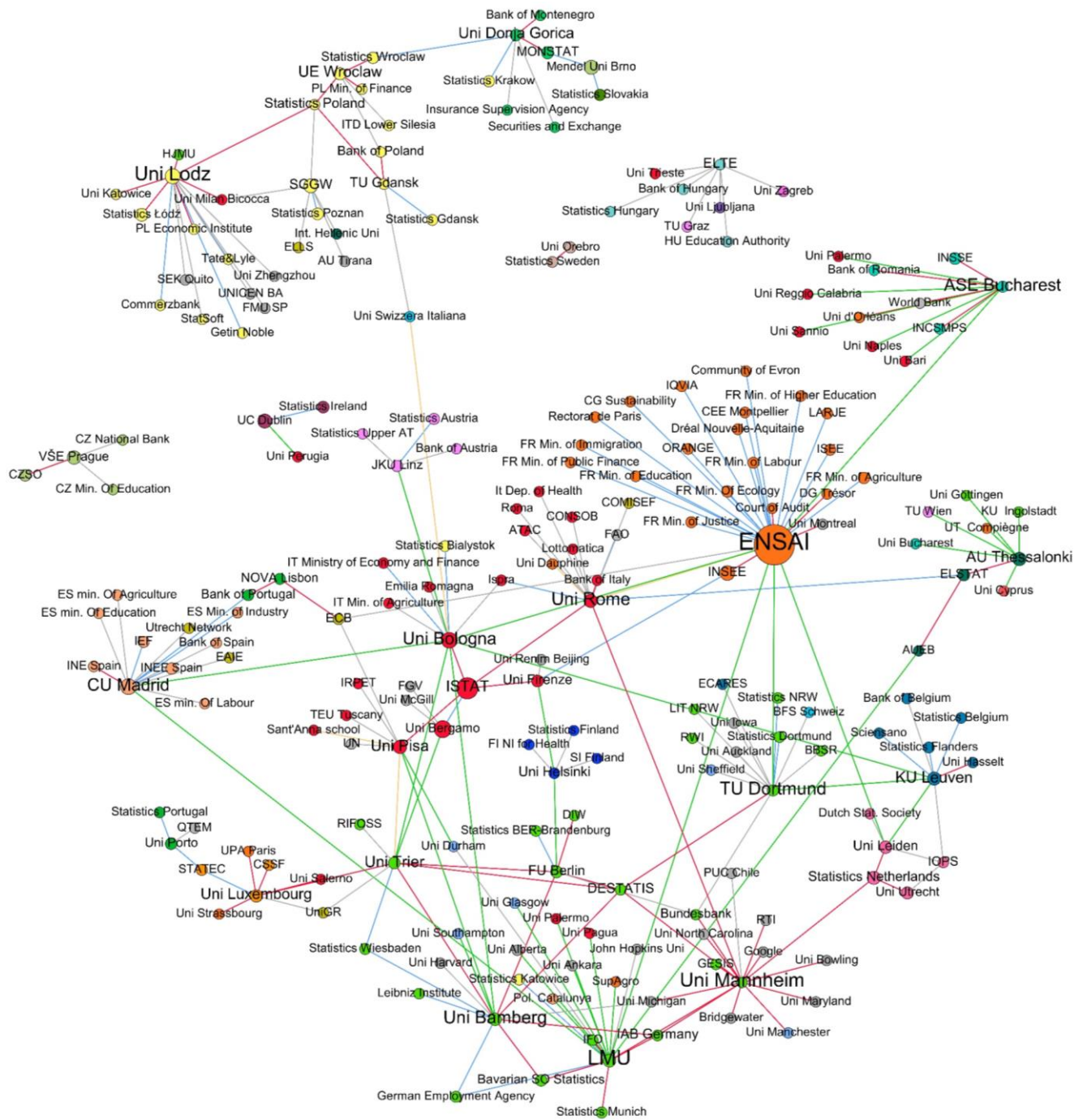
Source: prepared by PPMI based on EMOS label application and 2022 Annual Reports

FIGURE 4. NETWORK 2: EMOS COLLABORATIONS (BY MODULARITY CLASS)



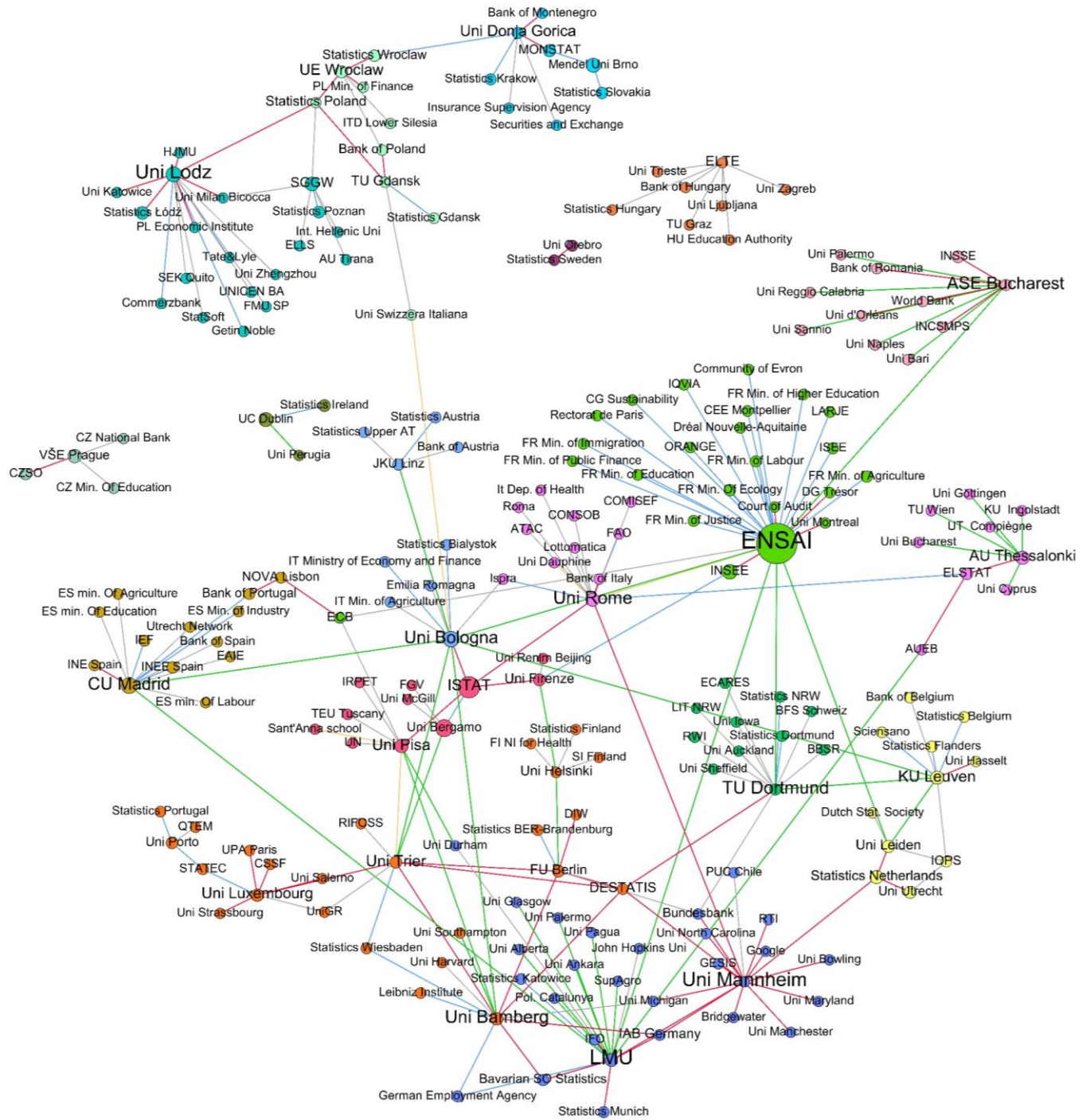
Source: prepared by PPMI based on EMOS label application and 2022 Annual Reports

FIGURE 5. NETWORK 3: ALL COLLABORATIONS OF EMOS PARTNER HEIS (COLOURED BY COUNTRY)



Source: prepared by PPMI based on EMOS label application and 2022 Annual Reports

FIGURE 6. NETWORK 4: ALL EMOS COLLABORATIONS (BY MODULARITY CLASS)



Source: prepared by PPMI based on EMOS label application and 2022 Annual Reports

A number of **observations and conclusions** can be made interpreting and comparing the collaboration patterns among EMOS partners in the four networks. To mention some of the key trends, size of the nodes in all the networks clearly highlights ENSAI/Rennes and ISTAT as the most active institutions having either produced the most EMOS graduates or hosted the highest number of trainees. Italy (14% of the nodes in networks 1 and 2) as well as France (13%) and Germany (13%) are the most active countries in the EMOS network. However, France exhibits a very centralised network structure with ENSAI/Rennes being the only HEI node sending all trainees and receiving all teaching staff, while the Italian network revolves around ISTAT connecting the five EMOS HEIs through traineeships and teaching placements. The German network is even more decentralised with multiple regional statistics offices acting as traineeship hosts and DESTATIS being significantly less involved than French or Italian NSIs. Poland also has a relatively large and decentralised network of EMOS partner institutions involving the NSI, the central bank and a number of regional statistics offices among others.

On the other hand, EMOS-labelled HEIs Austria, Ireland, Netherlands, Greece and Sweden as well as one of the Czech HEIs only exchanged trainees and/or teaching staff with their respective NSIs. University of Helsinki presents an outlier not having sent any trainees or hosted external teaching staff in 2021-2022.

In terms of transnational collaboration, EMOS network is still largely national or regional and there is definitely space to better exploit its international potential. Few EMOS partners implemented cross-border traineeships so far. There have been trainees sent from Portugal to Luxembourg and from Spain to Portugal, EMOS students from Germany and Italy completed traineeships in Poland. The most international cluster is built by Mendel University in Brno (Czechia), the Slovak NSI and the University of Donja Gorica in Montenegro and two Polish statistics offices.

However, there is much more cross-border and cross-institutional collaboration in teaching activities. Staff from national and regional statistics authorities as well as HEIs in Europe and the US taught courses on official statistics at EMOS partner institutions. Especially Universities of Mannheim, Luxembourg and ASE Bucharest heavily rely on external teaching staff. In addition, universities of Bamberg, Trier and FU Berlin have a joint teaching arrangement for EMOS curriculum and there are three joint degrees between EMOS network partners (Pisa – Trier, ENSAI/Rennes – ASE Bucharest, ENSAI/Rennes – University of Rome). Furthermore, teaching collaboration in EMOS is about as active as traineeship participation. 50% of the edges in network 1 represent traineeships, while 48% stand for cross-institutional teaching and 2% for joint degrees.

Idea for EMOS

Support mobility opportunities for academic staff

EMOS could have a designated visiting professorship or a similar staff mobility scheme to encourage mobility among academic staff and beyond the current regional network hubs. Teaching collaborations are already common within the network and can be funded through Erasmus+ programme by the partner universities, but a designated initiative by EMOS could boost academic staff mobility and teaching collaboration, which would be beneficial considering that professors in official statistics are relatively few and some EMOS partner HEIs reported difficulties in maintaining sufficient teaching capacity. A visiting professorship scheme would also foster academic and research collaboration in official statistics.

Impact: Increased academic collaboration, alleviating the teaching burden.

Implementation horizon: Short- to medium-term.

The modularity statistics (network 2) reveal 18 distinct clusters of institutions including some cross-border communities as well as distinct clusters within the same country, indicating a rather complex and fragmented network structure. For example, Universities of Munich and Mannheim form one interconnected community, while other German institutions, namely Universities of Trier, Bamberg and FU Berlin fall into another, more international cluster together with Universities of Luxembourg and Porto. The University of Porto is not connected to NOVA Lisbon, which falls into a cluster with the University of Madrid, both collaborating with the Bank of Portugal. Also, the Polish HEIs exhibit a complex network structure at national level, falling into two interconnected and one separate community.

The larger networks (3 and 4) include not only traineeships and teaching placements but also any collaboration and Erasmus+ agreements as well as memoranda of understanding between EMOS HEIs and their partners indicated in the label applications. As noted above, we have no information whether the institutions have actually exchanged information or Erasmus students as claimed in the agreements, so it is not possible to judge how active the network actually is.

In addition to teaching and traineeships, there is a substantial number of Erasmus+ agreements between EMOS partner HEIs. However, this is not the rule. For example, Polish or Czech HEIs do not have any Erasmus+ agreements with other EMOS universities. On the other hand, statistics departments of EMOS HEIs have a number of collaboration agreements with other universities that are not part of the EMOS network. If we are to think of a European or global expansion of the EMOS network, the institutions in networks 3 and 4 could be considered as potential partners, especially those nodes that act as a connection between two EMOS HEIs, such as the University of Svizzera Italiana or University of Salerno.

Modularity statistics in network 4 reveal even more complex communities than in network 2 once edges for Erasmus+ agreements and collaboration agreements with institutions such as the European Central Bank (ECB) or additional official statistics producers are added. University College Dublin, University of Orebro and Prague University of Economics and Business remain relative outliers, but University of Helsinki connects to the larger EMOS network through some Erasmus+ agreements. The communities are also slightly different than in network 2: Italian HEIs split into three distinct communities, University of Bologna joining a cluster with University of Linz through an Erasmus+ agreement. Belgian and Dutch institutions are joined through their participation in IOPS graduate school, TU Dortmund splits off the German network and drifts closer to ENSAI/Rennes (despite a high degree of centralisation of the network, the institution has multiple Erasmus+ agreements) and the Belgian/Dutch clusters.

As seen in the larger SNAs (networks 3 and 4), EMOS partner HEIs tend to have their own European and global networks of collaboration with institutions not participating in the EMOS network. These collaborations could be used to better exploit the international potential of EMOS. The institutions could be approached as potential partners if an expansion of the EMOS network is considered. Furthermore, seeing how Erasmus+ agreements consolidate and internationalise the EMOS network, signature of additional agreements among EMOS partner HEIs should be advocated.

4.3.2. Motivation to participate: HEIs

The main reasons to apply for or to extend the EMOS label mentioned in the applications and annual reports of the HEIs could be grouped as follows:

- **Prestige of the European label** helping to attract students and increase the visibility of the core study programmes nationally and internationally;
- Opportunity to establish closer **collaboration with NSIs** and other official statistics-producing institutions, and to address the national labour market needs in official statistics;
- Benefits of **belonging to the EMOS network** including collaboration with other HEIs, Eurostat and shared activities such as participation in conferences, webinars or the Master Thesis Competition, access to joint resources and co-teaching opportunities and the possibility to stay up to date with current developments in official statistics.

Two institutions, ELTE Budapest and the University of Wrocław, did not extend their participation in EMOS beyond 2023. They indicated a lack of interest among students and, as a result, costly implementation of teaching activities as the reasons to withdraw but expressed interest in collaborating with the network in the future. Free University of Berlin is also not reapplying for the label expiring in 2024 due to the retirement of the professor of official statistics and change of thematic focus of the newly appointed chair.

HEI representatives often cited close collaboration with NSIs as the main added value of the EMOS label. Establishing networks with official statistics producers provides universities with access to their data and new research opportunities. One EMOS network partner noted that the university secured a large research project thanks to their collaboration with an NSI. Additionally, several EMOS universities benefited from integrating and co-teaching their official statistics curricula through EMOS, or attracting practitioners from NSIs, central banks or international organisations to teach EMOS classes. Considering that official statistics is perceived as a rather narrow discipline and teaching resources are often scarce, this has been a significant benefit for participating HEIs.

4.3.3. Motivation to participate: Non-academic network partners

EMOS network partners and external stakeholders include NSIs, ministries, ONAs, national central banks, international organisations, private companies, non-governmental organisations, and research organisations. The network partners collaborate with EMOS as lecturers, internship hosts, knowledge and best practice disseminators, research partners, and employers.

Participating in the EMOS network offers networking opportunities with professionals and experts in official statistics as the main benefit, as noted by 52% of the respondents in Figure 7. EMOS fosters collaboration among HEIs, NSIs, and various public organisations involved in official statistics. This collaboration leads to tangible outcomes such as joint projects, internship positions, recruitment of young talent, sharing best practices, and sharing knowledge among academics and practitioners.

FIGURE 7. WHAT ARE THE BENEFITS OF BEING IN THE EMOS NETWORK FOR YOUR ORGANISATION? (NON-HEI NETWORK PARTNERS ONLY)

Source: PPMI survey of (potential) EMOS network partners and employers ($n=27$). Since respondents could select more than one option, the sum of the percentages is greater than 100%.

The second most significant benefit acknowledged by EMOS network partners is the improved visibility and reputation gained through association with EMOS, as reported by 44% of the respondents. Eurostat's recognition is particularly valuable for the partners, as it allows them to showcase their affiliation with the organisation working in the field at the EU level and serves as a sign of quality of their official statistical activities. The network partners find that this enhanced visibility and reputation offers them a platform to showcase their organisations, engage in learning and knowledge-sharing initiatives, attract new candidates to their open positions, and amplify their presence at the EU level.

EMOS also provides network partners with access to a pool of students interested in official statistics internships (37%) and to official statistics graduates (37%), which is the third-most important benefit. Organisations in official statistics tap into the pool of EMOS students to attract interns who contribute to the development of official statistics products, projects and data collection, processing, and dissemination activities. The internships also serve as an opportunity for network partners to consider graduates as potential candidates for open positions. Network partners from the public sector expect EMOS graduates to be the "organic" applicants to their positions because they have the knowledge, training, network, and potential to successfully fulfil diverse roles in official statistics.

EMOS network partners value the academia-NSI collaboration. This collaboration enables organisations to work with academic institutions on joint projects and leverage organisational and knowledge capabilities with the latest academic insights (33%). The academia-network partner collaboration allows access to up-to-date knowledge and good practices in official statistics. Conferences, webinars, joint projects, internships, and constant engagement with HEIs enable network partners to share good practices and learn from other academic and non-academic collaborators. This engagement also provides organisations access to valuable resources, publications and research output on official statistics generated within the EMOS network (30%). The exchange of information among stakeholders has fostered strong university-public sector cooperation at the local and international levels, creating a feedback loop that contributes to the continuous improvement of curricula.

The distribution of benefit ratings highlights the significant value placed on EMOS network partners' collaboration with HEIs, experts, students, and graduates, which leads to joint initiatives and access to resources. Conversely, network partners put less emphasis on benefits such as EU-level harmonisation, international experiences, and learning from case studies of other organisations.

Despite the benefits identified within the EMOS network, surveyed partners perceived several challenges as depicted in Figure 8.

FIGURE 8. WHAT ARE THE CHALLENGES OF BEING IN THE EMOS NETWORK FOR YOUR ORGANISATION?



Source: PPMI survey of (potential) EMOS stakeholders and employers (N=22). Since network partners could select more than one option, the sum of the percentages is greater than 100%.

The most common challenge for EMOS network partners were the **financial implications or costs associated with participating in EMOS activities**, as identified by one-third of the respondents. Some interviewed stakeholders indicated that short-term internships in their organisations implied a high administrative cost. Other partners expressed a desire for longer internship periods, allowing students more time to shadow colleagues, apply and utilise the knowledge gained during their internship period.

The second commonly selected challenge is **adapting organisational processes and practices to align with EMOS requirements**, as perceived by a quarter of the respondents. In fact, 23% of the survey respondents identified the administrative burden related to the organisation of internships and reporting as a significant challenge. On the other hand, network partners consider hiring international interns and cooperating at EU level within the EMOS framework challenging since national hiring procedures, administrative procedures and regulations are often rigid, especially in the public sector. Due to the public nature of NSIs and ONAs, solving administrative issues may take weeks. This challenge implies implementing changes in public sector organisations to allow fast solutions for administrative processes, especially in the case of international students.

Addressing potential discrepancies between the academic focus of the EMOS programme and the practical needs of the organisation is challenging for 27% of network partners. They acknowledge that bridging the gap between theory and practice is difficult and necessitates ongoing and close university-public sector cooperation. NSIs expressed their satisfaction with teaching, research, internships, and other cooperation initiatives within the EMOS network, and their will to keep and enhance these cooperation mechanisms.

Finally, interviewed EMOS network partners also perceived a **lack of resources and incentives** as a significant challenge. Participating HEIs and organisations in the field of official statistics indicated no visible incentives for them, while setting up and maintaining the curriculum, promotion of activities, participation in events, and dealing with the administrative burden require significant investment of both time and resources, disincentivising the network partners.

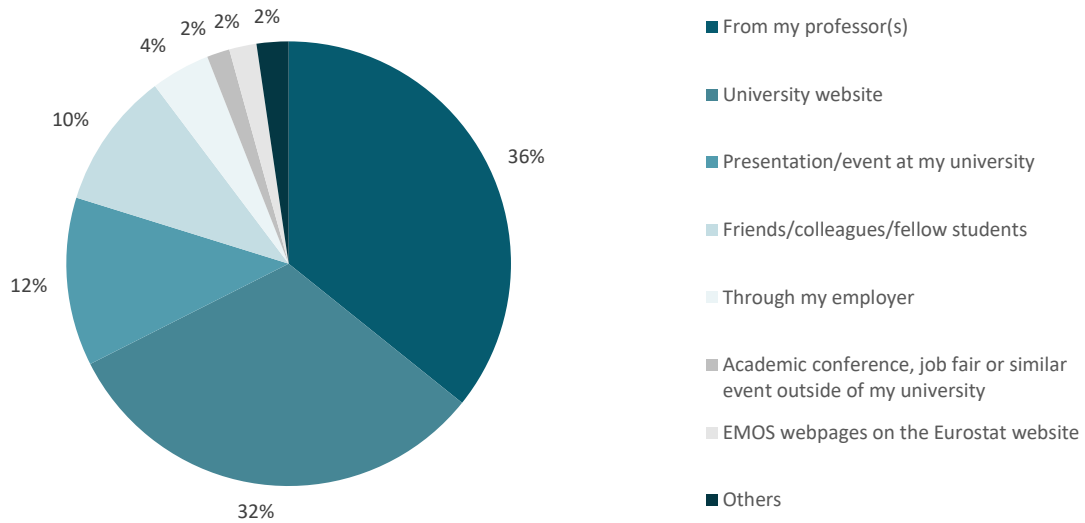
As presented above, challenges identified as most pressing by EMOS network partners relate to financial costs, administrative burden and discrepancies between theory and practice. Inter-institutional differences, organisational culture, language barriers and communication within the network were seen as less burdensome.

4.4. Analysis of EMOS-labelled master's programmes

4.4.1. Awareness and perception of the EMOS-labelled master's programmes

The survey of EMOS students and graduates shows that half of the respondents heard about EMOS through their academic, professional, or personal networks, namely professors (36%), fellow students and alumni (10%), or employers (4%), as depicted in Figure 9. In contrast, 32% of respondents found out about EMOS on partner university websites. Additionally, 12% of the respondents discovered EMOS through introductory presentations at the universities. Hence, the results demonstrate that personal connections and recommendations are crucial in raising awareness and that students are significantly less likely to find out about EMOS outside their university. They also suggest that other channels of communication such as academic conferences, job fairs, or the Eurostat website could be better utilised to promote EMOS. The trends are largely similar if we compare graduates to students, although current students (35%, n=128) tend to find out about EMOS from their university websites more often than graduates (26%, n=113) indicating an increasing importance of active online promotion of the label.

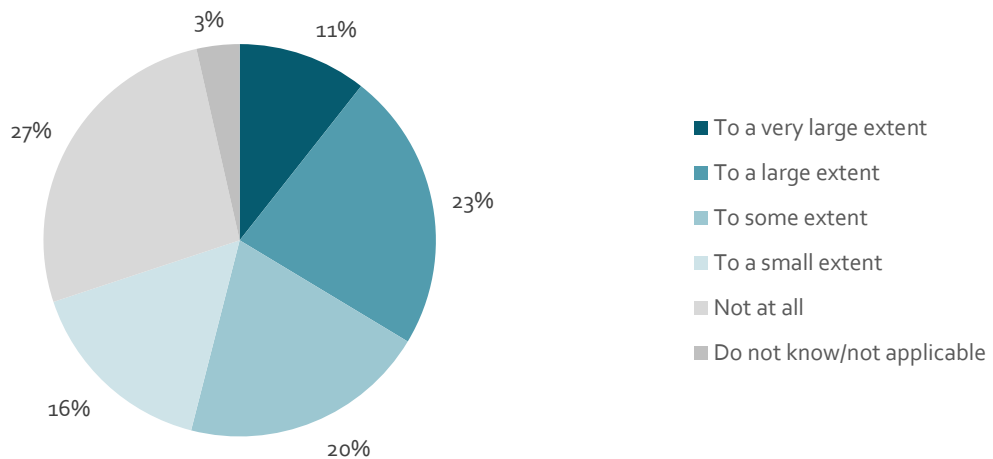
FIGURE 9. HOW DID YOU FIND OUT ABOUT EMOS?



Source: PPMI survey of students and graduates. (N=303)

As seen in Figure 10, only one third of the surveyed students and graduates indicated that the EMOS label influenced their choice of master’s programme, while over 40% claimed that this was not much or not at all the case.⁵¹ Students seem to rather be motivated by their interest in the study subject, hinting that the value and the recognition of the EMOS label could be improved.

FIGURE 10. DID EMOS LABEL INFLUENCE YOUR CHOICE OF THE MASTER'S PROGRAMME?



Source: PPMI survey of EMOS students and graduates, n=113


⁵¹ Due to overrepresentation of French and Italian survey respondents we have also analysed the data for France, Italy and other countries separately. The trend for other countries is similar to the full sample, while EMOS had less impact on the programme choice of the French and more on the Italian respondents (42% of the French stated it did not at all influence their choice, and 38% of the Italians stated it did to a large extent)

4.4.2. Motivation to choose an EMOS-labelled programme

EMOS students and graduates

Several factors motivate students to select the EMOS specialisation track. For many, the main motivation is a strong interest in official statistics. They aspire to contribute to informed public decision-making, aligning with EMOS's mission and recognise that by pursuing EMOS, they cultivate the skills needed for a career with a meaningful societal impact. Many students are excited about the prospect of a compulsory internship as part of the track, allowing them to gain hands-on experience in official statistics during their studies.

Surveyed EMOS students and graduates ($n=165$) express a significant interest in pursuing a career in official statistics, with 67% indicating a positive inclination. However, 19% remain uncertain, while 14% are not interested. To effectively communicate the value of EMOS, it is crucial to highlight its role as an almost guaranteed pathway to career advancement in both official statistics and data science. Emphasising success stories of students who have benefitted from the programme can serve as an impactful communication strategy, showcasing the tangible benefits and career outcomes associated with EMOS.


Idea for EMOS

Setting up an interactive platform for EMOS

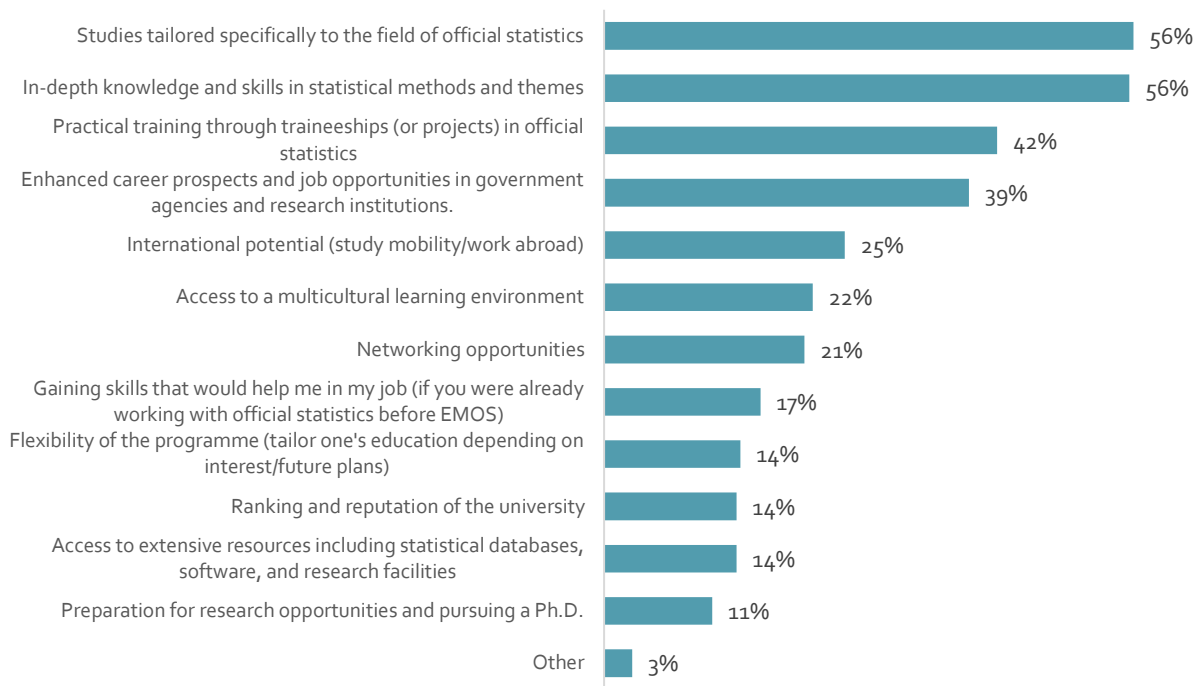
This measure would help to reach (potential) students with information on EMOS supporting activities, success stories, good practices, opportunities, and the EMOS value proposition. EMOS network partners will find out about the projects and collaboration opportunities. Receiving information directly from Eurostat would increase the sense of belonging to a larger European community. This will also facilitate communication tasks for EMOS HEIs.

This idea implies the development of a central **EMOS online platform** that should allow the registration of prospective and current students, graduates, and other stakeholders to consolidate a database. The interactive platform would allow customising messaging, sharing of updates, advertising internship and job opportunities, hosting online communities, and facilitating communication and awareness about EMOS.

Impact: Enhanced awareness about EMOS, increased sense of belonging, and consolidated online community.
Implementation horizon: Short- to medium-term.

Figure 7 shows that more than half of the students chose EMOS for the in-depth knowledge and skills, and studies tailored specifically to official statistics. Other noteworthy factors were practical training and career prospects.⁵² Students are also largely motivated by practical training through internships – a core component of EMOS, and enhanced career prospects in the public sector and research. To align with student preferences, EMOS should consider tailoring programmes and communication to emphasise these aspects. Only a quarter of respondents selected EMOS for its international potential, which might partially explain why relatively few students took advantage of the mobility opportunities described later.

⁵² Due to overrepresentation of French and Italian survey respondents we have also analysed the data for France, Italy and other countries separately. The trends do not deviate much from the overall sample except for French respondents being relatively more interested in studies tailored to the field of official statistics and less in practical training or networking, which can be explained by the fact that many of the French EMOS students are already employed at an NSI.

FIGURE 11. WHAT WERE THE MAIN REASONS YOU CHOSE AN EMOS PROGRAMME?

Source: PPMI survey of EMOS students and graduates ($n=236$)

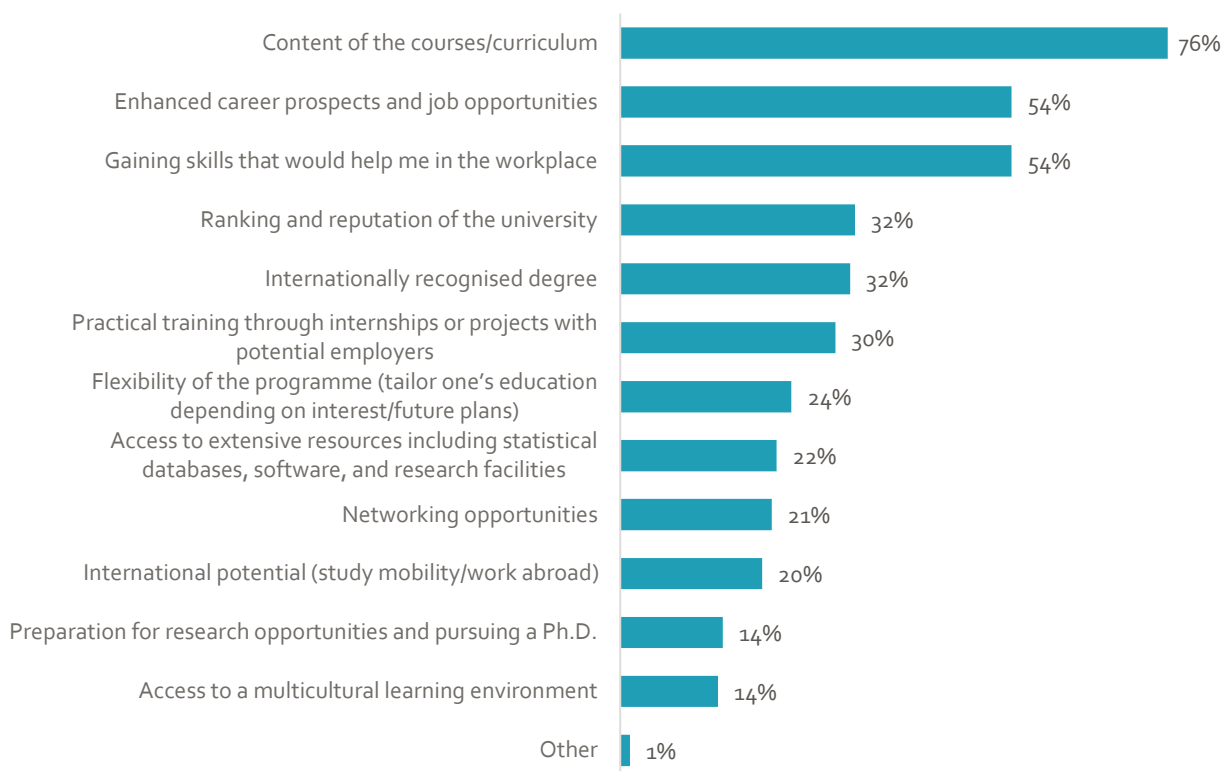
Potential students

The potential EMOS students interviewed for this study had diverse backgrounds and arrived in the field of data science looking for a career change either through a master's degree or by pursuing a second bachelor's degree. Their main motivations were promising employment opportunities and financial stability offered by data science. Additionally, they saw the intersection between data science and social sciences as the most important aspect of a programme in data science or statistics, as it can contribute to data-driven social applications in public policy, health, and other fields. These students looked for theoretical grounding and practical skills development when searching for prospective programmes. They considered aspects such as programme affordability, English as the language of instruction, the availability of real-world data and agreements with public and private organisations for internships. They considered the balance between theory and hands-on experience as a decisive factor.

The surveyed potential EMOS students noted that the most important element when choosing a programme is the content of the courses or the curriculum, as noted by 75% of the respondents ($n=148$). The ranking also shows that the application aspect of the programme, career prospects (54%) and skills for the workplace (54%) play a crucial role in the selection. Additionally, the reputation of the university (32%) and the international recognition of the degree (32%) were frequently mentioned. Interestingly, the international potential or intercultural dimension of the programme were not seen as important factors.

When choosing a study programme, three quarters of the students prioritised the content of the courses and curriculum, as detailed in Figure 12.⁵³ Additionally, more than half of the students valued career prospects and the skills to deploy in the workplace as key attractive elements. Other significant factors also influence students’ decision-making such as the reputation and ranking of universities, international recognition of the degree, practical training opportunities, and flexibility of the programs. These data suggest a multifaceted approach to programme development, marketing, and communication, where programmes must not only prioritise robust academic offerings but also emphasise the added value of their career prospects, skills development, reputation, and practical training opportunities to attract and retain prospective students effectively.

FIGURE 12. WHAT ARE THE MOST IMPORTANT ELEMENTS WHEN CHOOSING A STUDY PROGRAMME?



Source: PPMI survey of potential EMOS students (n=148). Since respondents could select more than one option, the sum of the percentages is greater than 100%.

The qualitative study also supports the findings shown in Figure 12. Interviewed graduates and current students reported course contents, career prospects, and workplace skills (i.e. statistical tools and methods, data production, etc.) as the most important aspects when choosing a study programme. They also mentioned skills development, HEI reputation, international recognition of the degree, and practical training as key elements in selecting a programme. Additionally, a recurrent element that

⁵³ Italian respondents are overrepresented in the sample of potential EMOS students (39 out of 148 respondents), but the Italian subsample did not show significantly different trends if compared to the full sample except for greater interest in engaged career prospects and job opportunities (77%).

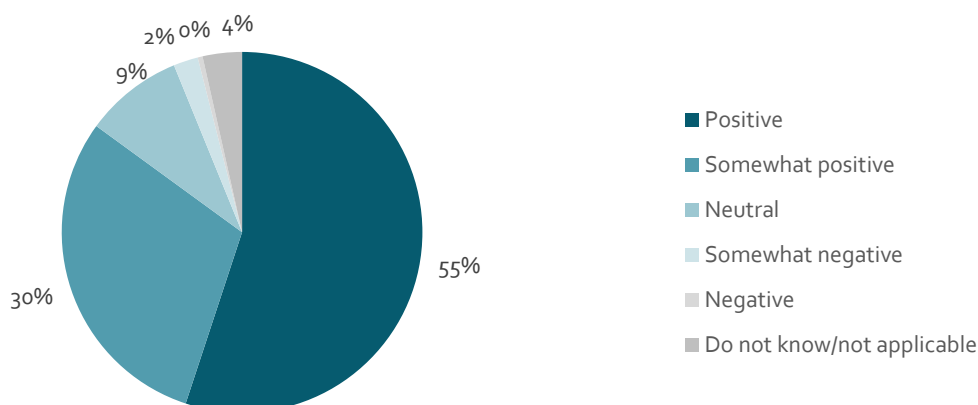
EMOS students and graduates mentioned as a key element to select a programme was the potential social impact their careers can generate beyond economic revenue.

Potential EMOS candidates' career plans are continuing their activities in the private sector of the data science field, with a potential interest in PhD studies. The interviewees reported high satisfaction with the field of study and the career opportunities that it opened to them in the private sector. However, they also noted a deep interest in contributing to society through their work by joining the public sector, non-governmental organisations, or any organisation with a social mission at a later stage of their career. They also highlighted their interest in online and flexible learning options, particularly after graduate studies, in the form of lifelong learning study options, such as training, courses, and diplomas. They would be interested in courses in official statistics similar to those offered by EMOS but in a different, preferably online, flexible format compatible with their careers. They thought that online courses in official statistics would be intellectually challenging and necessary to have a wider panorama of the field.

In conclusion, the insights from potential EMOS students present a nuanced perspective on the crucial elements influencing their choice of study programme in data science. While curriculum, career prospects, and skill development remain paramount, the desire for social impact emerges as a recurring theme, suggesting a growing consciousness towards societal contribution. This insight suggests room for improvement in EMOS communication by defining and disseminating the social impact of EMOS graduates' careers as a key transparency element for both prospective and current students. Additionally, potential students showed a strong interest in lifelong learning, flexible learning, and online courses, suggesting opportunities for EMOS to develop educational strategies that contribute to training and fostering networking among statistical practitioners in the private and public sectors at the EU level.

4.4.3. Student experience

The overall feedback from the student interviews indicates that many students have had a positive experience with the EMOS programme. Satisfaction levels were generally high, with students appreciating the quality of the courses and the overall academic experience. This was confirmed by the survey, where 85% of EMOS students and graduates evaluated their EMOS experience as positive or somewhat positive, as shown in Figure 13.

FIGURE 13. HOW WOULD YOU EVALUATE YOUR OVERALL STUDY EXPERIENCE IN AN EMOS PROGRAMME (SO FAR)?

Source: PPMI survey of EMOS students and graduates, $n=227$

One of the defining features of EMOS in many institutions is the small number of students. This intimate setting has its advantages and disadvantages. On the positive side, small classes and cohorts facilitate close interaction between students and lecturers, allowing for a personalised learning experience. This might explain why interaction with professors was mentioned by 48% of surveyed graduates ($n=107$) as one of the most valuable aspects of EMOS. On the other hand, excessively small groups can lead to students feeling isolated and demotivated due to the lack of interaction with peers on a similar academic journey. The sentiment of loneliness was exacerbated during the COVID-19 pandemic, as highlighted by one student who was the only one enrolled in the EMOS-labelled master's programme during their studies. EMOS supporting activities discussed in the following sections could help to build a sense of community and integrate students across partner HEIs.

Idea for EMOS

Increasing Eurostat direct involvement with EMOS students

As mentioned by some programme managers, solutions such as having a virtual welcoming day by Eurostat could increase the sense of belonging to the 'EMOS community' among students. Having Eurostat welcoming students and presenting EMOS would bring awareness of how important and how connected the programme is to statistics producers in the ESS.

Impact: Increased attractiveness of EMOS, increase sense of community and belonging to the European statistical community. Promote student engagement with EMOS.

Implementation horizon: Short- to medium-term.

4.4.4. EMOS courses and curriculum

Most EMOS labelled programmes **target BA graduates** in statistics, mathematics, economics, quantitative sociology, or related fields. Students usually must have some prior knowledge of quantitative methods, statistics, mathematics, or data analytics. Several HEIs also offer training for professionals working in the field of official statistics or wanting to improve their knowledge of official statistics along with their full-time MA programmes (University of Porto, University NOVA Lisbon, ENSAI/University of Rennes, University of Donja Gorica, University of Mannheim).

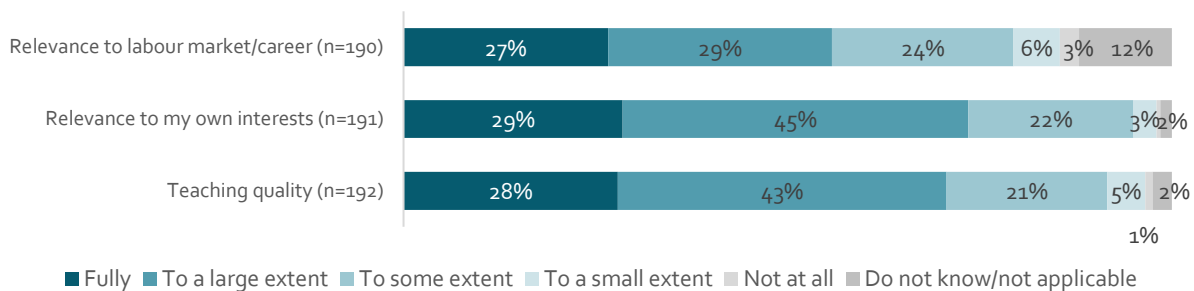
Most EMOS programmes are two-year full-time MA or MSc degrees of 120 ECTS. Some exceptions are University NOVA Lisbon with a one-year 60 ECTS curriculum and Universities of Athens, Thessaloniki and Mannheim requiring 90 ECTS. Students at Orebro University can choose between a one-year 60 ECTS or two-year 120 ECTS curriculum. Most of the EMOS curriculum is delivered face-to-face in a traditional classroom setting. There are some exceptions. For example, courses at the University of Mannheim targeting professionals are taught online (although the programme currently does not have any students) So is the shared EMOS curriculum between the Universities of Trier, Bamberg and FU Berlin.

In terms of **topics covered**, most of the EMOS-labelled programmes focus on **statistics, applied statistics, survey statistics and data science, economics and econometrics**. Only ENSAI/Rennes and Complutense University of Madrid hint at official statistics in their core programme titles: “Master in Data science for Public Decision” and “Official Statistics and Social and Economic Indicators.”

Typically, the EMOS curriculum consists of a few courses specifically related to official statistics and data management in official statistics such as systems or aspects of official statistics, courses on the national and European statistics systems, data production for official statistics and others. The other courses meeting the EMOS learning outcomes are usually courses in key statistical methods or data production such as survey design or data analysis, sampling, econometrics and similar.

Students and graduates are generally satisfied with the courses offered in the EMOS curriculum. They were mentioned by 52% of graduates ($n=107$) as one of the most valuable aspects of the programme. Other aspects mentioned in the survey as valuable included interaction with professors (47.7%) and internship opportunities (43%). Good quality of courses was also frequently highlighted in the open-ended survey questions. While students and graduates mentioned that the quality of teaching can vary depending on the lecturer, they generally agreed that EMOS courses were of high quality. As shown in Figure 14, 71% of students and graduates were fully or largely satisfied with the quality of teaching in EMOS courses. Three-quarters of students and graduates also thought that the EMOS courses were fully or largely aligned with their interests. On the other hand, some students mentioned that they wished they had more EMOS specific- courses and that the EMOS curriculum was not much different from the core curriculum of their programme. Finally, students and graduates were generally satisfied with the labour market relevance of EMOS courses, albeit to a smaller extent. The labour market and employability aspects of EMOS will be approached in more detail in section 4.5 of this report.

FIGURE 14. HOW SATISFIED ARE YOU WITH THE COURSES OFFERED UNDER THE EMOS SPECIALISATION TRACK?



Source: PPMI survey of EMOS students and graduates

Programme coordinators usually agreed that the EMOS learning outcomes are appropriate and provide good guidance for programme development. That does not mean that they do not recognise the need for updating the learning outcomes and programme curricular periodically. EMOS-labelled programmes showed a high level of awareness for the need to stay up to date with the fast-changing data landscape and labour market needs. This mostly concerns the increasing variety of data sources and the need to equip new statisticians with data management along with data production skills to be able to make use of these data sources in official statistics. To keep up with the changes, many of the EMOS-labelled programmes have already or are planning to introduce more courses on (big) data analytics and programming (Python and R) into their curricula. These changes are in-line with students' opinions. During interviews, students frequently mentioned that their favourite courses were the more practical ones, and expressed a desire for more courses on coding, text mining and machine learning techniques. In the survey, when asked if there was anything they missed in EMOS, many indicated that they missed practical courses in programming and data analysis (12), with specific mentions of training in Python (3), machine learning (2), and SQL (1). While these are important aspects to be included in order to keep the EMOS curriculum up to date, any new courses need to be considered in line with EMOS goals and programme profile.

Another aspect that could be incorporated into the EMOS curricula is statistical production and dissemination at the international and European level. Particularly staff at central banks highlighted that having only a national perspective is not enough given that many of the statistics produced in Europe follow EU-wide regulations and conventions. International organisation representatives also highlighted the difficulties in recruiting people with sufficient knowledge in international official statistics. In that context, EMOS is perfectly positioned to provide students with a broader European perspective on official statistics.



Idea for EMOS

Launching an EMOS summer school

EMOS could create an **interinstitutional summer school**, where students could work on challenges together and interact with NSIs and ONAs from different countries. Students could present the development of their internships and master's theses in events that involve other EMOS-labelled programmes and students from other cohorts. They could also work on complex societal challenges related to statistics. When creating such opportunities, EMOS should carefully consider the associated costs for students. Therefore, it would be important to create funding opportunities whenever possible.

Impact: Community-building, facilitation of collaboration among EMOS partners, and development of shared curriculum.

Implementation horizon: Medium-term as organisation (finding hosts, facilities, dates) might be time-consuming.

4.4.5. Innovative pedagogies

We were not able to collect many details on innovative pedagogies or teaching and learning methods from EMOS reports and university websites, so the information presented in this section comes mostly from interviews and surveys. EMOS-labelled programmes implement pedagogical innovation in teaching and learning mostly by involving practitioners in the curriculum. Lists of EMOS teaching staff reveal that a number of **external professors from other HEIs as well as numerous practitioners** working for NSIs and other research institutes are involved in teaching EMOS courses. According to data on teacher profiles in EMOS annual reports⁵⁴, 394 academics primarily employed at a university

⁵⁴ When this information was not available in 2022 annual reports, we used data from programme applications

and 115 practitioners primarily employed at NSIs, Central Banks, ministries, institutes, or international organisations were listed as EMOS teaching staff.⁵⁵ Some universities relied on academics only (Porto, Bergamo, Trier, Warsaw, Brno, Linz, Helsinki, Leuven, Berlin, Dublin), while others had up to a half of teaching staff coming from NSIs and other external institutions. University of Utrecht presents an interesting case where 10 out of 11 EMOS teachers are from the NSI.

The involvement of practitioners in teaching should ensure its high relevance and practice orientation. They provide first-hand insights, bridging the theoretical aspects of the curriculum with practical applications and offering a unique perspective on the field's challenges. Furthermore, students reported that interactions with practitioners opened doors to networking opportunities, potential mentorships, and insights into various career paths. The survey of students and graduates confirmed that they highly appreciated the involvement of external experts. Close collaboration with NSIs or other institutions and stakeholders from the EMOS network was mentioned by 30% ($n=107$) of graduates as one of the most valuable aspects of the programme. In an open question about their favourite aspect of EMOS, seven students mentioned the interaction with experts and guest lecturers.

Teaching EMOS courses can also be beneficial for the practitioners involved. Interviewees reported that participating in teaching was personally fulfilling and an interesting activity. They reported that students' questions and perspectives brought insightful reflections that enriched their experience.

Besides the teaching collaboration with stakeholders, some EMOS partner HEIs also collaborate with each other and share teaching activities. German HEIs are particularly engaged in collaborative teaching. The University of Trier and LMU Munich developed an online course involving the European Central Bank and Bundesbank, the German central bank. It is a basic EMOS course with recorded video lessons and joint Q&A sessions. This approach promotes a smart and efficient use of resources, which can reduce the costs of EMOS implementation in HEIs. Several coordinators of EMOS-labelled programmes mentioned in their interviews that they could foresee the possibility of integrating at least some of EMOS courses between partners.

Idea for EMOS

Creating shared learning and teaching resources on official statistics, leveraging online and hybrid models

With centralised learning resources provided by Eurostat, HEIs could reduce implementation costs and ensure the sustainability of EMOS even when they have few professors specialised in official statistics. These centralised resources could range from study materials to micro-credentials or full online courses. To generate most impact and represent the European perspective, there could be a centralised online course on official statistics. EMOS secretariat at Eurostat could facilitate the organisation by providing an online platform and administrative support. Partner HEIs could collaborate to administer the lectures in such an online course, potentially on a rotating basis, where each year a couple of universities take responsibility for the course. It would be up to each HEI whether to incorporate the online course in their EMOS curriculum or not. Such an online course has already been implemented in Germany in collaboration with several EMOS universities, the Bundesbank, and the ECB and has been highlighted as a success and an opportunity to attract more students to EMOS.

Impact: Reduced EMOS implementation costs, particularly reducing teaching load for partner HEIs and therefore reducing costs of teaching staff. Increased efficient use of resources.

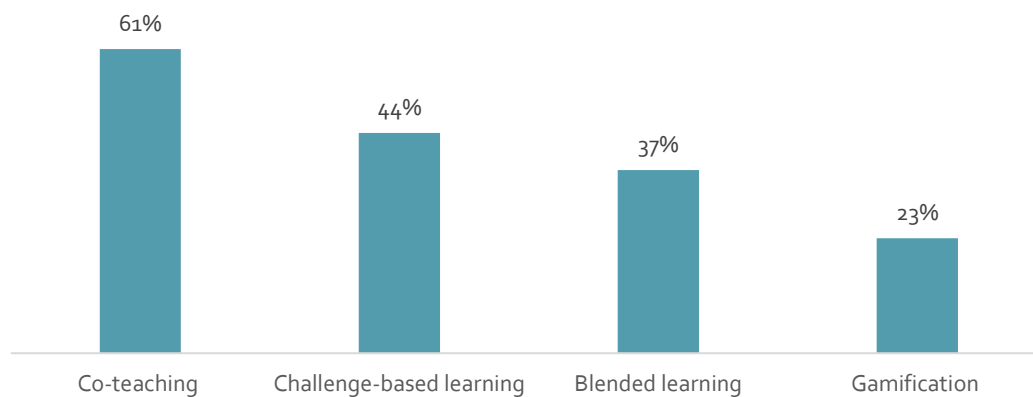
Implementation horizon: Medium-term. There could be significant initial costs for setting up such resources.

⁵⁵ Primary employment is highlighted here because the teacher lists often include people working part time for the NSI and full time for the university, or the other way around. They were categorized by their full time employment, or by the first institution listed first if both were indicated as part time.

However, teaching collaboration is not without its challenges. Guest lecturers often have demanding schedules from their main occupation. Their involvement is typically voluntary and is an addition to their regular duties. This can sometimes lead to a scarcity of practitioners willing to teach. As one practitioner pointed out, while the experience of teaching is rewarding, it often comes without monetary compensation or professional recognition, making it a challenging commitment to sustain. Additionally, some HEIs reported difficulties in recognising credits from courses done in collaboration with other HEIs, or internal rules making online, blended or internationally collaborative teaching difficult to implement.

Apart from co-teaching, some HEIs also report using other innovative pedagogies, with methodologies such as flipped classroom, challenge-based learning, and student-centred learning. The Bucharest University of Economic Studies, for example, created an EMOS lab, which is a dedicated classroom with computers and a library, focused on promoting EMOS student interaction and providing an appropriate structure for practice-based lessons where students use specific statistical software. Other universities reported that several assignments involve project-based learning, with students working in groups, developing their own projects, and presenting them to their peers. Students also often use real-world data in their assignments. Findings from the student and graduate survey confirm that co-teaching is the most common innovative pedagogy applied in EMOS courses and show a strong presence of challenge-based learning and blended learning, as indicated in Figure 15.

FIGURE 15. WERE ANY INNOVATIVE PEDAGOGIES APPLIED UNDER EMOS SPECIALISATION TRACK? (PLEASE SELECT ALL THAT APPLY)



Source: PPMI survey of EMOS students and graduates, $n=161$ (since students could select more than one option, the sum of the percentages is greater than 100%)

In terms of flexible curricula and student-centred learning, EMOS tracks or modules increase the options for specialisation within the core programmes, but the core **compulsory EMOS curriculum itself is usually rather narrow and specialised**. Only a few official statistics-specific seminars are typically offered by the EMOS HEIs and so the opportunities to personalise the curriculum within the discipline of official statistics are limited. This is largely due to the relatively low number of students in most of the EMOS HEIs as well as a high specificity of the discipline and a limited number of teachers available. Despite these challenges, survey findings confirm that more than half of the students and graduates were able to personalise their EMOS study path to some or lesser extent, and 11% of them ($n=191$) said they were not able to do so at all.

Overall, innovative pedagogies, besides co-teaching, seem to be highly dependent on initiative of the partner HEI and the teacher. The same course can be implemented using several innovative pedagogies or in a very traditional way, depending on the partner HEI and the teacher. EMOS does not have guidelines for the use of innovative pedagogies, so while there are numerous good examples across partner HEIs, they are not a rule.

4.4.6. Internships

Compulsory EMOS internships offer students a unique opportunity to acquire practical experiences in official statistics. 165 EMOS traineeships took place in the academic year of 2021-2022, and 199 took place in 2022-2023. Eurostat provides guidelines on how internships should be organised in EMOS labelled programmes, but their structure and organisation vary considerably. The type of hosting organisations, mode of internships, duration and intensity are some of the aspects that vary among programmes.

The information from our survey and from the EMOS Annual Reports shows that NSIs and ONAS are the main internship hosts, but a significant number of internships is hosted by private companies, central banks, ministries, and research organisations. With several EMOS-labelled programmes in Italy, ISTAT (the Italian NSI) is the most active host of EMOS internships. ISTAT is followed by INSEE (the French NSI) and Statistics Netherlands (the Dutch NSI). While there is also a substantial number of EMOS students in Poland and Germany, the interns are more distributed across diverse regional statistical offices and other institutes. Even though a traineeship with a public official statistics producer or other public body is a requirement of EMOS, some students (from ENSAI/Rennes, University of Lodz and Bucharest University) completed their placements in the private sector.

Despite the diversity of hosts, many programmes are relying on their local NSI as the sole internship host. Students have mentioned that they are not always satisfied with the variety of internship hosts and expressed a desire for a greater diversity of internship opportunities.

EMOS coordinators also expressed the desire for more flexible guidelines from Eurostat, which would allow them to reach out to different institutions and diversify the internship offer, showing that an official statistics specialisation does not limit career opportunities, and, potentially, attract more students to EMOS. The current mandate is sometimes seen as a limitation, particularly the restriction on private sector hosts.

Additionally, HEIs expressed concerns over the capacities of NSIs to absorb trainees. If EMOS programmes were to attract more students, the NSIs might not be able to host all of them with the appropriate level of dedication.

Eurostat was often mentioned as a desirable internship host, both by students and EMOS-labelled programme coordinators. The strong reputation of the institution in the European context and its pan-European orientation makes it a very attractive alternative to the local/national statistical offices.

 Idea for EMOS

Expanding the network of internship hosts beyond NSIs and ESS

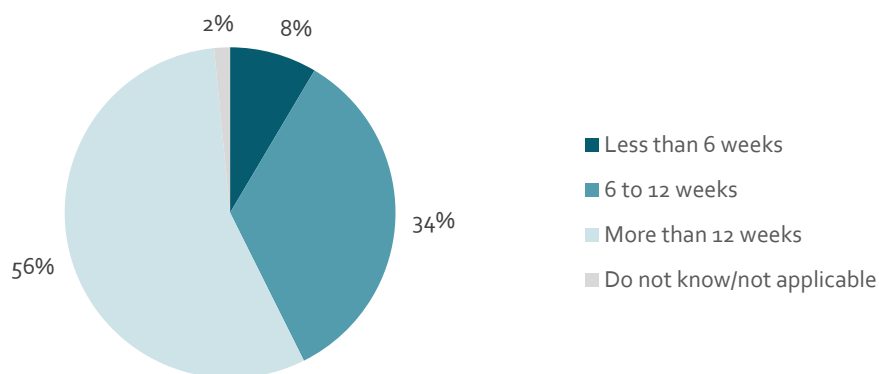
Students and HEIs flagged the opportunity to expand the internship offer with international organisations, line ministries, and other public organisations that use official statistics. Despite this already happens in practice, it is currently underexplored in EMOS-labelled programmes. EU-level organisations such as the Eurostat and JRC, and international organisations such as OECD and UN agencies would be highly attractive to students and still aligned with EMOS learning outcomes. To further expand internship offers, students could be allowed to conduct their internships in private sector organisations, as long as they find a topic related to official statistics. Eurostat, similarly, to JRC having their own scientific traineeship programme, could develop alternative possibilities to host EMOS students as interns or offer short study visits and training

Impact: Increased attractiveness of EMOS and preparation for its expansion by surpassing the limited capacity of NSIs to host interns.

Implementation horizon: Short- to medium-term.

Full-time internships of at least 6 weeks are a compulsory part of EMOS curriculum. Still internships vary significantly in duration and intensity. While some require full-time commitment over a few weeks, others span over several months with part-time involvement. This is seen at KU Leuven, for example, where students work two days a week for the whole academic year. Additionally, some programmes, for example, the University of Luxembourg, apply a 2-phase approach where students complete two internships with the same host. This variability in the internship structure and in academic calendars of EMOS programmes has posed challenges in organising cross-border internships and mobility between EMOS partners, which will be further explored in the next sections. The survey responses show that most internships last longer than the minimum requirement of 6 weeks set by Eurostat, with 56% of respondents reporting that their internship lasted for more than 12 weeks. For 8% of the respondents, the internship lasted less than the minimum requirement of 6 weeks, as shown in Figure 16.

FIGURE 16. WHAT WAS/WILL BE THE DURATION OF YOUR INTERNSHIP?



Source: PPMI survey of EMOS students and graduates, *n*=129

Finally, internships also vary in their modes of execution, from fully on-site to hybrid and fully remote. According to our survey, 43% of EMOS students and graduates performed an on-site, 31% hybrid and 26% a remote internship (*n*=129). Looking only at EMOS graduates, the percentage of remote internships was even higher, probably due to the COVID-19 pandemic. There is a large variation of internship

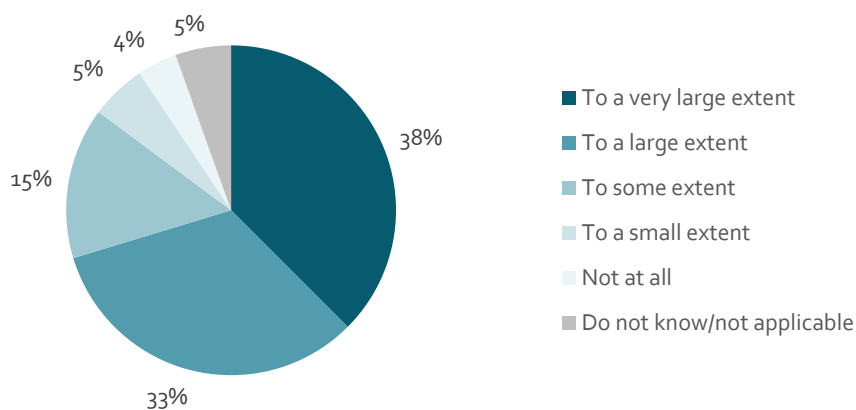
execution modes per country, with Italy hosting most internships online, and France hosting most internships on-site⁵⁶.

While remote and hybrid internships are a reality for many EMOS students, they have been met with mixed reactions. Some students appreciate the flexibility that remote internships offer. It is easier to accommodate family commitments or cut relocation costs considering that EMOS internships are generally unpaid. Others miss the richness of interaction and learning that comes with physical presence. ISTAT usually offers remote internships due to limited office space, relatively high number of interns, and the possibility to offer opportunities to students based all over Italy. Especially here, students could benefit from a greater variety of internship hosts allowing them to choose on-site placements if they prefer.

Student perspective

Internships are generally highly appreciated by EMOS students and graduates. They were mentioned by 43% of graduates ($n=107$) as one of the most valuable aspects of the EMOS programme. In one of the open-ended questions of the survey, internships were often mentioned (9 instances) as one of the students' favourite parts of their EMOS experience. As shown in Figure 17, 71% of the students and graduates said they were largely or very largely satisfied with their internship experience.

FIGURE 17. HOW SATISFIED ARE YOU WITH YOUR OVERALL INTERNSHIP EXPERIENCE?



Source: PPMI survey of EMOS students and graduates, $n=128$

One of the most important benefits of EMOS internships is the opportunity for students to **apply the theoretical knowledge they acquire in the classroom** to real-world situations, as stated by 95% of students ($n=21$) and 78% of graduates ($n=91$). Internships help students to understand the practical implications and applications of what they learn and decide whether they see themselves working in official statistics after graduation.

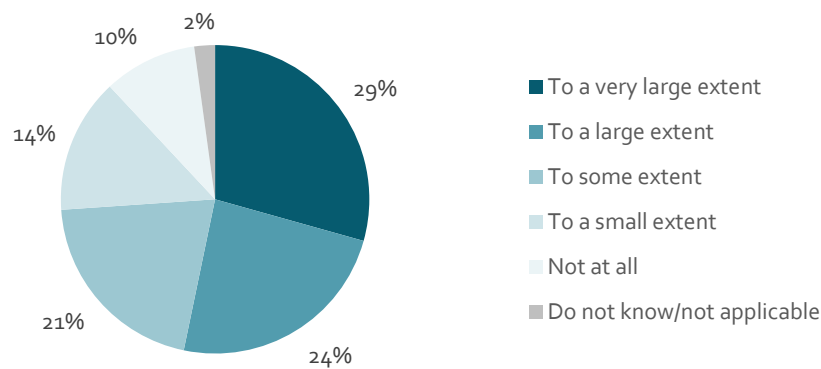
Furthermore, internships also **developed important skills** such as real-world data cleaning, validation, and interpretation, teamwork and problem-solving, next to exposure to the nuances of working in

⁵⁶ In Italy, 66% of students and graduates had a remote internship, followed by 21% who did a hybrid and only 13% and onsite internship ($n=38$). In France, only 7% of graduates did their internship remotely, with 58% being onsite and 35% hybrid ($n=40$).

organisations producing official statistics. Many students mentioned the **interesting research opportunities** that internships present. Some published academic papers building on the work done during their internship. Students also often mentioned that the internships were essential for the preparation of their master’s theses.

Survey findings show that 53% of graduates think their internship was very useful for their career development, and only 10% said it was not useful at all, as shown in Figure 18.

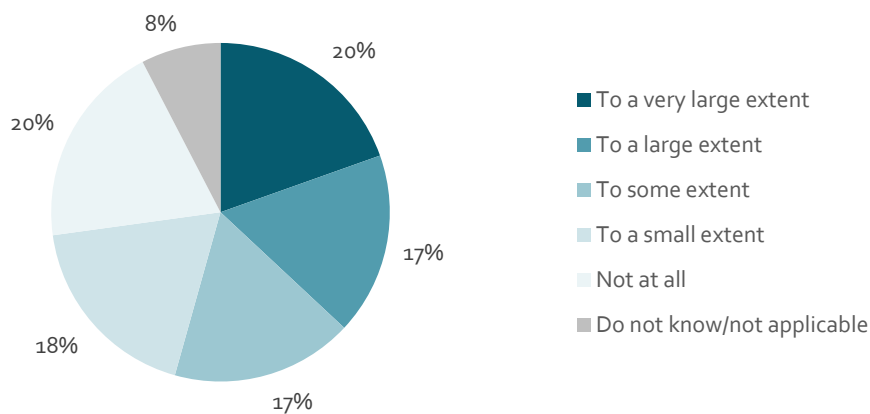
FIGURE 18. WAS THE INTERNSHIP USEFUL FOR YOUR CAREER DEVELOPMENT?



Source: PPMI survey of EMOS graduates, n=92

Finally, internships provide students with a clear understanding of what working in official statistics entails, which helps them **make informed decisions** about whether this is the right career path for them. The internship influenced career development of 72% of EMOS graduates to at least some extent, as shown in Figure 19.

FIGURE 19. DID THE INTERNSHIP INFLUENCE YOUR CAREER CHOICE?



Source: PPMI survey of EMOS graduates, n=92

Internships have also presented a set of challenges for students. A significant concern is posed by the increasing number of **working students**. Many EMOS students are employed either part- or full-time, which restricts their availability and motivation to engage in additional internships, especially when those are unpaid. Some programmes reported that two thirds of their students are employed at least part-time.

Some HEIs such as ENSAI and NOVA University Lisbon have tried to align the internships of the working students with their jobs by, for example, asking them to develop projects related to official statistics within their existing roles. However, this approach is not always feasible, leaving many working students in a difficult position.

The **preparedness of host institutions** to provide adequate guidance and support to trainees is another area of concern reported by several students. This sometimes resulted in students feeling that they were not engaged in meaningful work. To enhance the overall student experience, EMOS-labelled universities should take action to follow up with students after their internship and help them reflect on their experience.

Finally, financial considerations also play a crucial role in the student experience with internships. There is some variety in the financial support offered by hosts and HEIs, but usually, apart from allowances for relocation or commuting, the internships are unpaid, which can discourage students. Lastly, **language barriers** present another significant challenge, with many NSIs operating exclusively in their local languages. This is particularly challenging for programmes that attract large numbers of international students.

Employer (host) perspective

For hosts, as much as for students, EMOS internships have brought significant benefits. 37% of surveyed stakeholders ($n=27$) mentioned that having access to a pool of students interested in internships at their organisation was one of the key benefits of being in the EMOS network. EMOS interns can help the host organisations to **address specific tasks and challenges** that often remain unattended due to the daily operational demands. Interviewees mentioned that the collaboration with EMOS universities has consistently brought in competent students capable of conducting quality research on topics of interest of the host institution. In many instances these research projects were transformed into master's theses and subsequent publications, the synergy benefitting both students' academic journeys and the internship host institutions.

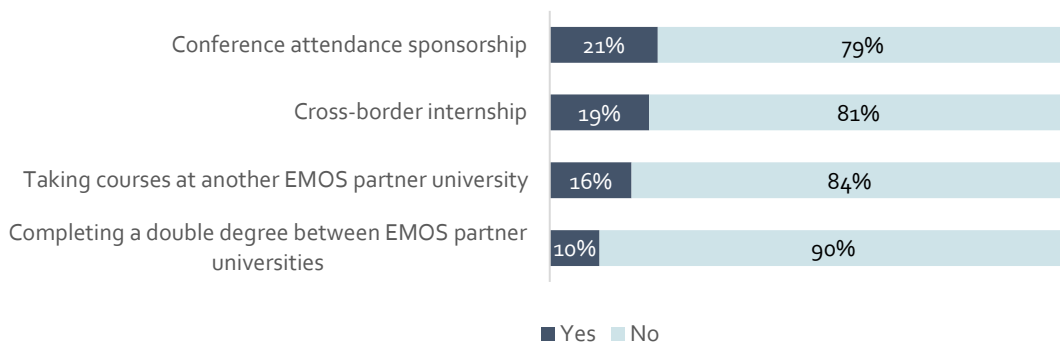
Hosting EMOS interns also presents a series of challenges, as mentioned by a number of interviewees. One of the primary concerns is the substantial investment required from the hosts, both in terms of **time and resources**. The internships are time-consuming for host institutions, requiring a considerable commitment to instruct and supervise the students. 23% of the surveyed EMOS stakeholders ($n=22$) mentioned that the administrative burden related to organising internships is one of the key challenges of being a part of the EMOS network. Furthermore, finding thematically suitable projects for students that also align with the academic calendar of the university is often a complex task. Lastly, interviewees reported difficulties in convincing high-level management at the host organisations about the **added value of EMOS internships**, which results in a lack of substantial support in terms of resources to effectively facilitate internships. Raising the international profile of EMOS could help get more support from top management.

4.4.7. Mobility opportunities

With a network of several HEIs in Europe, EMOS is well-positioned to foster student and staff mobility and leverage resources and knowledge from the different partner institutions. Exchanges between students and staff could help EMOS-labelled programmes to strengthen and develop and would reinforce the European and transnational aspect of the programme. We identified three main opportunities for mobility at the student level: conference attendance sponsorship, cross-border traineeships, and learning mobilities, which can encompass taking courses at a partner university, or completing a joint/double degree between EMOS partners. We did not identify any structured opportunities for staff mobility within the EMOS network.

Regarding student mobility, we found that most EMOS students do not take part in any type of mobility during their studies. As Figure 20 shows, relatively few students indicated that they have taken or plan to make use of EMOS mobility opportunities. Looking into why students do not make use of EMOS mobility opportunities, **lack of awareness** clearly stands out as the main reason pointed out by more than half of respondents. Other significant barriers include lack of time or interest, and family-related reasons for long-term mobility. The reasons why EMOS students and graduates took advantage of mobility opportunities varied by type of activity. Still, for all three types of mobility indicated in the survey, students mentioned that the cultural experience was one of the most important drivers for participation.

FIGURE 20. DID YOU UNDERTAKE OR PLAN TO UNDERTAKE ANY EMOS MOBILITY OPPORTUNITIES DURING YOUR STUDIES?



Source: PPMI survey of EMOS students and graduates, *n*=177

Learning mobility

The European Platform on Learning Mobility in the youth field (EPLM) defines learning mobility in the youth field as “mobility of young people (transnationally, regionally or online) undertaken freely and voluntarily for a specific period of time, consciously organised for educational purposes, to impact on the local community or to acquire new competences (knowledge, skills, attitudes or values). It

encompasses a wide variety of project formats and activities and can be implemented in informal or non-formal education settings”⁵⁷.

Learning mobility opportunities would include taking courses at other EMOS partner universities and joining for summer school or short learning opportunities abroad. Most of the learning mobility within the EMOS network is facilitated through the Erasmus+ framework. Universities within the EMOS network often recommend partner institutions for Erasmus exchanges as they have similar learning goals in their courses. Multiple EMOS universities have mobility agreements with each other, but student interest in those remains rather limited. Only four students reported to have participated in learning mobility in our survey. They all found it useful for career, academic and thesis development, as well as networking.

In terms of challenges, only one out of four respondents rated the sufficiency of funding positively (two of them received funding through Erasmus+ and one from the sending university). Our interviews showed that there is no unified approach to funding EMOS learning mobilities and students often have to seek out their own funding. Another challenge related to EMOS learning mobility involves the heterogeneity of the European higher education system, especially concerning graduate course fees. Some institutions, like NOVA University Lisbon, have higher course fees, making it challenging to accept many exchange students without inadvertently offering a backdoor to their courses at reduced or no cost. Moreover, the EMOS curriculum is intensive, and students are often focused on completing their internships for the better part of the second year of their studies. This makes it challenging to fit longer mobility periods in the EMOS schedule. Some students have expressed reservations about spending a significant portion of their programme abroad, especially when it is uncertain how the courses offered will align with their primary programme's requirements. Additionally, financial constraints restrict students' ability to take part in mobility offers.



Idea for EMOS

Creating more opportunities for coordinated short- and long-term student mobility within the EMOS network

Mobility agreements currently depend on the bilateral relations among EMOS partner HEIs. Eurostat could incentivise the utilisation of the full EMOS network for mobility opportunities, prompting credit recognition and providing information about courses in EMOS partner universities that are open to international students. Additionally, EMOS could promote short-term mobility as well as semester mobilities to provide mobility opportunities even when the tight schedule of EMOS programmes does not allow for long periods abroad.

Impact: Improved learning experience, transversal skills development, cultural exposure, language skills for EMOS students and better use of the EMOS network.

Implementation horizon: Medium-term, as promoting credit recognition and creating mechanisms for students to easily identify mobility opportunities within the EMOS network will take some time.

When asked if they had any suggestions to improve the EMOS course mobility, students mentioned that the procedures for mobility could be simplified among EMOS partners. Many said that it took the same effort to participate in learning mobility outside of EMOS partners. Creating strong agreements for funding, credit mobility and reduced bureaucracy between EMOS network partners can help lower participation costs for students and incentivise mobility within the network.

⁵⁷ <https://pjp-eu.coe.int/en/web/youth-partnership/european-platform-on-learning-mobility>

Several EMOS programmes have initiated collaborations to develop joint or double degrees. One of the notable successes is the double degree programme between the University of Pisa and the University of Trier. This collaboration has already seen its first batch of students graduate, with more currently pursuing their studies in Trier. Notably, the flow of students, for the time being, has been predominantly from Pisa to Trier. Additionally, the partnership between ENSAI/Rennes and Rome La Sapienza has also been fruitful, attracting a steady stream of students each year. Another promising collaboration started between the University of Bergamo and the University of Trier, even though there is no double degree foreseen.

Cross-border internships

Cross-border internships are a recent EMOS mobility initiative allowing students to expand their cultural and professional horizons by completing their internship in a different country. These internships are perceived as an important opportunity for students to immerse themselves in a different cultural and professional environment, where they can observe and learn diverse methodologies applied by national authorities in various countries.

More than for other types of mobility, students chose to take cross-border internships because they expected a positive reflection on their CV. 81% of respondents who performed or intended to perform a cross-border traineeship ($n=21$) mentioned a positive reflection on their CV as one of the main reasons for participating in this type of mobility. Secondly, and as with all other mobility types, students mentioned the cultural experience as one of the reasons to carry out a cross-border traineeship (76%, $n=21$). Students who participated in cross-border internships reported positively on the experience, with special appreciation for the usefulness of the internship for their career development and networking opportunities it provided.

However, in our survey, only about a dozen survey respondents completed a cross-border internship. Students mentioned that the main reason why they did not participate in cross-border traineeships was because they did not know about this opportunity. Survey results reveal that more than half of current EMOS students were not aware of cross-border internship opportunities.

Besides issues with communication and awareness, students reported that there are currently too few opportunities advertised for cross-border internships. Programme managers mentioned the same issue in their Annual Reports of 2023. Another important challenge is the timing and topics of these internships. It is challenging for students to find a cross-border internship that fits both the academic schedule and internship requirements of their home HEI without delaying their graduation. To solve that issue, programme managers suggested shorter cross-border internships, where the students are not required to leave their studies for a substantial period of time.

Conference attendance sponsorship

The EMOS conference sponsorship programme was launched in 2021, along with the cross-border traineeships. It is an opportunity for students to receive sponsorship to attend academic conferences, with a particular emphasis on the NTTs. From the feedback gathered in student interviews and survey, it is evident that students who have attended these conferences have found the experience enriching. Their participation not only enhances their academic profile but also instils a sense of belonging to the European statistical community. Many students reported that this was the only opportunity they had to meet colleagues from other EMOS programmes, which was highly appreciated. Survey data also

shows that students evaluated their experience in attending EMOS-sponsored conferences very positively. Programme managers also evaluate this opportunity positively. For 59% of programme managers, the conference sponsorship is a very useful tool, as described in the 2023 Annual Reports.

However, as reflected in the small size of the survey sample, not many EMOS students made use of the conference sponsorship. Some coordinators mentioned that, while they do circulate the information on the opportunity to students, the uptake has been limited. From the student perspective, as with other mobility types, the main reason not to participate in conferences sponsored by EMOS was lack of awareness of this opportunity, followed by a lack of time.

4.4.8. Supporting EMOS activities

EMOS offers a range of supporting activities designed to enhance the student experience and foster a sense of community. The main activities currently offered are: (1) Master Thesis Competition, (2) EMOS webinars, (3) EMOS workshop, and (4) the European Big Data Hackathon.

EMOS Master Thesis Competition has been largely appreciated for fostering a sense of belonging to a broader European statistical community. The competition is seen as an avenue for students to showcase their research on a European platform, emphasising the pan-European nature of the EMOS programme. For some students, it has been their first taste of international recognition, validating the hard work they put into their research.

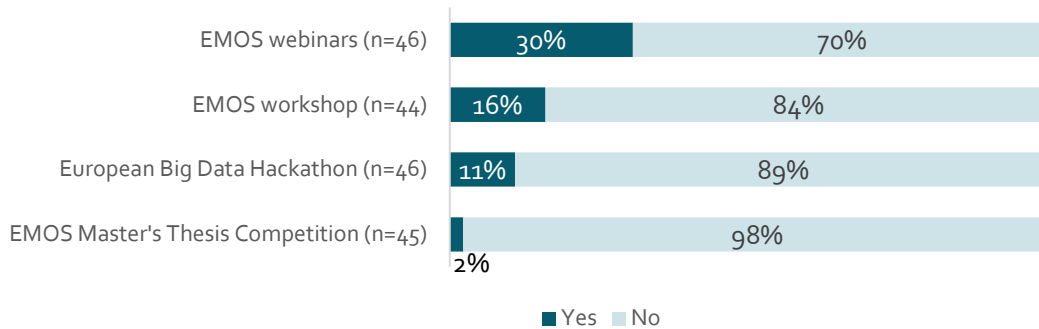
EMOS webinars are another important supporting activity for enhancing the learning experience of EMOS students. They cover a range of topics pertinent to the field and offer a flexible and accessible means of education. The feedback from students and graduates on the content and quality of the webinars has been largely positive. They mentioned that the possibility to explore other topics in official statistics was one of the main reasons to join the webinars.

The EMOS workshop was highlighted by interviewees as a good platform for individuals to connect, share experiences, and learn from one another. Students, staff and programme managers all expressed their appreciation for the networking opportunities provided by the workshop. The feedback from the 2023 event in Prague was particularly positive. In the 2023 Annual Reports submitted by EMOS-labelled programmes, 93% of coordinators said that the workshop was at least somewhat useful. One coordinator mentioned that it was a good opportunity to make connections with potential internship hosts for their students.

The **European Big Data Hackathon** is organised by Eurostat for the broader ESS community, and a certain number of EMOS students are invited to join every edition. Students who joined this activity said it offered them a unique platform to showcase their skills and collaborate in real-time problem-solving scenarios.

Despite the positive feedback from students and programme coordinators, student participation in EMOS supporting activities is low, as shown in Figure 21.

FIGURE 21. DID YOU PARTICIPATE IN ANY OF THE FOLLOWING SUPPORTING EMOS ACTIVITIES?

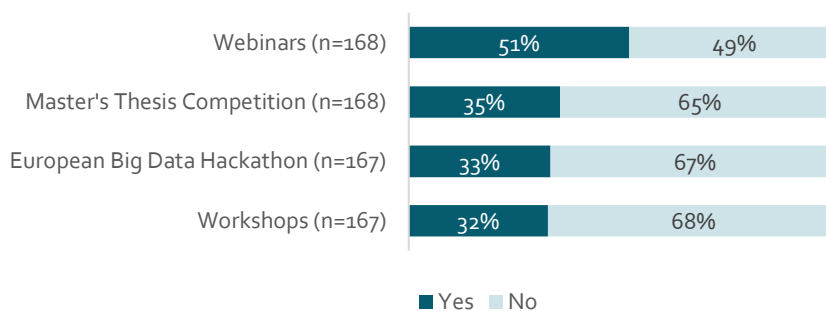


Source: PPMI survey of EMOS students and graduates

The most popular activity are EMOS Webinars, which can be explained by the ease of participation in such events. There are no costs involved, and students can join online from anywhere. In contrast, the least popular activity is the Master Thesis Competition. Possible reasons for this are that the competition only happens every two years, and that students cannot apply on their own, but need to be nominated by their professors.

For all activities, two main barriers to student participation emerge. The first, and most important is the **lack of awareness about the opportunities**. Figure 22 shows that most activities are unknown to many EMOS students, with almost 70% of respondents being unaware of EMOS workshop and the European Big Data Hackathon:

FIGURE 22. HAVE YOU HEARD OF THE FOLLOWING SUPPORTING EMOS ACTIVITIES?



Source: PPMI survey of EMOS students and graduates

 Idea for EMOS

Creating an academic advisory/counselling role to support awareness of opportunities within EMOS

Assign a student supervisor/contact person that helps the student in mapping/planning their programme participation. They should support the student in making informed choices about their learning journey as an EMOS student. This interaction/relationship would provide another quality layer to the student experience making sure that the opportunities that EMOS offers are fully leveraged by the students according to their personal situation and goals. A counsellor could be made available by the EMOS secretariat to all the EMOS programmes. Alternatively, the European University INVEST has developed an AI-based system that mimics the human experience in academic advising⁵⁸. This joint tool provides students with informed recommendations on study tracks within the alliance. EMOS could explore a similar solution, which is more scalable and cost-effective than having contact points working as academic advisors.

Impact: Improved awareness of EMOS supporting activities, increasing student participation, and enriching student learning experience.

Implementation horizon: Short-term if implemented using a contact person/counsellor, medium-term if implemented through the development of an AI based system.

Another common barrier for student participation is the **lack of time**. The time commitment required for these activities deters students, especially if they are not rewarded with ECTS credits and do not contribute to the completion of the degree, as noted by many EMOS coordinators.

 Idea for EMOS

Offer extra credits or microcredentials to recognise student participation in EMOS supporting activities

To foster student participation in EMOS supporting activities, and to increase the possibilities for students to design their own study paths, EMOS-labelled programmes could offer extra-credits for participation in such activities. Many universities have already started to integrate EMOS Webinars into their regular curriculum. The University of Bergamo, for instance, has utilised EMOS webinars as a substitute for their thematic activities, which often involve guest lectures. This approach not only ensures continuity in learning but also provides students with insights from a diverse range of experts without the logistical challenges of physical visits. Other institutions have even made attendance in a few webinars mandatory or have incorporated webinars into courses, reflecting their perceived importance.

Similarly, student participation could be promoted by issuing digital badges of participation. These could be done by Eurostat in the format of microcredentials.

Impact: Increasing student participation, and enriching student learning experience.

Implementation horizon: Short-term.

Other supporting activities

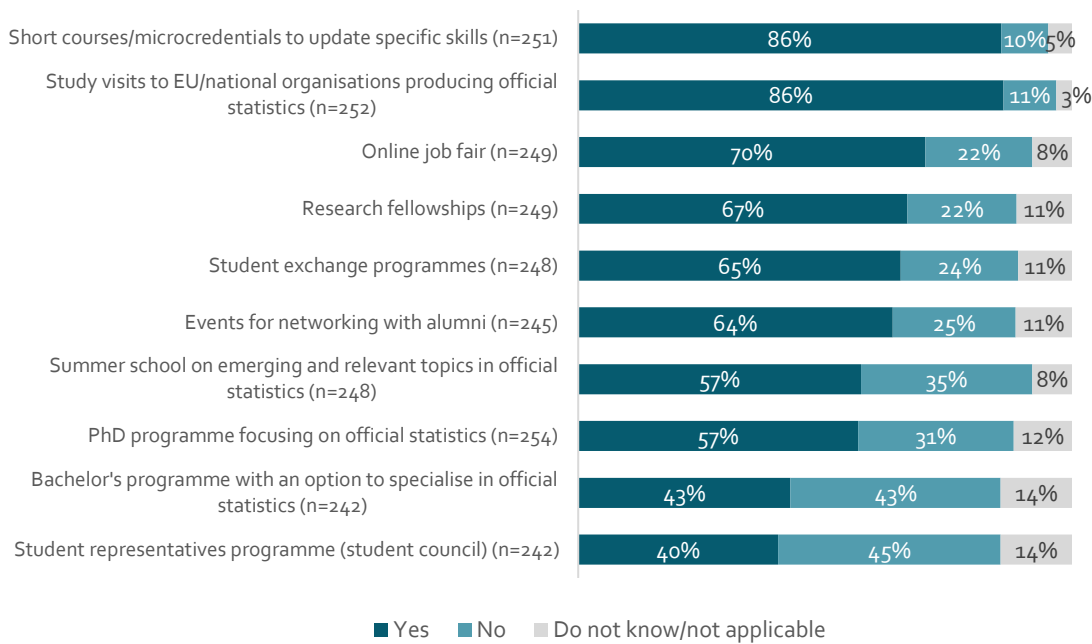
Overall, our study reveals that students value the supporting activities provided by Eurostat and are enthusiastic about initiatives that allow them to engage with the broader European statistical community. There was an enormous pledge from interviewees for more frequent and meaningful interaction within the EMOS network. Activities that facilitate physical interactions, such as meetings or hackathons, are particularly valued. Such events allow students to establish contacts, understand the workings of official statistical institutions, and appreciate the broader European context of their studies.

Introducing new supporting activities for EMOS students can be an easy way to improve the experience within EMOS programmes and can increase the attractiveness of the programme without making substantial changes in the learning outcomes or implementation of the programme. Figure 23 lists

⁵⁸ <https://educ8eu.invest-alliance.eu/engine/>

activities that surveyed students, graduates and potential students would be most attracted to, with short courses and study visits topping the list by a notable margin. These findings are very much in line with the opinions of graduates interviewed as part of the study, often indicating that the European Statistics Week was their best EMOS experience and is missed since its discontinuation due to the COVID-19 pandemic.

FIGURE 23. IF THE FOLLOWING ACTIVITIES WERE OFFERED BY YOUR UNIVERSITY/STUDY PROGRAMME, WOULD YOU BE INTERESTED IN TAKING THEM?



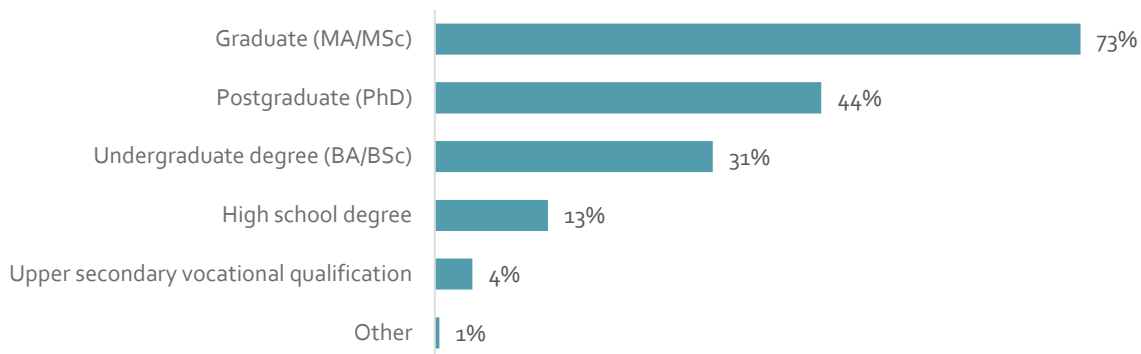
Source: PPMI survey of EMOS students, graduates, and potential students

4.5. Graduate employability

This section presents the characteristics of the EMOS employment market, skills needed, and challenges of the official statistics sector related to employability.

The findings of the survey of (potential) EMOS stakeholders and employers showed that master’s degrees are the most prevalent qualifications held by employees working in official statistics and related fields, with three-quarters of the employees holding a master’s degree as shown in Figure 24. PhD degrees are the second most common qualification (44%), followed by bachelor’s (31%). Comparatively, a few (17%) employees have vocational or high school degrees, in some cases associated with dual education systems. For example, countries such as Germany and the Netherlands educate employees in the workplace and allow them to obtain degrees on the job.

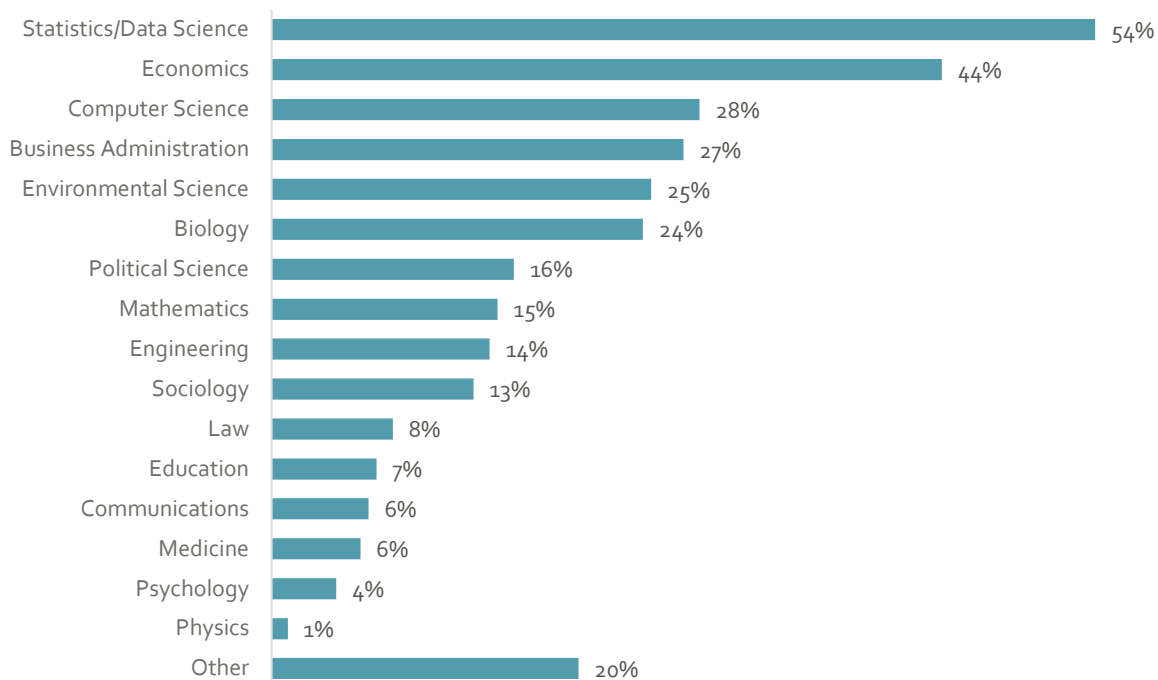
FIGURE 24. WHAT IS THE MOST COMMON QUALIFICATION LEVEL OF EMPLOYEES WORKING IN THE PRIMARY ACTIVITY OF YOUR ORGANISATION?



Source: PPMI survey of (potential) EMOS stakeholders and employers (N=188). Since stakeholders could select more than one option, the sum of the percentages is greater than 100%.

From the perspective of NSIs alone, the distribution of qualification levels differs. Although the graduate (MA/MSc) level remained the main qualification (44%), it was followed by undergraduate degrees (14%), and high school and/or vocational training degrees (11%). The PhD level was the lowest employed qualification (6%) for NSIs. Hence, the data suggest that NSIs require employees mostly with master’s level qualifications, and EMOS is in line with this requirement.

(Potential) EMOS stakeholders and employers described the ideal profile as a combination of a statistician and an IT specialist. However, some profiles comprehend high levels of interdisciplinarity, including social science backgrounds such as business, political sciences, and sociology. This variation relates to the fact that statistics are embedded in other academic programmes in some countries. Apart from NSIs, other public organisations may require and/or prefer candidates with subject-domain knowledge related to the organisation’s field of action. This is especially relevant for public organisations in sectors such as agriculture, banking, environment, and health. Figure 25 provides an overview of the most common educational backgrounds of employees working in organisations of (potential) EMOS stakeholders and employers.

FIGURE 25. WHAT ARE THE MOST COMMON EDUCATIONAL BACKGROUNDS OF EMPLOYEES WORKING IN THE PRIMARY ACTIVITY OF YOUR ORGANISATION?

Source: PPMI survey of (potential) EMOS stakeholders and employers (N=188). Since stakeholders could select more than one option, the sum of the percentages is greater than 100%.

Despite statisticians, data scientists and economists dominating employment in official statistics and related fields, Figure 25 also presents a wide variety of profiles. The 'Other' category (20%) was heavily dominated by profiles from the agri-food sector (28 mentions), followed by scattered profiles from development studies, geography, international relations, philosophy, and public health, as indicated in the open-ended survey responses. From the perspective of NSIs alone, the top five profiles employed are economics (79%), statistics/data science (74%), computer science (50%), mathematics (44%), and business administration (35%), indicating a stronger focus on professionals with quantitative/computer science backgrounds.

The NSIs representatives interviewed for this study noted that EMOS graduate profiles are highly attractive because of curriculum alignment with their requirements. The fact that NSIs can participate in training as professors and mentors in the development of the EMOS curriculum ensures a match between their employers and graduates. They also noted the graduates' high-level skillset in methodology, analysis, coding, and soft skills as an asset to their organisations. They appreciate that EMOS graduates are highly interested in official statistics, and their skills are an asset to their organisations. EMOS graduates seamlessly integrate into public positions because they have a network and knowledge of the institutional ecosystem of official statistics. Some NSI representatives describe EMOS graduates as 'plug-and-play' profiles since they do not require additional training to start in a position in official statistics.

The interviewed coordinators of EMOS-labelled master's programmes reported high employment rates for EMOS graduates. Although some HEIs do not track graduate trajectories, others have formal tracking mechanisms at the institutional level. However, informal tracking through close connections

among coordinators of EMOS-labelled master's programmes, professors, and graduates is prevalent. Coordinators of EMOS-labelled master's programmes noted that several students did indeed end up working for NSIs, regional statistics offices, or chose an academic career in official statistics, but they perceived that this is not the trend. Professionals with statistical and data skills are in high demand and many students secure jobs in the private sector even before graduation.



Idea for EMOS

Introducing graduate tracking systems as a requirement for EMOS Label

Introducing graduate tracking systems as a requirement for EMOS-labelled programs has the potential to consolidate information on the impact of the label over time and its effectiveness. The results of a tracking system can provide prospective and current students with clear visibility of the career trajectories of EMOS graduates, empowering them to make informed decisions. Additionally, it might help map career trajectories and key new stakeholders employing EMOS graduates. Graduate tracking systems usually align with the EUROGRADUATE Survey, reflecting graduates' personal and social backgrounds, educational careers, transitions to work, work history, skills, job satisfaction, and social outcomes.

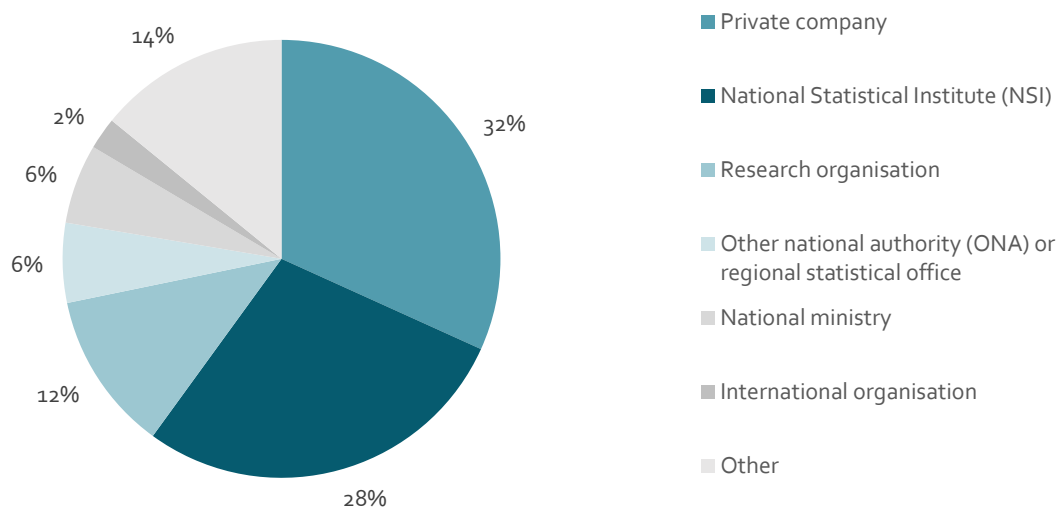
There is a potential for rapid adoption within existing EMOS programmes by including this requirement for EMOS programmes, as other labels such as EMT do. This implies agreement on the strategy, technological tools, and responsibility of designing, applying, and presenting the results of the tool. The tracking system can be applied by each HEI or centralised at Eurostat. Such a tracking system can be applied to recent graduates and specific cohorts to create a comparative contrast, especially since graduates are likely to transition to NSIs or other public sector institutions several years rather than immediately after graduation.

Impact: Facilitation of informed decision-making for (prospective) students while identifying the label's overall effectiveness.

Implementation horizon: Mid- to short-term.

EMOS graduates pursuing PhD degrees and academic careers often develop their programme within the EMOS academic network and collaborate with their public sector internship hosts. In the interviews, they expressed that the academic path was attractive to them because of the challenging learning opportunities provided. Academic positions allow them to combine research with work in diverse public organisations, which they see as an attractive pathway because of the applied nature of their research. Some interviewees saw an opportunity to expand EMOS to the PhD level by launching 'EDOS', European Doctorate in Official Statistics. This PhD could be organised as a joint degree, taking advantage of MSCA funding, and leveraging the already existing EMOS network. 'EDOS' would provide EMOS graduates with academic career opportunities and contribute to the development of official statistics as an academic discipline. However, a PhD programme would enrol a reduced number of students, and the capacity of NSIs to employ PhDs is low.

The EMOS graduates participating in the 2023 PPMI survey reported high employment rates (n=89). 82% were employed full-time, 11% were studying, 3% were self-employed, and 3% were unemployed. The survey respondents were pursuing PhD degrees and enrolled in an internship in one case. Most EMOS graduates work in the private sector (32%), NSIs (28%), and research organisations (12%), as shown in Figure 26. This finding contrasts with the low number of international organisations (2%). Under the 'other' option, six graduates indicated working in HEIs and scattered positions in multinational companies, regional councils, and a parliament of a European country. Overall, a third of EMOS graduates end up working in the private sector, while 40% embark on public sector careers at an NSI, ONA or national ministry.

FIGURE 26. IN WHICH TYPE OF ORGANISATION ARE YOU EMPLOYED?


Source: PPMI survey of EMOS graduates (N=85).

Analysing the data separately for countries with more respondents, France (n=37) and Italy (n=23), we can see opposite trends. While two thirds (68%) of EMOS graduates in France work for an NSI or ONA, none of the Italians do. Similarly, 11% of graduates in France and 61% of Italians work in the private sector. This might be directly related to the fact that Italy has a high number of graduates for one statistical office with complex hiring procedures, and to the organisation of EMOS in France as a professional development programme for public servants from diverse ministries, public organisations, and public agencies. The programme remains open to diverse students who want to join, and it is at the same time a lifelong learning opportunity for public servants. This case suggests the possibility for EMOS to become a graduate certificate/diploma for professionals in official statistics working in the public sector. Through agreements with the public sector, employees who need skills in official statistics would have the opportunity to have a study licence and earn an EMOS graduate certificate/diploma. At the end of their studies, they would return to the sending organisations with new knowledge to deploy.

Overall, the EMOS graduates interviewed reported high levels of satisfaction with their career paths and did not experience periods of unemployment. 42% (N=90) of the surveyed graduates considered that the EMOS diploma supplement was useful for their careers to a very large or large extent and an additional 31% (N=90) thought it was useful for their careers to some extent. As the attractiveness of the private sector, graduates emphasised competitive salaries, diverse career prospects, and strong employer reputations as the most appealing factors. Some interviewed graduates, EMOS programme coordinators, and private sector organisations suggest expanding EMOS network partners to the private sector.

EMOS graduates working in the public sector expressed high job satisfaction because they found personal fulfilment in their contributions to society through their work. Despite recognising that EMOS does not make any difference in the hiring procedures of the public sector, graduates acknowledged

that the skills and knowledge acquired through EMOS facilitated success in official tests and satisfactory integration into public positions.

 **Idea for EMOS**

Creating an EMOS student & alumni online community

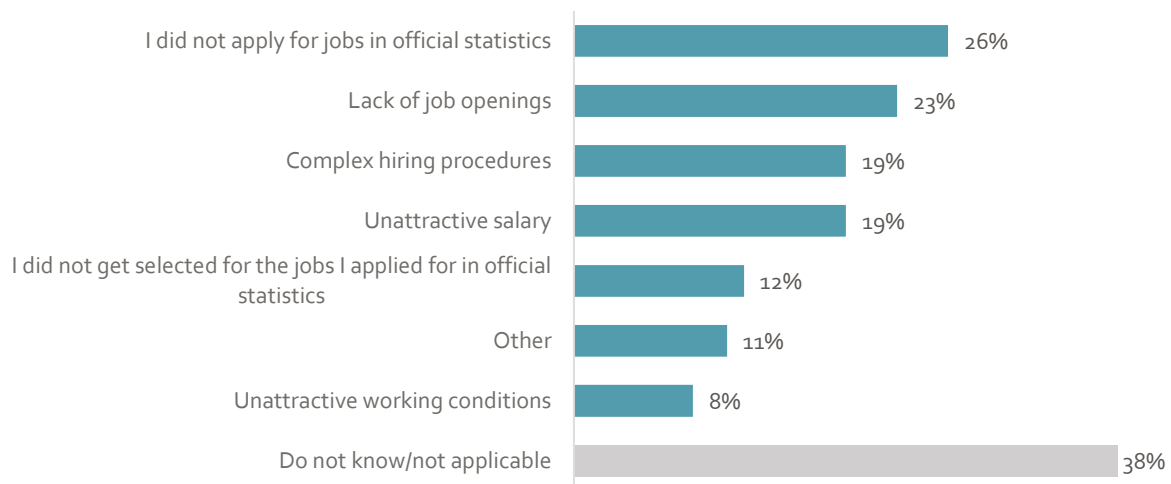
An online portal characterising and presenting alumni profiles, success stories, and role models would help (prospective) students to see the EMOS potential and its career paths. Graduates would be able to identify other key profiles across Europe that belong to the EMOS network. This strategy should be accompanied with engagement opportunities for graduates to participate in EMOS supporting activities and events. Hence, the online graduate community could help leverage benefits for graduates and promote EMOS. Additionally, a graduate community offers the opportunity for creating a mentoring scheme of EMOS graduates that students could consult on topics related to the transition to the labour market.

Impact: Creating an EMOS alumni community, attracting more prospective students and enhance EMOS visibility while engaging graduates.

Implementation horizon: Short- to medium-term.

Among EMOS graduates not working in official statistics, a quarter indicated that they did not apply for such positions, as seen in Figure 27. Others mentioned complex hiring procedures, lack of job openings and unattractive salaries, as also frequently reiterated by interviewed NSI and HEI representatives. Under other reasons for not pursuing a career in official statistics, graduates listed those barriers such as not being an EU citizen, lack of knowledge of the local languages, and the offer of other attractive career opportunities hindered them from applying for positions in the sector.

FIGURE 27. WHAT PREVENTED YOU FROM GETTING A JOB IN THE FIELD OF OFFICIAL STATISTICS?



Source: PPMI survey of EMOS graduates (N=84). Since graduates could select more than one option, the sum of the percentages is greater than 100%.

In conclusion, EMOS graduates’ employability was high, with only 3% of the surveyed graduates reporting unemployment, and there was high job satisfaction among graduates in the public sector. There is diversity in the data regarding the sector of employment, in PPMI 2023 survey 28% of the graduates work in NSIs and only 7% according to Eurostat consolidated data on graduate employability. However, 26% mentioned that they simply did not apply to positions at the NSIs. Some

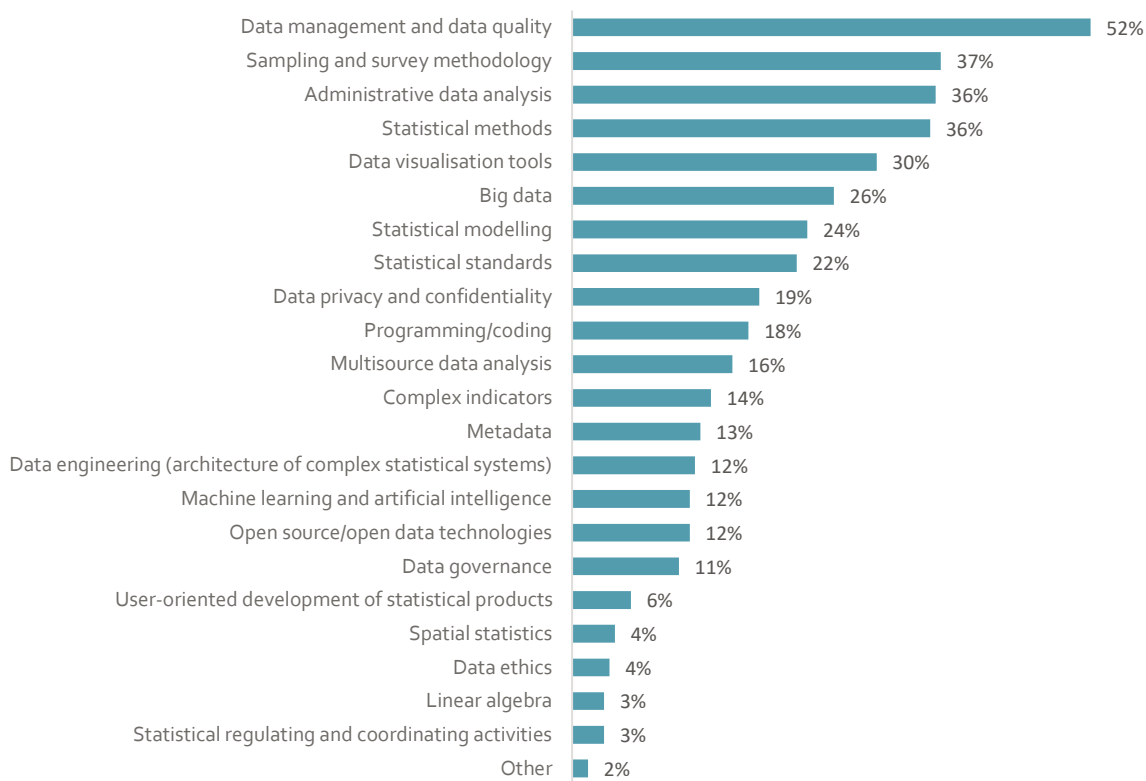
of the pathways that EMOS could implement to support EMOS employability in statistical offices could be introducing a tracking system for graduates, creating alumni networks, expanding the EMOS network to the private sector, and launching an EMOS PhD.

4.5.1. Skill needs

(Potential) EMOS network partners and employers who participated in the survey rated three sets of skills – (1) data and statistical skills, (2) soft skills, and (3) future demand for data and statistical skills – to create an overview of the skills needed in official statistics and related sectors.

As listed in Figure 28, more than half of (potential) EMOS network partners and employers indicated that the most useful skill in data and statistics is data management and data quality. Skills related to sampling and survey methodology (37%), administrative data analysis (36%) and statistical methods (36%) come second, which closely reflects the need for specific official statistics methods, as expressed by NSI representatives interviewed in this study. Interestingly, skills relating to new data sources and machine learning, often quoted as new trends and needs by NSI representatives, occupy lower positions in this list.

FIGURE 28. WHICH DATA AND STATISTICAL SKILLS ARE MOST COMMONLY USED IN YOUR ORGANISATION (CONSIDER SKILLS REQUIRED FOR YOUR ORGANISATION'S PRIMARY ACTIVITY)?

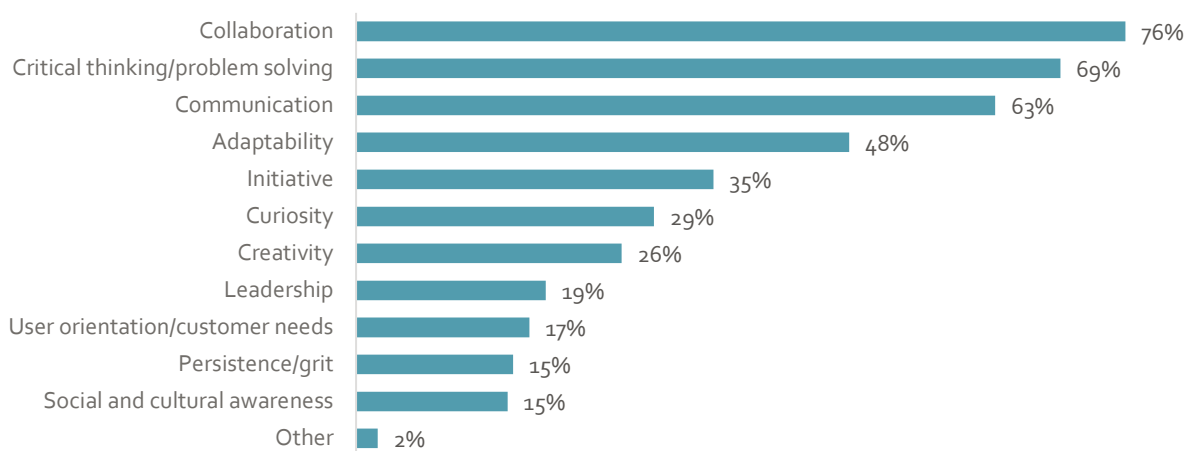


Source: PPMI survey of (potential) EMOS stakeholders and employers (N=187). Since stakeholders could select more than one option, the sum of the percentages is greater than 100%.

In addition to data and statistical skills, interviewed stakeholders often cited skills related to understanding legal frameworks, GDPR, data harmonisation, FAIR principles, quality assurance, and working with pan-European data as highly relevant. Furthermore, employers also require skills related to project management, such as project methodologies, negotiation, communication, and data user engagement. This implies that the functions of statisticians and data scientists go beyond data collection and processing, also involving dealing with clients and managing projects. From the perspective of NSIs only, the top five data and statistical skills needed for their organisations are administrative data analysis (61%), data management and data quality (61%), sampling and survey methodology (58%), programming/coding (39%), and statistical methods (30%), which is in line with the general trend, except for a greater emphasis on programming/coding.

From a complementary perspective, Figure 29 shows the most important soft skills ranked by the surveyed (potential) EMOS network partners and employers. The three most crucial soft skills were collaboration (76%), critical thinking and problem-solving (69%), and communication (63%). In addition, the interviewed (potential) EMOS network partners and employers emphasised the value of lifelong learning and self-motivation abilities due to the dynamic nature of the sector. They placed great importance on workers who stay up to date on industry advancements, continuously improve their abilities.

FIGURE 29. WHICH SOFT SKILLS ARE MOST IMPORTANT FOR THE WORK DONE IN YOUR ORGANISATION (CONSIDER SKILLS REQUIRED FOR YOUR ORGANISATION'S PRIMARY ACTIVITY)?



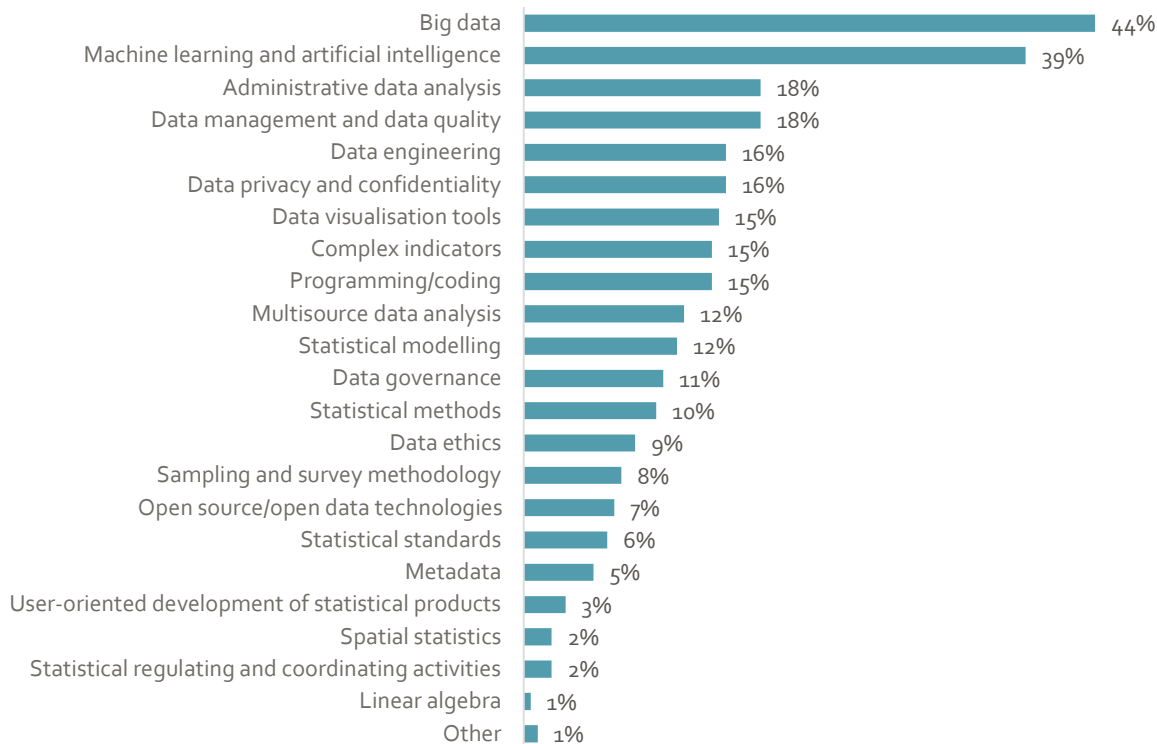
Source PPMI survey of (potential) EMOS stakeholders and employers ($N=188$). Since stakeholders could select more than one option, the sum of the percentages is greater than 100%.

From the perspective of NSIs only, the top five soft skills needed were collaboration (79%), critical thinking/problem solving (79%), communication (58%), adaptability (45%), and persistence/grit (30%). This is in line with the general trend, except for 'persistence/grit', to which NSIs place a greater emphasis.

For future skill needs, Figure 30 shows that (potential) EMOS network partners and employers consider big data (44%), and machine learning and artificial intelligence (39%) as the skills that will be most in demand over the next five to ten years. This is in line with our interviewees, that often highlighted the interconnectedness of data science and statistics with emerging technologies. Skills related to machine

learning, cybersecurity, remote sensing, web-scraping, and natural language processing have intertwined with statistics. Nowadays, (potential) network partners expect statisticians to acquire those skills as well.

FIGURE 30. WHICH DATA AND STATISTICAL SKILLS DO YOU EXPECT TO BE MOST IN DEMAND IN THE COMING 5-10 YEARS?



Source: PPMI survey for EMOS stakeholders ($N=186$), October 2023 (since stakeholders could select more than one option, the sum of the percentages is greater than 100%).

From the perspective of NSIs only, the top five soft skills needed are machine learning and artificial intelligence (36%), big data (30%), administrative data analysis (27%), data management and data quality (24%), and data privacy and confidentiality (21%), which are line with the general trends, with a more distributed emphasis in each skill.

To address organisational skill gaps, 45% of (potential) EMOS network partners and employers offered training opportunities for their employees. Some EMOS network partners identify themselves as learning organisations because continuous learning/lifelong learning is an integral part of their organisational culture. Some interviewed EMOS programme coordinators and employers suggested creating lifelong learning opportunities that could consist of standalone courses offered within the EMOS network, possibly awarding micro-credentials, and offering executive education opportunities. This would expand the scope of EMOS and attract more students. Flexible learning opportunities could be oriented to practitioners already working in the field. The certifications of flexible learning opportunities should offer the opportunity to be accumulated as ECTS, so that they can be recognised and transferred as part of the ECTS require to complete a master's degree in a relevant topic. By

expanding its learning offer to practitioners, EMOS could become a leading European training programme in official statistics.

Of the organisations offering training ($n=85$), 58% offered it in-house, 36% offered both in-house and external training, and only 6% offered external training only. According to the employers interviewed, these training sessions are tailored to various phases of official statistics production, encompassing regulations, and include coaching for trainees learning on the job. The training strategies consisted of on-site workshops and collaborations with other statistical offices at the EU level, primarily Eurostat.

In conclusion, the insights from (potential) EMOS network partners and employers highlight that while data management and survey methodology remain crucial, there is also a growing demand for soft skills, such as collaboration, critical thinking, and communication. Emerging technologies such as big data and machine learning are anticipated to drive future skill requirements. The creation of initiatives such as lifelong learning opportunities within the EMOS network could address evolving needs, ensuring that practitioners and academics continuously adapt to meet the demands of official statistics.

4.5.2. Challenges in graduate employability

Despite EMOS network partners acknowledging the benefits that the EMOS programme brings to its graduates, they also consider that those benefits may be relative, given the increasing demand for data scientists. Graduates with backgrounds in data science currently enjoy a distinct advantage in the market as data scientists are in high demand. The interviewed network partners noted that statisticians may not experience evident added value from EMOS because of the ample job opportunities available to them. Additionally, factors such as the reputation of graduates' HEIs and their professional trajectories may influence their employability.

Most NSIs reported that EMOS graduates often did not apply for their positions. Despite their involvement in teaching and hosting EMOS student internships, it is difficult to attract graduates to open positions. The NSIs interviewed attributed this phenomenon to the high demand for data scientists, resulting in an overheated job market. As a result, they must compete with the private sector for those profiles with the disadvantages of bureaucratic procedures for hiring, less flexibility, and, in some cases, less competitive salaries. As shown in Figure 27, 26% of graduates mentioned that they do not consider applying to jobs in official statistics, and they also perceive as barriers lack of job openings (36%), complex hiring procedures (19%), and unattractive salaries (19%).

NSIs are usually unable to offer any advantages to EMOS graduates in the recruitment process ($n=33$). 12% of the network partners include mentions of EMOS in their vacancy notices, and 3% would like to do so, but are not allowed. This is due to the public sector's fair treatment rules that do not allow the treatment of EMOS as an advantage during the hiring process or even referring to it in job advertisements.



Idea for EMOS

Establishing an EU-level job portal for the official statistics sector

An EU job portal for official statistics would contribute to increasing the visibility of the EMOS-labelled master's programmes, provide EMOS graduates with local and EU-level employment opportunities in the public sector, and contribute to attracting and retaining talent. This portal would be an EU-level platform centralised in ESSC/Eurostat, where public sector organisations at the national and EU-level would be invited to promote their open positions to EMOS graduates. Therefore, various customisation options should be offered to enable users to receive personalised notifications based on their interests. The job portal could be similar to that offered by EURAXESS⁵⁹, but focused on official statistics and hosted on the EMOS website.

Impact: Broader pool of job offers for student/graduates and increased attraction of candidates to open positions for EMOS network partners.

Implementation horizon: Medium-term.

The NSI representatives interviewed perceived a lack of autonomy in the recruitment process as a barrier. Securing a position in the public sector is generally perceived as a burdensome task characterised by lengthy procedures. Additionally, there are sometimes barriers to hiring international candidates, especially non-EU citizens or those not speaking the local language, which poses a notable obstacle, considering that several EMOS graduates are international students from outside the EU. Despite some positions being performed in English, public hiring procedures require proficiency in the local language and, in some cases, citizenship in the country they are applying to. This restricts the international mobility of workers within the public sector across Europe beyond internship positions and limits their talent pool to local graduates.

EMOS graduates also echo the difficulties of going through the public recruitment processes. They emphasise the demotivating nature of the public sector's effort-intensive hiring process. For them, opportunities for flexible positions within the public sector are scarce, and sometimes project-based contracts for short periods (less than six months). These types of contracts represent a significant challenge for graduates, who must move to other cities for periods of less than one year and face challenges such as housing scarcity and career uncertainty. Thus, efforts are greater than benefits.



Idea for EMOS

Establishing and internship/fellowship/junior work programme for recent EMOS graduates

An internship/fellowship/junior work programme for recent graduates of official statistics would help attract EMOS graduates to the public sector and retain them in the sector after graduation. Such a programme could be offered at the inter-country and/or EU level (at NSIs or Eurostat) as a strategy to foster brain circulation.

The programme is expected to offer full-time remunerated positions for the most competitive EMOS graduates for a period of six months to two years. This would allow graduates to bridge the gap between studies and secure a public sector job through public competition without having to move on to the private sector. This idea bears similarity to the ECB Graduate Programme, which provides two-year internship contracts to recent graduates.

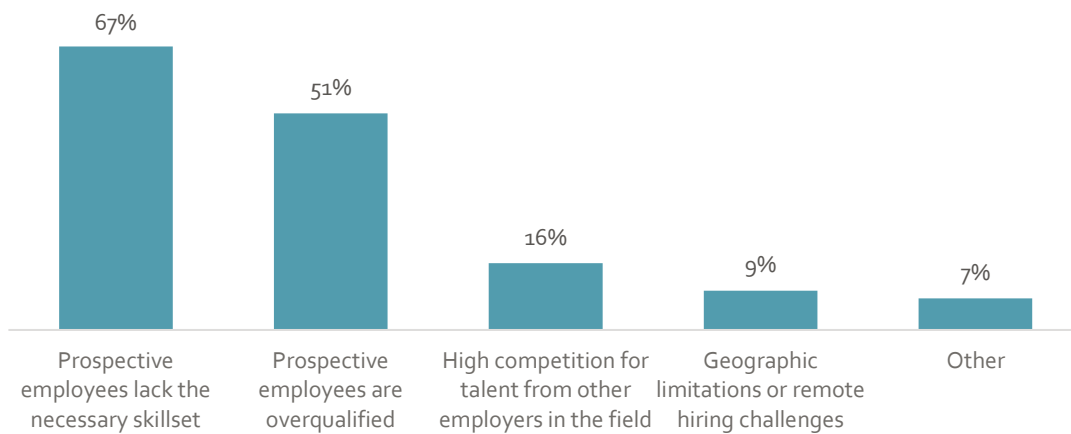
Impact: Attracting and retaining EMOS graduates in the public sector. Increased interest of students looking for employment prospects in the public sector.

Implementation horizon: Long-term.

⁵⁹ EURAXESS. Search for jobs. <https://euraxess.ec.europa.eu/jobs/search>

According to the PPMI 2023 survey, 59% ($n=186$) of (potential) EMOS stakeholders and employers found it somewhat difficult or difficult to find profiles with the right data and statistical skills to fill their positions. Figure 31 shows that the main difficulties in hiring prospective employees are the lack of the necessary skill set (67%) and overqualification (51%). Several NSI representatives we interviewed mentioned that they commonly have applications of candidates from diverse fields of study without adequate data and statistical skills, or candidates with PhD degrees or senior profiles that do not match entry positions. Most NSI representatives agreed that it is difficult to fill in their positions with candidates with adequate data and statistical skills. They especially attributed this situation to the scarcity of profiles with knowledge of survey sampling, data production, methodology, and quality assurance of data.

FIGURE 31. WHAT ARE THE MAIN DIFFICULTIES YOUR ORGANISATION FACES WHEN SEARCHING FOR PROSPECTIVE EMPLOYEES?



Source: PPMI survey of (potential) EMOS stakeholders and employers. ($N=108$). Since stakeholders could select more than one option, the sum of the percentages is greater than 100%.

NSIs representatives interviewed noted that high turnover rates among young professionals are a current career trend that affects public sector career pathways. According to the experience of most NSIs, young professionals often commit only for two or three years before transitioning to the private sector or pursuing a PhD. They consider it is difficult to encourage younger individuals to consider long-term careers in the public sector immediately after graduation. Especially, if they have to go through lengthy and rigorous hiring processes that could last more than six months. However, some public sector employers reported the phenomenon of individuals aged 30 to 50 seeking employment in the public sector after quitting the private sector, primarily for the sake of stability. EMOS could consider offering re-skilling opportunities such as short courses, micro-credentials and executive education to this target group.

From the perspective of NSIs only, the main difficulty in searching for new employees was the high competition for talent from other employers in the field (77%), followed by prospective employees lacking the necessary skills (55%). Overqualification represents only 5% of NSIs. This discrepancy between the data can be explained by the qualitative study in which most NSIs representatives suggested high competition for employees in the field of data science and statistics with the private sector. Additionally, they mentioned that complex hiring procedures, lower salary levels, and slower

career progression make the public sector less attractive to graduates with backgrounds in data science and statistics.

The study team noticed a discrepancy between expectations regarding the length of stay in the positions offered by NSIs. While certain public institutions view these positions as permanent due to the stability and increasing benefits they provide over time, some recent graduates envision a two to four-year commitment before moving on to higher roles or pursuing further education, such as a PhD or academic positions. As a result, EMOS graduates tend to expect career progression plans that involve transitioning between roles within an organisation and pursuing continuous learning opportunities. This implies that offering diverse career progression options in job advertisements may be more appealing to graduates of EMOS programmes.

In summary, the challenges faced by employers and EMOS graduates underscore the dynamic landscape of the data science field and evolving expectations within the public sector. Despite the recognised benefits of the EMOS programme, graduates encounter hurdles in navigating bureaucratic hiring processes, and NSIs face competition from the private sector to attract talent. Possible pathways for EMOS to bridge these gaps include enhancing recruitment strategies through the creation of job portals to promote open positions and establishing internships or junior positions after graduation to facilitate attraction.

5. Scenarios for future EMOS

Consolidating the findings reported in the previous sections, we suggest three broader scenarios for the future development of EMOS. The idea boxes throughout the report present ideas and options on how to better implement EMOS mostly fit under either of these scenarios. However, before the potential of the individual ideas is further considered, a decision should be made about one of the scenarios setting a strategic direction for EMOS and the mode of its future implementation.

The scenarios mostly consider the mode of delivery and award of the label and the resulting implications. EMOS could continue being implemented at its current state as a quality label or shift towards more academically (joint programme) or professionally (certificate) oriented scenarios.

5.1. EMOS as a quality label

The vision of the first scenario is that, in five years, EMOS will consolidate as Europe's quality label leader for postgraduate education in official statistics. The network will continue to thrive as a hub for collaboration between HEIs, NSIs, key public sector organisations, and the wider statistical community. EMOS will expand its reputation and outreach, including more HEIs in every European country, labelling programmes that fulfil a set of flexible criteria (rather than programmes that implement a specific specialisation). This will enhance the pool of graduates with the label, increasing the availability of graduates qualified to apply for positions at NSIs and public sector organisations.

The study findings indicate that EMOS could continue being implemented as a quality label at its current state, with Eurostat rather than ESSC acting as the accrediting authority for a reputational and visibility gain. A quality label is a suitable mode of certification and quality assurance for a network of 30+ HEIs with a potential for expansion. A quality label offers considerable flexibility to the partner HEIs and many of the challenges EMOS is currently facing could be successfully addressed under the current mode of implementation. It also allows for consolidation of EMOS network at European level, while at the same time focusing on the objective to provide graduates to work at NSIs and other national institutions.

EMOS is struggling to fulfil one of its core objectives of providing qualified work force to NSIs and other national and regional official statistics producers with relatively few graduates securing jobs with these organisations. However, EMOS has brought many other benefits such as intensified collaboration between NSIs and academia regionally, nationally and internationally, and strengthening of official statistics as an academic discipline, and so the value of the label is evident but could be better reflected and communicated by reconsidering its objectives.

Compared to other similar European quality labels (EMT, EIT), the requirements of EMOS are relatively demanding to the partner HEIs, corresponding more to the requirements of a joint degree than to a typical quality label. EMOS partner HEIs often need to set up additional curricular components or collaborations while other labels often allow the HEIs the flexibility to meet the learning outcomes with their existing learning offer. In contrast to that, the visibility and prestige of the EMOS label remain limited. Moving to a framework that ensures sufficient quality of the EMOS-labelled programmes but

makes the label more flexible and, as a result, more attractive to potential partner HEIs, would help to expand the network and increase the visibility and reputation of EMOS.

Implementing EMOS as a quality label at its current state does not exclude the possibilities to develop joint study programmes among different network partners, expand the label to BA or PhD levels, enhance the potential of the EMOS network or expand it to include more international and private sector partners.

5.2. EMOS as joint programme

The vision of the second scenario is that in five years, EMOS will be a joint European programme involving a wide range of HEIs in Europe that award a degree in official statistics under the coordination of Eurostat. This joint programme will foster unprecedented collaboration, strengthen the pan-European dimension of official statistics and establish it as a research field. This programme will act as a European level knowledge hub, bringing together academics, practitioners, authorities, professionals, and future leaders in official statistics from diverse European countries.

Re-designing EMOS to be implemented as a joint programme (similarly to the EJMSBM programme in collaboration with FRONTEx) would greatly enhance the pan-European orientation of the programme and significantly contribute to developing (European) official statistics as a field of research, and the ESS by bringing key institutions, researchers and practitioners together. A joint programme could be delivered by several HEIs in collaboration with numerous official statistics producers and Eurostat or ESSC as a coordinator.

Under a joint EMOS programme, participating HEIs would be responsible for development of the curricula and quality assurance, while Eurostat would act as a coordinating institution offering diverse additional activities as component of the programme. NSIs and other institutions could be included into the programme as network partners.

Synergies with various EU-level initiatives such as the upcoming European Degree label that is currently being piloted, or collaboration through European Universities alliances could be exploited under this scenario, positioning EMOS more strongly in a European setting and increasing visibility and reputation of the programme.

However, this option is somewhat problematic with the current set-up and size of the EMOS network. There are too many HEIs to make the implementation of a joint programme feasible, and development of several joint academic programmes, or a network of joint degrees would risk fragmenting or even dissolving the current EMOS network with less active HEIs withdrawing. Furthermore, the number of students that could enrol in such joint degree is limited (for example, 25 students graduate from EJMSBM every two years), so it might not allow to attract more students to EMOS.

5.3. EMOS as a certificate

The vision of the third scenario is that, in five years, EMOS will be a leader in providing official statistics training in the form of certificates issued by a professional body in cooperation with HEIs and NSIs from each country where it is offered. As part of the existing master's degree offering an EMOS track,

public servants have the opportunity to join a set of courses in a master's programme, share with students, network with academics and professionals, and earn professional certificates. Additionally, beyond a master's degree, students gain a professional certificate that represents a competitive advantage in the employment market.

The mode of certification of EMOS could be changed to a professional certificate that offered after obtaining a pre-defined set of qualifications. Eurostat could act as the awarding authority. The certificate could be offered to both students and professionals as an independent qualification, possibly as micro-credentials, potentially transforming EMOS into a leading provider of training in official statistics in Europe.

Changing to this mode of certification, the focus of EMOS coordinator would shift from accrediting HEIs to certifying learners obtaining additional professional qualification, significantly increasing the burden on the certificate-awarding institution but decreasing it for the HEIs. It would allow for a broader range of students, also from other HEIs and disciplines, to obtain the certificate. Such an approach would contribute to enhancing statistical literacy and meeting the diversifying labour market needs in official statistics.

The certificate could also be awarded to professionals at NSIs and other institutions and sectors. Engaging in training provided by HEIs would provide a networking opportunity for students and practitioners. Synergies with ESTP and NSIs having their own training programmes could also be exploited to make EMOS a leading European training programme in official statistics. Decentralised implementation would allow to accommodate the needs of different national and local contexts.

This scenario would require the biggest adjustments to the current implementation of EMOS as a quality label. Depending on the way the requirements for the certificate are set up, it might also decrease the academic orientation and rigour of the programme once HEIs are disconnected from the process of awarding the qualification. Quality assurance system would need to be substantially revised and likely complex with an increased number of institutions providing official statistics training and the coordinating institution overseeing the quality.

5.4. Comparative overview of the future scenarios for EMOS

This section presents a comparative overview of the main characteristics, benefits, and implications of the three future scenarios for EMOS. By comparing these scenarios, Table 7 provides key insights for differentiating each scenario as a unique pathway.

TABLE 7. COMPARATIVE OVERVIEW OF THE FUTURE SCENARIOS FOR EMOS

	EMOS AS QUALITY LABEL	EMOS AS JOINT PROGRAMME	EMOS AS CERTIFICATE
Strategic aspects			
Vision	EMOS as a reputed quality assurance label in official statistics.	EMOS as a highly specialised joint European master's degree.	EMOS as a leader in providing professional training in official statistics.
Mission	Quality label providing accreditation for master's programmes delivering education in official statistics awarded by Eurostat.	Joint master's programme educating leaders in official statistics, co-delivered by multiple HEIs and NSIs, coordinated by Eurostat	Certificate programme providing professional education in official statistics for practitioners and students, co-delivered by HEIs and NSIs, and coordinated by Eurostat.
Objectives	<ul style="list-style-type: none"> -Strengthening EMOS as an accreditation authority. -Developing flexible frameworks and standards for official statistics education. -Increasing emphasis on external feedback (peer reviews) and support for HEIs. -Increasing attractiveness for HEIs. 	<ul style="list-style-type: none"> -Transforming EMOS into a joint master's degree. -Developing an EMOS joint master's programme. -Increasing close collaboration among selected HEIs, NSIs, and students. -Increasing attractiveness for students and employers. 	<ul style="list-style-type: none"> -Transforming EMOS into a professional training certificate. -Developing multiple graduate certificate programmes. -Increasing close collaboration among HEIs, NSIs, other national authorities, practitioners and professionals. -Increasing attractiveness for students, practitioners, and employers.
Reference models	EMT	EJMSBM	MDataGov
Key aspects and activities			
Flexibility	Flexible criteria in the form of standards that HEIs fulfil in multiple ways.	Semi-flexible curricula with broad learning outcomes.	Semi-flexible curriculum with specific learning outcomes.
Collaboration	Collaboration among HEIs, official statistics producers, and Eurostat at the strategic level.	Collaboration among HEIs, official statistics producers, and Eurostat at implementation level.	Collaboration among students and practitioners, HEIs, official statistics producers, other public sector organisations and Eurostat.
Curriculum and activities	<ul style="list-style-type: none"> -Curriculum implementation remains responsibility of partner HEIs. -Supporting activities remain open to all partner HEIs. 	<ul style="list-style-type: none"> -Partners agree upon curriculum implementation. -Supporting activities are highly specialised for students. 	<ul style="list-style-type: none"> -EMOS curriculum is adapted to become one or several short programmes. -Support activities will depend on each certificate programme.
Impact on the number of graduates	High and rapid increase in the number of graduates with EMOS-labelled degrees.	Decrease in the number of graduates with EMOS-labelled degrees.	Initial moderate increase in the number of graduates with EMOS certificates, with potential for a significant increase over time.
Benefits			
Benefits for HEIs	<ul style="list-style-type: none"> -Increased reputational value of HEIs' educational offers. -Enhanced collaboration opportunities at the EU level. 	<ul style="list-style-type: none"> -Increased specialisation in official statistics. -Intensified collaboration with key stakeholders at the EU level. 	<ul style="list-style-type: none"> -Increased attractiveness of HEIs lifelong learning offers. -Intensified collaboration with key stakeholders at the national/local level.
Benefits for students	<ul style="list-style-type: none"> -Additional professional pathways and career prospects. -Enhanced networking with public sector organisations. 	<ul style="list-style-type: none"> -Access to an EU-level network of academics, practitioners, and authorities in official statistics. -High level of specialisation in official statistics for professional and academic careers. 	<ul style="list-style-type: none"> -Opportunity to gain both a master's degree and a professional certificate, enhancing competitiveness in the job market. -Intensified networking with professionals from NSIs and other public sector sectors.
Benefits for NSIs	<ul style="list-style-type: none"> -Enhanced pool of graduates eligible for positions in official statistics. -Strengthened collaboration of NSIs with HEIs as strategic advisors. 	<ul style="list-style-type: none"> -Strengthened EU level dimension of official statistics, contributing to its advancement as a research area. -Intensified collaboration among key stakeholders at the EU level. 	<ul style="list-style-type: none"> -Enhanced pool of graduates highly specialised in official statistics. -Intensified collaboration among key stakeholders at the EU level.

	EMOS AS QUALITY LABEL	EMOS AS JOINT PROGRAMME	EMOS AS CERTIFICATE
Implementation roadmap			
Timeline	1-3 years (short-term)	3-5 years (medium to long term)	2-4 years (medium term)
Possible funding sources	-Fees charged to master's programme. -Erasmus+ cooperation partnerships for student mobility.	-Erasmus+: Erasmus Mundus Joint Master's Degrees. -Funding through a European Universities alliance.	-Tuition fees charged to individual students. -Partnerships with NSIs and other stakeholders to offer the certificates to their staff.
Key actors and responsibilities	-Eurostat and network partners: set up a framework and minimum standards for education in official statistics. -HEIs: apply for EMOS accreditation and implement strategic recommendations for their programmes.	-Eurostat: Prepares a roadmap, creates incentives for EMOS HEIs to set up a joint programme, and coordinates programme's activities. -HEIs and network partners: Set up and co-deliver a joint programme.	-Eurostat: sets up a joint platform, negotiates the creation of courses with HEIs and stakeholders, and coordinates the certificate programme. -HEIs and network partners: jointly develop and deliver the certificate programme.
Preliminary SWOT			
Strengths/ Opportunities	-Large opportunity for EMOS network expansion and outreach. -Easy expansion to BA or PhD levels, and international/private sector partnerships. -Large increase in graduates with EMOS-labelled master's degrees.	-High specialisation of the network. -Strengthened collaboration between EMOS HEIs. -High visibility/reputation of a degree awarded by multiple institutions.	-Enhanced flexibility and accessibility to certification in official statistics for students and practitioners. -Potential for consolidating EMOS as a European leader in lifelong learning in official statistics. -Enhanced professional orientation of the label.
Weaknesses /Threats	-Struggle to provide a highly qualified workforce to NSIs as this scenario will generate diverse profiles. -Limited impact of EMOS on curricula.	-Feasibility challenges in reducing the size of the current EMOS network. -High administrative burden for HEIs and Eurostat. -Potential accreditation and/or recognition issues.	-Complex implementation (opening the curriculum to practitioners, tuition fees, administrative issues). -Uneven skill levels and background knowledge of potential learners. -Recognition, quality assurance, and regulatory challenges due to different national contexts.
Synergies with other scenarios			
Complimentary scenarios	Scenario one could potentially incorporate scenarios two and/or three.	Scenario two could potentially incorporate scenario three.	

Source: Prepared by PPMI.

Although these scenarios represent divergent stand-alone approaches to the future of EMOS, they are not necessarily mutually exclusive. EMOS currently stands among the three scenarios: it is a quality label, it has the requirements of a joint master's degree, and it acts as a specialisation track. Hence, future scenarios could include overlaps among them. For example, future scenarios one and three could be complementary, and they would fit into what EMOS currently is. It would entail tight requirements for universities to obtain the label and certify the specialisation track as a separate professional certificate. Future scenarios two and three could become a master's degree with stand-alone certificates open to practitioners. Implications such as the impact on the number of graduates, benefits for stakeholders, and administrative burden for stakeholders and Eurostat should be considered when choosing among the proposed future scenarios.