

## Article

# Erasmus Staff Mobility in the Building of a European Network: The Case of a Central European University

Krzysztof Kafarski <sup>1</sup>  and Jan K. Kazak <sup>2,\*</sup> 

<sup>1</sup> International Relations Office, Wrocław University of Environmental and Life Sciences, ul. Norwida 25, 50-375 Wrocław, Poland; krzysztof.kafarski@upwr.edu.pl

<sup>2</sup> Institute of Spatial Management, Wrocław University of Environmental and Life Sciences, ul. Grunwaldzka 55, 50-357 Wrocław, Poland

\* Correspondence: jan.kazak@upwr.edu.pl

**Abstract:** Globalization now applies to almost all aspects of life, and it also applies to the world of science. Internationalisation and interdisciplinarity are fundamental determinants of modern research and education. The foremost factor of functioning in the international world of science is the mobility of students and scientists. Considering this context, the objective of this study was to analyse the staff mobility for teaching under the Erasmus+ programme at the Wrocław University of Environmental and Life Sciences (UPWr). The research took into account the mobility of staff for teaching (STA) within the period of the academic years from 2009/2010 to 2020/2021. The methodological approach applied in this study is based on the concept of mobility network analysis and mobility flows. The geo-visualization was prepared with the use of a spider diagram. Using this approach, the connections between spatial locations and domains of scientific activity were analysed. The results show that the mobility flow at UPWr rose significantly after the authorities of the university decided to increase the funding for STA, and eventually was slowed down by the outbreak of the COVID-19 pandemic. Moreover, the findings in the geographical aspect show that there were two main regions of destination, which were the Iberian Peninsula and the closest neighbouring countries, where the predominant institutions could be observed. The most mobile group of teachers were the ones representing environment sciences. The STA flow is not reflected in the students' mobility flow. COVID-19 has enhanced the virtual component of learning, resulting in the strengthening of the blended mobility model.

**Keywords:** Erasmus; higher education institutions; staff for teaching; mobility; the mobility flow



**Citation:** Kafarski, K.; Kazak, J.K. Erasmus Staff Mobility in the Building of a European Network: The Case of a Central European University. *Sustainability* **2022**, *14*, 4949. <https://doi.org/10.3390/su14094949>

Academic Editors: Marc A. Rosen, Tiago Domingos, Inês Ribeiro and Silvia Di Salvatore

Received: 15 February 2022

Accepted: 18 April 2022

Published: 20 April 2022

**Publisher's Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Copyright:** © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

Currently, globalization is setting new challenges for many aspects of socio-economic systems, including human resource development and education [1]. It is becoming more important than before to educate students, not only focusing on local context but also strengthening international knowledge exchange, including also intercultural education [2], as this also influences chances on the labour market [3]. This relates both to global education itself (associated with two main topics, which are social justice and knowledge, skills, and a multi-cultural orientation) as well as the global context of education in specific domains like health [4,5], engineering [6], social sciences [7], and sustainability [8], even with the youngest pupils [9]. The promotion of international experiences in education finally has an impact on changes in the economy in many fields and domains, implementing sustainability in practice [10–14]. However, changes in education systems require support to make a shift from traditional teaching to a more international context. One of initiatives supporting this education approach is the Erasmus program.

The Erasmus program (European Region Action Scheme for the Mobility of University Students) was launched in 1987 as a consequence of a pilot student exchange between 1981

and 1986. At the beginning, the program included 11 European Union (EU) countries, and had expanded to 34 countries (including both EU Member States and Non-EU countries) by 2020 [15]. Initially, the Erasmus program concerned only student and staff exchange, and since 1987 it has embraced such aspects as vocational training, school education, adult education, youth and sport. In 2014 the Erasmus+ program was initiated, combining into one single program all of the initiatives in the field of education, training, youth and sport (e.g., Erasmus, Leonardo da Vinci, Comenius, Grundtvig, Jean Monnet, Erasmus Mundus, Alpha, Edulink, Youth in Action and Sport). The main budget share was dedicated to the education and training sector, and within this budget heading the Higher Education Institutions (HEIs) have benefited the most [15].

Between the years 1987 and 2020, over 9 million people have studied, volunteered, been trained and gained professional experience abroad within the framework of the program. The next Erasmus program for 2021–2027 (called Erasmus+) is more ambitious, and will have an almost-doubled budget of around €30 billion in comparison to the multi-year funding cycle of 2014–2020. It will allow us to engage around 12 million people to benefit from the program, which will be simpler and more accessible to people with fewer opportunities, and will have better synergies with other EU funding programs [16].

The Erasmus+ program has a very large impact on both the individuals and institutions participating in its actions. One of them is the effect of student mobility and its relationship to employability. Studies of the European Commission show that mobile students are less vulnerable to the risk of unemployment than non-mobile students. The mobility experience also fosters an entrepreneurial spirit, and Erasmus+ alumni hold managerial positions more often [17]. In addition to having an impact on working life, Erasmus+ also has an impact on personal life, strengthening hard and soft competences such as language, team working, organisation, decision making, communication skills, and IT competences, to name just a few. Nada and Legutko [18] analysed academic alumni who took part in the Erasmus programme. The study was carried out several years after their graduation. The findings suggest that taking part in an Erasmus exchange can help people grow personally and learn in new ways. As a result of the initial Erasmus exchange, young people's future decisions may vary significantly, resulting in, for example, more internationally oriented aspirations, a greater knowledge of cultural variety, or an enthusiasm for engaging in further foreign experiences.

The Erasmus+ program also has a very significant impact on the internationalization of HEIs and their employees. The mobility of staff is of a crucial value, and usually precedes the mobility of the students in order to prepare the student flow between HEIs. Besides the teaching activities within the STA mobility (Staff Mobility for Teaching), the other main objectives are:

- broadening and enriching the range and content of courses on offer at the participating institutions;
- creating and strengthening the links between HEIs;
- promoting exchange and experience regarding pedagogical methods;
- motivating students to take part in the mobility schemes;
- allowing students that do not have the possibility to go abroad to benefit from the international experience of foreign professors (internationalisation at home);
- knowledge-transfer infrastructure between HEI and enterprises.

The Erasmus programme is in a strong relationship with the concept of sustainability. Nogueiro et al. [19] set the following question: "To which Sustainable Development Goals (SDG) do the Erasmus+ Programme and the mobility projects for higher education directly contribute?" Their study showed that the most relevant SDGs for the programme and for the action and mobility projects are SDG4 (Quality Education), SDG5 (Gender Equality) and SDG8 (Decent Work and Economic Growth). Similar results were obtained by De La Torre [20]. Analysing which knowledge, skills, and attitudes are addressed by institutional activities to promote students' mobility, and demonstrating their contribution to the SDGs, they concluded that institutional initiatives are related to several SDGs, but

mainly to SDG4 and SDG8. The impact of the Erasmus programme on sustainability can be observed on different layers. The study carried out in Albania showed that the main element was a vocational education and training system which addresses specific Albanian educational priorities. Due to Erasmus support, local universities have been empowered as lifelong learning providers within their third mission strategy [21]. Apart from forms enhancing knowledge transfer and networking between cultures, generations and geographical context, the content of joint efforts involving different HEIs in the Erasmus programme can also refer to sustainability. One such example is the interdisciplinary approach to address climate change and green energy transitions in the university curriculum (DALILA—Development of new Academic curricula on sustainable energies and green economy in Africa). In order to address the energy transition in higher education in African countries as a requirement for climate change mitigation and sustainable development, the project recognizes and rewards various types of expertise in renewable energy and green economy [22]. The important aspect of all of the activities supported by the Erasmus programme is to guarantee their long-lasting effects. Alonso De Castro and García Peñalvo [23] conducted a survey with administrative project coordinators in order to explore the sustainability of their project results over time. One of the main findings was that the results have been positive with sufficient funds to be able to carry them out, and with the capacity to go on using them once the grant period has ended.

The Erasmus+ mobility flows have a major impact on the environment. It is enough to take into account journeys that usually take place by air between the participating institutions from different countries across the globe. On the whole, however, empirical studies and data on Erasmus+ mobility and its effects on individuals and HEIs do not abound, and there is a particular shortage of reliable data and research that goes beyond perception analysis and into the measurement of real effects and outcomes. Moreover, most of the studies on Erasmus mobility concentrate on the mobility of students [17,24–33], while the mobility of academic staff is relatively less common [34,35]. However, as Zajadacz et al. [35] stated after analyzing the mobility of Polish academic teaching staff, mobility had the most significant impact on their professional development. In practice, mobility provides a new platform for teaching observation, research opportunities, and exposure to other management systems for academic personnel.

There are different approaches which are used to evaluate the Erasmus programme. One of the most common approaches is a survey assessing mobility from the point of view of participants, schools or companies sending participants, and schools or companies hosting participants [18,26,27,35,36]. However, there are also different approaches that present high usefulness in research on the Erasmus programme, such as network analyses or mobility flows. Applying social network analysis, Marques et al. [37] identified the universities that play a key role in the international program's inter-organizational framework. These universities actively facilitate the evolving Europeanization of higher education by strengthening inter-university networks via the Erasmus programme. Considering mobility flows, Restaino et al. [38] used the mobility data and socio-demographic indicators from the European Union Open Data Portal and the Eurostat website in order to investigate student flows. Such an approach allowed them to define the number of students involved in the Erasmus programme, divided by gender. This enabled the evaluation of gender equality aspects in mobility activities.

Despite research on the impact of the Erasmus program on individuals [28,39], social interactions between cultures [29], cultural identity [40], or employment and professional careers [30], the European Commission notes that there is a gap in the knowledge when it comes to empirical research and data on Erasmus mobility and its impact on universities; particular, there is a lack of reliable data and research that goes beyond perceiving and measuring actual outcomes [32]. The perspective of the missing information was also confirmed by Ramirez and Tejada [41]. They conducted a survey with social councils of Spanish public universities in order to identify what kind of information regarding academic staff the university stakeholders perceive as being very relevant, which should

be provided for the more effective management of human resources. Among the four main elements, the mobility of teachers and researchers was mentioned. Therefore, the objective of this research was to analyse patterns of Erasmus staff mobility for teaching over time, and the differences between different geographical distributions and scientific disciplines. The obtained results were discussed along with the impact on institutional situation of a HEI in terms of internationalisation and networking. The paper is structured as follows: Section 2 describes the analysed case study, materials and methods that were applied in the research; Section 3 contains the results of the research; and the discussion and conclusions of the obtained results are presented in Section 4.

## 2. Materials and Methods

The research is based on detailed data of staff mobility for teaching (STA) from the Wrocław University of Environmental and Life Sciences (UPWr) in Wrocław, Poland. The data sample comes from the period of academic years from 2009/2010 to 2020/2021, which covers whole period for which data are available. This includes 110 unique records. The Wrocław University of Environmental and Life Sciences is a medium-sized university, with almost 8000 students and 740 academic staff. The University educates and conducts research in the fields of agricultural sciences, engineering and technology, and social sciences. UPWr has patriated the Erasmus scheme since 1998, i.e., since Poland's accession to the program. In 2020, the number of inter-institutional agreements exceeded 140. Each year, the university sends more than 100 students and around 15 staff members (both teaching and administrative) to the program countries.

The research is based on the concept of mobility network analysis, as proposed Gadár et al. [42], and mobility flows, as proposed by Breznik and Skrbinjek [43]. These approaches search for relations by analysing connections between spatial locations and domains of scientific activity. Mobility flows are based on a network architecture with nodes and linkages. Restaino et al. [38] created the network with nodes representing countries, and with the amount of students exchanged between incoming and outgoing countries being represented by linkages. This stands in line with the approach of Breznik and Skrbinjek, who used the social network approach and Erasmus data as an input to the mobility flow analysis. In the case of this study, the nodes represent specific universities, and the linkages represent the number of academic teaching staff. In our research, the STA within the analysed period is considered through the perspective of countries and cities, as well as the scientific disciplines of the teachers who took part in the mobility activities.

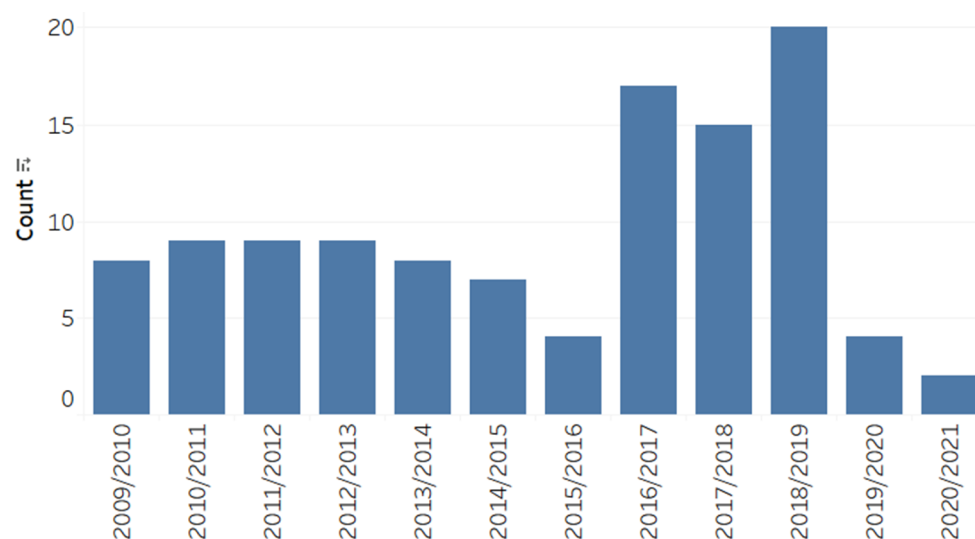
As de Soto stated, the conceptual basis of network analysis is the Graph Theory [44]. This approach, which is still commonly employed today, dates back to the eighteenth century. In 1736, Leonhard Euler, a prominent mathematician, was confronted with a challenge posed by the city of Königsberg: how to cross its seven bridges without crossing any of them twice. Despite the fact that Euler believed it was impossible to solve the problem, his processes for finding a solution was crucial to the future of Graph Theory. Each land region became a node (point), and each bridge became an edge (line). Graph Theory was founded on the capacity to transform a real (or fictional) concept into a scheme made up of points and lines. Many other researchers have utilized this methodology since 1736, including Kirchhoff in 1847, to work on electrical systems; Cayley in 1857, to work on the isomers of an organic substance; Hamilton, in 1859, to create some voyages in dodecahedrons; and Jordan and others, in 1869, to study abstract tree shapes [44]. Network analysis is also currently being used for human mobility evaluation [45–47]. The visualization of the mobility network in our research is presented using one of the methods derived from Graph Theory, namely the spider diagram. The spider diagram (also called 'desire lines' in some software) demonstrates which objects move between which points (nodes). In the case of this research, the objects represent teachers, and the points represent universities (the home university and hosting universities). Each object is connected to its associated points by a line (edge), making it easy to analyse the actual network. A spider diagram is a set of rays that connect each teacher to the university. They can be

unweighted (where each object is counted equally) or weighted (where each object is treated differently). The line representing each object may be drawn in a different colour or thicknesses, depending on the variables [48]. A spider diagram is a method used for data exploration and visualization [49]. The geovisualization of the mobility flows was prepared with the use of business intelligence software (Tableau ver. 2021.4), which was verified as a proper tool for geo-data analytics [50,51].

### 3. Results

#### 3.1. STA over Time

Based on the collected data (Figure 1), we can state that there is no one stable trend in STA activity over the analysed period. The first six years of the period (2009/2010–2014/2015) were relatively stable, with mobilities of between seven and nine grants per year. After one year of four grants, there was a peak that lasted 3 academic years (2016/2017–2018/2019) with between 15 to 20 grants per year. This trend can be attributed to the fact of shifting a significant part of the funds within the budget categories of the awarded projects to the mobility of academic staff. It is an intended activity of the university, which increases the outgoing mobility of the didactic staff. After this peak, a significant drop in mobility activity can be observed, to four grants per year and two grants per year, respectively.



**Figure 1.** Number of STA grants from UPWr in the period 2009/2010–2020/2021.

An important aspect in terms of international staff exchange starting from year 2020 is the global spread of the COVID-19 pandemic, which resulted in restrictions and lockdowns worldwide. In the case of Poland, similarly to many European countries, pandemic measures were introduced in March 2020 [52]. These resulted in a dramatic drop of STA mobility of around 75%. However, the academic teachers are willing to use the awarded grants at a later time, and are very interested in taking part in new intakes. In the last call for the ongoing academic year (no complete dataset available at this time), the number of STA candidates exceeded the number of STA places allocated to the university.

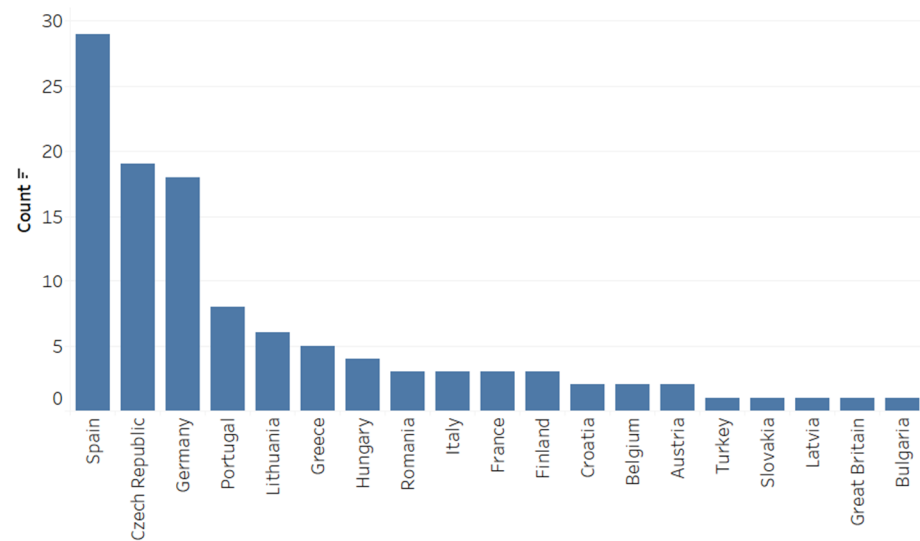
A more detailed visualization representing the number of STA grants from UPWr in the period 2009/2010–2020/2021, divided by countries, is included in Appendix A, Figure A1.

#### 3.2. STA over the Geographic Distribution

Analysing the main destinations of STA (Figure 2), two main patterns could be observed. One is the mobility to the Iberian Peninsula (27 grants to Spain and eight grants to Portugal), and the other is the mobility to the closest neighbouring countries (19 grants to Czechia and 18 grants to Germany). In terms of neighbouring countries, Poland has a common inland border with seven. However, considering that UPWr is located in a region



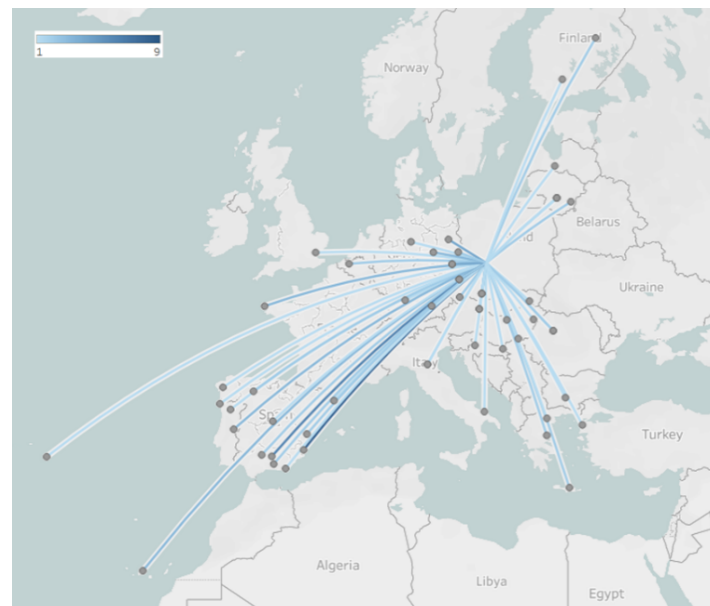
which has a border with Czechia and Germany, these two countries can be categorized as the closest neighbours.



**Figure 2.** Number of STA grants from UPWr to different countries.

A more detailed visualization presenting the number of STA grants from UPWr to different countries, divided by scientific disciplines, is included in Appendix A, Figure A2.

It is not only at the national level that STA mobility varies. In Figure 3, it can be observed that within many of the countries, different cities were selected. In the case of countries from the Iberian Peninsula, some STA took place in islands located in the Atlantic Ocean. Such a geographical distribution shows that the cooperation of UPWr within STA is not concentrated on a few selected HEIs, and instead covers many different institutions.



**Figure 3.** Destinations of STA.

Apart from the variety of destinations, it is worth highlighting that most of the HEIs were visited once, while just a few had multiple visits. The most visited institutions were the Czech University of Life Sciences Prague (nine grants), Miguel Hernández University of Elche (eight grants), the University of Jaén (six grants) and Dresden University of Technology (six grants).

### 3.3. STA over Scientific Disciplines

The academic teachers who were the most active in STA represent the following scientific disciplines (Figure 4): agriculture and horticulture (31 grants), nutrition and food technology (24 grants), veterinary science (11 grants), environmental engineering, mining and energy (11 grants), and civil engineering and transport (10 grants). STA grants within agriculture and horticulture strongly correspond with one of the spatial patterns defined in the previous subsection. Most of their mobility activities took place in the closest neighbourhood countries (Czechia, nine grants; Germany, nine grants). The second most active discipline (nutrition and food technology) followed a different geographical pattern. The country that was selected most commonly was Spain.

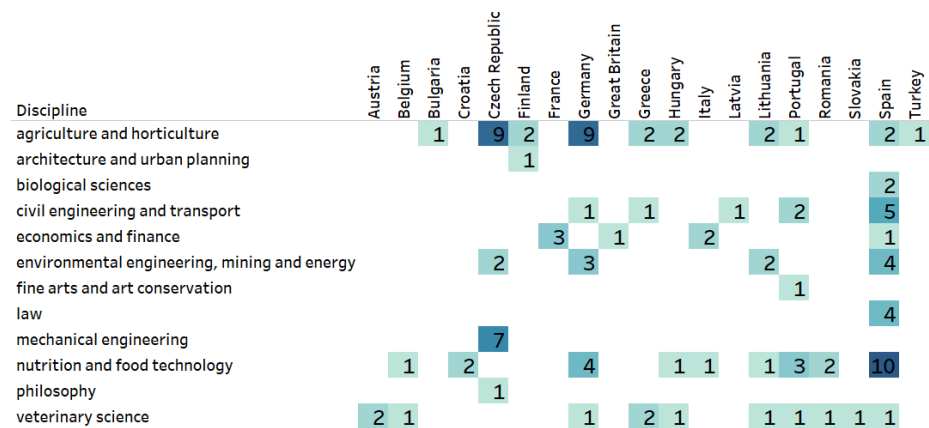


Figure 4. Numbers of STA grants from UPWr in terms of scientific disciplines.

In order to cluster the scientific disciplines, UPWr created three main Priority Research Areas, which are: veterinary, food, and environment sciences. Similarly to Figure 3, the STA grants within each priority research area are presented separately (Figures 5–7). The mobility flows of the disciplines which are not assigned to the priority research area are presented in Appendix A, Figure A3.

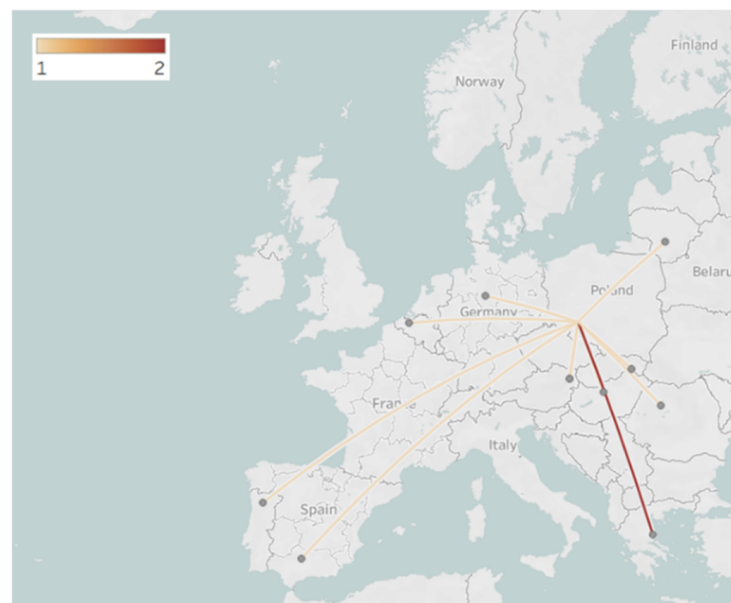
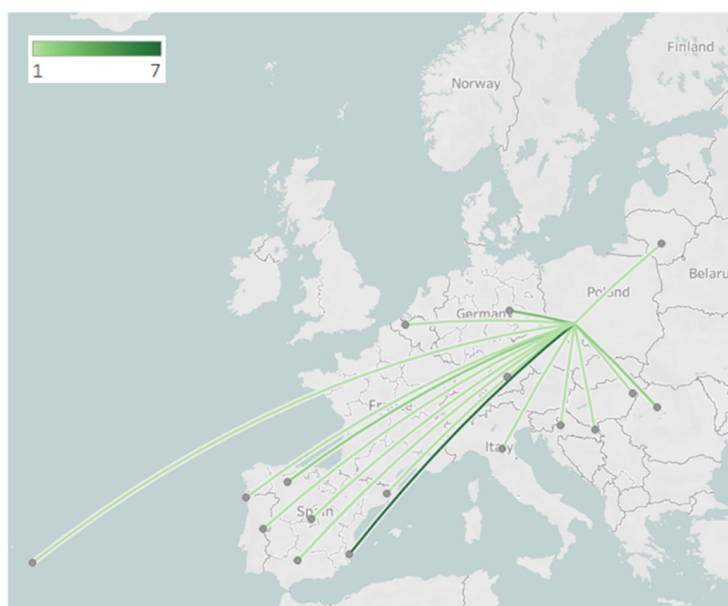


Figure 5. Mobility flows of STA within the priority research area: veterinary science.



**Figure 6.** Mobility flows of STA within the priority research area: food science.



**Figure 7.** Mobility flows of STA within the priority research area: environment science.

The academic teachers who were the most active in STA represent the following priority research areas: environment (61 grants), food (27 grants) and veterinary (12 grants) sciences. There were also 12 grants which were not classified in the priority research areas.

STA grants within the environment priority research area again strongly correspond with one of the spatial patterns defined in the previous subsections. Most of the host institutions were located in the neighbouring countries (Czechia, 18 grants; Germany, 13 grants). In the case of food sciences, the most visited country was Spain (12 grants), while veterinary medicine and scientific disciplines not classified in the priority research areas were evenly distributed around Europe.

#### 4. Discussion

Based on the data on STA over the analysed period, it can be observed that the number of mobilities was fairly constant from 2009/2010 to 2014/2015, followed by a decrease to four grants. Seeing such a low activity in participation in the programme, the



university authorities decided to increase the available pool of funds by making transfers in project budgets lines, adding to the pool of academic staff mobility. This move had a very positive outcome, as the number of STA grants doubled for the next three academic years. This trend was stopped by the outbreak of the COVID-19 pandemic limiting the outgoing flow to two grants in the academic year 2020/21. The open question is what would be the long-lasting impact of the COVID-19 pandemic situation of future staff mobility for teaching. Until now, a study carried out in Spain showed that there was a certain number of mobility grants that were cancelled (both due to COVID-19 and Brexit) [53]; however, despite these cancellations, another aspects would be the willingness of the participants to apply for mobility grants (both teachers and students). On the basis of the submitted applications for trips abroad at UPWr, one may be tempted to say that the academic staff are still willing to travel abroad, but are waiting for the easing of restrictions related to the COVID-19 pandemic. An attitude of willingness to participate in exchange programmes requires institutional support. As Liu and Willis [54] observed, people bring their prior teaching experience and institutional cultures to a new context, where they may encounter techniques and pedagogic practices that contradict their assumptions about what constitutes successful teaching. This educational dissonance can lead to feelings of dissatisfaction or insecurity, but it can also spark creativity and self-reflection. Therefore, the decision to increase support from HEIs is needed in order to give proper condition to those teachers who are willing to take up the challenge.

The geographic distribution of Erasmus activities for academic staff presents some clear patterns. The outgoing STA mobility in the analysed period was mostly to European countries, with a visible predominance of trips to the Iberian peninsula and to the foreign countries relatively closest to Poland, i.e., Germany and the Czech Republic. Among these destinations, an image of the most frequently visited institutions emerges, i.e., the Czech University of Life Sciences Prague (nine grants), Miguel Hernández University of Elche (eight grants), University of Jaén (six grants), and Dresden University of Technology (six grants). It can be observed that UPWr conducts many joint projects with these institutions, such as, for example, double-degree studies with Miguel Hernández University of Elche in Spain in the domain of food science. There is a lack of case studies that could illustrate the ways in which the geographical distribution of STA differs between universities. Some reports can be found considering students' mobility. For example, in the case of Trinity College Dublin (Ireland), the main destinations were France, Germany, Spain and the United Kingdom [55]. The fact of being located on an island influences the geographical characteristic of mobility; however, some similarities to the closest neighbouring countries and the Iberian Peninsula can be noticed. The open question is how strongly selected destinations of staff mobility relate to the experience of the hosting university in order to enrich academic excellence, and how strongly they are connected to the point of view of "travelling". Kosmaczewska and Jameson [27] analysed the drivers influencing the choice of students, asking "education first" or "tourism first". Similar questions could be directed to teaching staff, considering—for example—destinations that potentially could be interesting due to touristic reasons (e.g., islands located in the Atlantic Ocean). This corresponds to discussions presented in the book 'Academic Tourism: Perspectives on International Mobility in Europe' [56]. However, this element was not analysed in our study; therefore, it is not possible to know if that had an impact on the geographical distribution of mobility in the analysed case.

Breaking the results down by the Priority Research Areas of UPWr, it can be noticed that the most active area in STA mobility is environment science, followed by food science and veterinary medicine. This is in direct opposition to the student mobility trend, where veterinary students are the most mobile student group, followed by environmental and food science students. The case is similar when considering international teaching projects, where food science and veterinary science areas are more active than environmental science in obtaining international grants. This trend may result from the fact that veterinary medicine at UPWr is scored as one of the highest in Poland [57], enjoying the greatest

popularity at the university and acquiring good quality candidates for studies. The average number of candidates for one place for veterinary studies at UPWr is 7.35 in 2021. They are characterised by a high potential in foreign language skills, which is associated with having a full studies program offered in English.

The main limitation of this study is the fact that it was an analysis of an individual case study. The results and conclusions were detailed; however, they did not allow us to state general findings that would characterise all European universities. However, such individual cases are being used in scientific discussion, and in the context of Erasmus programme evaluation, they were used to analyse both the perspective of academic teaching staff [58] and students [29].

The analysis of the STA mobility impact on academic networking is a problematic issue. It was proven that the Erasmus program gives an opportunity to make an impact on regional innovation and higher education [59] or joined degrees between universities [37,58,60]. Such an example can also be observed in case of UPWr. The double diploma with the Miguel Hernández University of Elche (established in September 2021) is the result of very good cooperation within the Erasmus+ programme. However, it should be highlighted that the STA mobility is only a small part of academic outgoing mobility within the UPWr. Overall, the number of foreign trips of academic staff in the pre-pandemic time was around 500/600 annually. Some of them were financed by the sources of the university, some of them were covered by national sources (like the Polish National Agency for Academic Exchange [61–63]) or European sources (like Horizon 2020: Research and Innovation Staff Exchange projects [64], European Cooperation in Science and Technology actions [65–67], or classical research projects, including internships). Regardless of the existing mechanisms of building a cooperation network in pre-pandemic periods, the future of international cooperation can face new challenges, such as the emerging aspect of the environmental impact of mobility in HEIs [68]. During interviews carried out in Norway [69] while analyzing the impact of an academic mobility, it was raised by one of faculty deans that—in recent years—there has been a need to think more about the environment. On the one hand the system encourage students to travel overseas to increase their international experience. On the other hand, such activity is characterized by large carbon footprint. The stated conclusion was that, while we are successful in encouraging students to travel abroad, we are not successful in getting them to think more environmentally, especially that if there is a chance the majority of them travel to another part of the globe (including the United States and Australia). The alternative could be the significant progress in long-distance teaching due to the COVID-19 pandemic. This may result in switching the focal point from direct mobility into other forms of international academic cooperation. This applies both to students and academic teaching staff. An example of activity changing the current system could be the European Universities Initiative [70] or the Blended Intensive Programmes [71], which of course include mobility as a possible approach of cooperation; however, it also includes also other approaches which do not require travel, such as telecollaboration [72]. As Koris et al. [31] stated, in post-pandemic reality we face the shift “from real to virtual mobility”. The open question for future studies would be “what would be the share of real mobility and what would be the share of virtual mobility?”

Based on the conducted study, we formulated some recommendations covering future research on the Erasmus+ programme and other internationalisation activities. First of all, it would be valuable to analyse how the pandemic has influenced the flow of academic mobility in the long term. In parallel, it would be worthwhile to consider the impact of COVID-19 on modernizing teaching techniques, introducing elements of distance learning, and if it can be considered as an impulse to develop hybrid types of mobility that combine the traditional form of academic travel and distance learning. This should cover Blended Intensive Programmes within Erasmus+. Such a solution may be a suitable form of post-pandemic cooperation, combining a component of virtual education and staying abroad. The developed contacts within the STA mobility should become a foothold of various forms of cooperation, such as the previously mentioned Blended Intensive Programs, or a

large undertaking such as building a consortium under the European University Initiative. Future studies could aim to define the origins and supporting tools that were used to achieve a successful level of international cooperation of HEIs.

**Author Contributions:** Conceptualization, K.K. and J.K.K.; methodology, J.K.K.; validation, K.K. and J.K.K.; formal analysis, K.K.; investigation, K.K.; resources, K.K.; data curation, J.K.K.; writing—original draft preparation, K.K. and J.K.K.; writing—review and editing, J.K.K.; visualization, J.K.K.; supervision, J.K.K.; funding acquisition, J.K.K. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

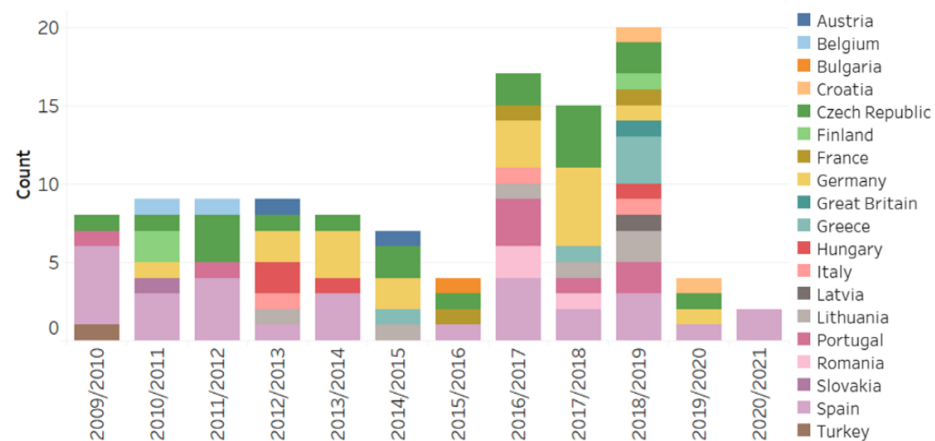
**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

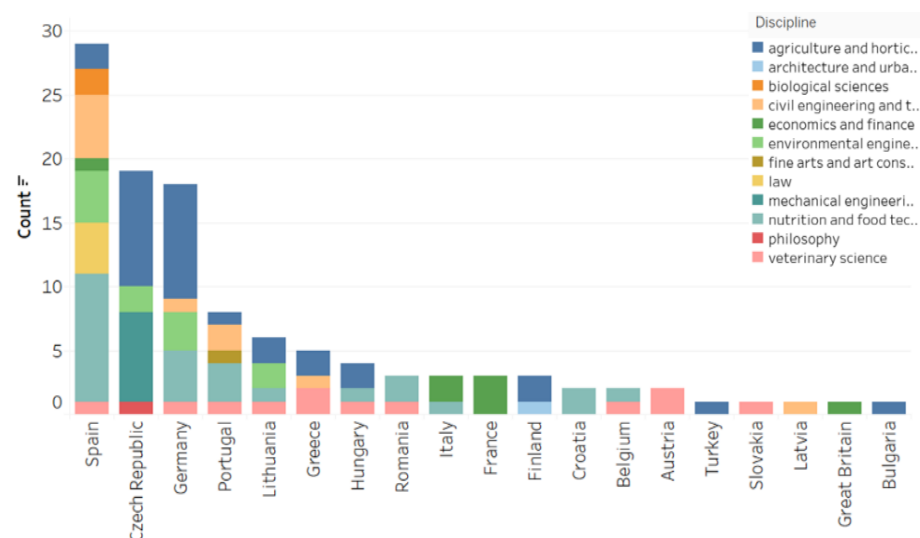
**Acknowledgments:** We would like to thank to Szymon Szewrański for his support in building the database of collected data.

**Conflicts of Interest:** The authors declare no conflict of interest.

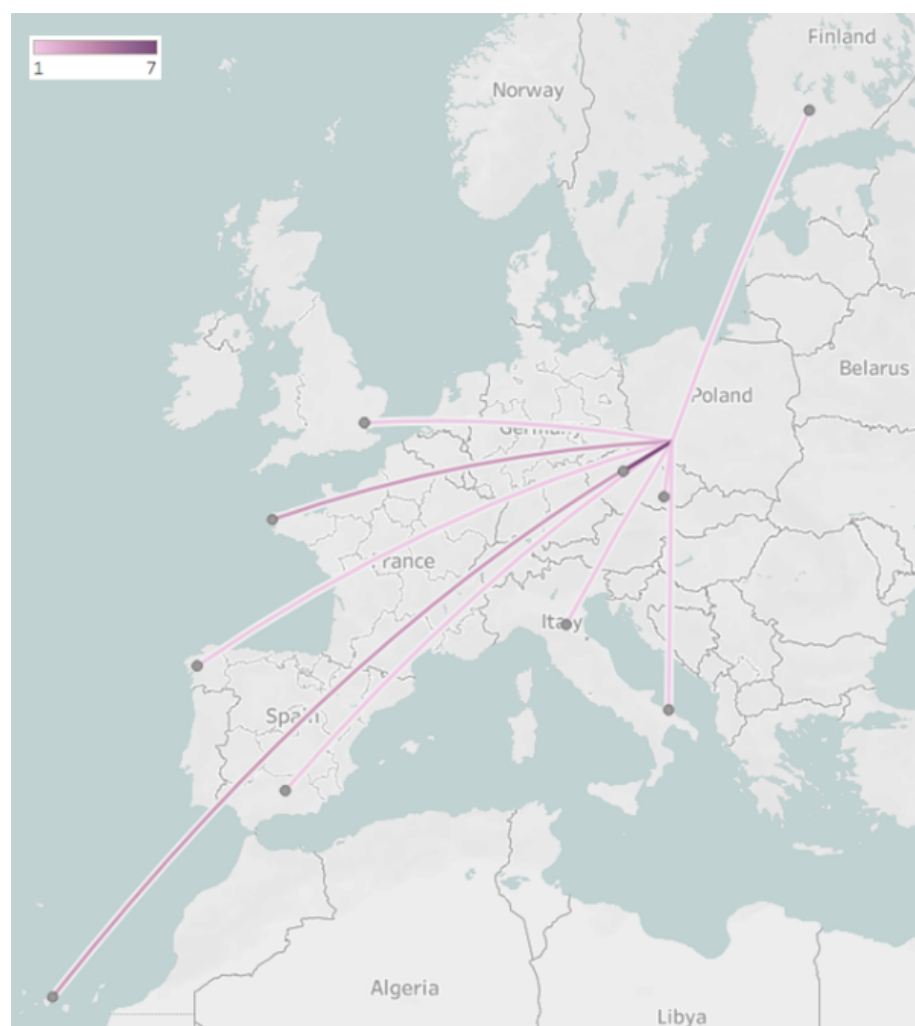
## Appendix A



**Figure A1.** Number of STA grants from UPWr in the period 2009/2010–2020/2021, divided by countries.



**Figure A2.** Number of STA grants from UPWr to different countries, divided by scientific disciplines.



**Figure A3.** Mobility flows of STA within scientific disciplines which are not assigned into the priority research areas.

## References

1. Stofkova, Z.; Sukalova, V. Sustainable development of human resources in globalization period. *Sustainability* **2020**, *12*, 7681. [[CrossRef](#)]
2. Biasutti, M.; Concina, E.; Frate, S.; Delen, I. Teacher professional development: Experiences in an international project on intercultural education. *Sustainability* **2021**, *13*, 4171. [[CrossRef](#)]
3. Marianowska, A. Doświadczenie mobilności w programie Erasmus a szanse na rynku pracy. Przegląd międzynarodowych raportów (en. Mobility experience in the Erasmus program and chances on the labor market. Review of international reports). *Eduk. Dorosłych* **2017**, *77*, 157–167.
4. Baker, C.; Cary, A.H.; da Conceicao Bento, M. Global standards for professional nursing education: The time is now. *J. Prof. Nurs.* **2021**, *37*, 86–92. [[CrossRef](#)] [[PubMed](#)]
5. Lee, A.; Quinn, M. Global health education in U.K. universities. *Glob. Health J.* **2021**, *5*, 155–162. [[CrossRef](#)] [[PubMed](#)]
6. Grodotzki, J.; Upadhya, S.; Tekkaya, A.E. Engineering education amid a global pandemic. *Adv. Ind. Manuf. Eng.* **2021**, *3*, 100058. [[CrossRef](#)]
7. Crawford, E.O.; Higgins, H.J.; Hilburn, J. Using a global competence model in an instructional design course before social studies methods: A developmental approach to global teacher education. *J. Soc. Stud. Res.* **2020**, *44*, 367–381. [[CrossRef](#)]
8. Žalėnienė, I.; Pereira, P. Higher Education For Sustainability: A Global Perspective. *Geogr. Sustain.* **2021**, *2*, 99–106. [[CrossRef](#)]
9. Ahmed Shafi, A.; Little, R.; Case, S. Children’s education in secure custodial settings: Towards a global understanding of effective policy and practice. *Int. J. Educ. Dev.* **2021**, *82*, 102379. [[CrossRef](#)]
10. Furmankiewicz, M. Współzrządzenie czy ukryta dominacja sektora publicznego? Koncepcja governance w praktyce lokalnych grup działania LEADER (en. Co-governance or hidden domination of the public sector? The concept of governance in the practice of “Leader” Local Action Group. *Studia Reg. Lokalne* **2013**, *14*, 71–89.

11. Bazan-Krzywoszańska, A.; Skiba, M.; Mrówczyńska, M.; Sztubecka, M.; Bazuń, D.; Kwiatkowski, M. Green energy in municipal planning documents. *E3S Web Conf.* **2018**, *45*, 6. [CrossRef]
12. Dąbrowska, J.; Dąbek, P.B.; Lejcuś, I. A GIS based approach for the mitigation of surface runoff to a shallow lowland reservoir. *Ecohydrol. Hydrobiol.* **2018**, *18*, 420–430. [CrossRef]
13. Forys, I.; Tarczynska-Luniewska, M. Multivariate Analysis of the Condition of the Property Development Sector: Selected Local Real Estate Markets in the European Union. *Int. Adv. Econ. Res.* **2018**, *24*, 1–15. [CrossRef]
14. Izakovičová, Z.; Šwiader, M. Building Ecological Networks in Slovakia and Poland. *Ekológia* **2017**, *36*, 303–322. [CrossRef]
15. European Commission. *From Erasmus to Erasmus+: A Story of 30 Years*; European Commission: Brussels, Belgium, 2017.
16. European Commission EU Budget: Commission Proposes to Double Funding for Erasmus Programme. Available online: [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_18\\_3948](https://ec.europa.eu/commission/presscorner/detail/en/IP_18_3948) (accessed on 7 February 2022).
17. Brandenburg, U.; Petrova, D.; Bugárová, M.; Kunc, M.; Stiburek, Š.; Tůmová, P. *The Erasmus Impact Study Regional Analysis: A Comparative Analysis of the Effects of Erasmus on the Personality, Skills and Career of Students of European Regions and Selected Countries*; European Commission: Brussels, Belgium, 2016.
18. Nada, C.I.; Legutko, J. “Maybe we did not learn that much academically, but we learn more from experience”—Erasmus mobility and its potential for transformative learning. *Int. J. Intercult. Relat.* **2022**, *87*, 183–192. [CrossRef]
19. Nogueiro, T.; Saraiva, M.; Jorge, F.; Chaleta, E. The Erasmus+ Programme and Sustainable Development Goals—Contribution of Mobility Actions in Higher Education. *Sustainability* **2022**, *14*, 1628. [CrossRef]
20. De La Torre, E.M.; Perez-Encinas, A.; Gomez-Mediavilla, G. Fostering Sustainability through Mobility Knowledge, Skills, and Attitudes. *Sustainability* **2022**, *14*, 1349. [CrossRef]
21. Vieira, M.-J.; Ferreira, C.; Rodríguez-Esteban, A.; Vidal, J. Towards Sustainable Development in Education: Implementing a VET System for In-Service Teachers in Albania. *Sustainability* **2021**, *13*, 8739. [CrossRef]
22. Zacchia, G.; Cipri, K.; Cucuzzella, C.; Calderari, G. Higher Education Interdisciplinarity: Addressing the Complexity of Sustainable Energies and the Green Economy. *Sustainability* **2022**, *14*, 1998. [CrossRef]
23. Alonso De Castro, M.G.; García Peñalvo, F.J. ICT tools highlighted and their usefulness during the pandemic: Erasmus+ projects related to eLearning. In Proceedings of the Ninth International Conference on Technological Ecosystems for Enhancing Multiculturality, Barcelona, Spain, 26–29 October 2021; Association for Computing Machinery: New York, NY, USA, 2021; pp. 219–224.
24. De Benedictis, L.; Leoni, S. Inclusive universities: Evidence from the Erasmus program. *Appl. Netw. Sci.* **2021**, *6*, 83. [CrossRef]
25. Levatino, A. What do exchange students value when choosing a destination for their study period abroad? A conjoint experiment. *Glob. Soc. Educ.* **2022**, 1–20. [CrossRef]
26. Van Mol, C. Intra-European student mobility and the different meanings of ‘Europe’. *Acta Sociol.* **2022**, *65*, 24–40. [CrossRef]
27. Kosmaczewska, J.; Jameson, S. “Education First” or “Tourism First”—What Influences the Choice of Location for International Exchange Students: Evidence from Poland. *J. Hosp. Tour. Educ.* **2021**, 1–16. [CrossRef]
28. Dolga, L.; Filipescu, H.; Popescu-Mitroi, M.M.; Mazilescu, C.A. Erasmus Mobility Impact on Professional Training and Personal Development of Students Beneficiaries. *Procedia-Soc. Behav. Sci.* **2015**, *191*, 1006–1013. [CrossRef]
29. Sudas, I. Europe in Mind: Social Representations of Turkey-Europe Relations in Case of Turkish University Students. *Eur. J. Geogr.* **2013**, *4*, 36–47.
30. Bryła, P. The Impact of International Student Mobility on Subsequent Employment and Professional Career: A Large-scale Survey among Polish Former Erasmus Students. *Procedia-Soc. Behav. Sci.* **2015**, *176*, 633–641. [CrossRef]
31. Koris, R.; Mato-Díaz, F.J.; Hernández-Nanclares, N. From real to virtual mobility: Erasmus students’ transition to online learning amid the COVID-19 crisis. *Eur. Educ. Res. J.* **2021**, *20*, 463–478. [CrossRef]
32. Brandenburg, U.; Berghoff, S.; Taboadela, O. *The Erasmus Impact Study: Effects of Mobility on the Skills and Employability of Students and the Internationalisation of Higher Education Institutions*; Publications Office of the European Union: Luxembourg, 2014; ISBN 9789279383809.
33. Marin-Pantelescu, A.; Tăchiciu, L.; Oncioiu, I.; Ștefan-Hint, M. Erasmus Students’ Experiences as Cultural Visitors: Lessons in Destination Management. *Sustainability* **2022**, *14*, 2553. [CrossRef]
34. Osidak, V.; Drahinda, O.; Kvasova, O. Training the Trainers in Language Assessment via Mentoring: Building Expertise to Promote Language Assessment Literacy of Ukrainian University Teachers. *Languages* **2021**, *6*, 194. [CrossRef]
35. Zajadacz, A.; Krukowska, R.; Durydiwka, M. Staff Teaching Mobility of Selected Polish Universities on the Example of Erasmus Plus Programme. In *Academic Tourism: Perspectives on International Mobility in Europe*; Springer: Berlin/Heidelberg, Germany, 2021; pp. 67–84.
36. Fabbris, L.; Scioni, M. Pooling Rankings to Obtain a Set of Scores for a Composite Indicator of Erasmus + Mobility Effects. *Soc. Indic. Res.* **2021**, *156*, 481–497. [CrossRef]
37. Marques, M.; Zapp, M.; Powell, J.J.W. Europeanizing Universities: Expanding and Consolidating Networks of the Erasmus Mundus Joint Master Degree Programme (2004–2017). *High. Educ. Policy* **2022**, *35*, 19–41. [CrossRef]
38. Restaino, M.; Primerano, I.; Vitale, M.P. Exploring the Gender Gap in Erasmus Student Mobility Flows. In *Studies in Classification, Data Analysis, and Knowledge Organization*; Springer: Berlin/Heidelberg, Germany, 2021; pp. 173–182.
39. Ajanovic, E.; Çizel, B.; Çizel, R. Effectiveness of Erasmus programme in prejudice reduction: Contact theory perspective. *Bus. Tour.* **2016**, *17*, 47–60. [CrossRef]



40. Haj-Yehia, K.; Erez, M. The impact of the ERASMUS program on cultural identity: A case study of an Arab Muslim female student from Israel. *Women's Stud. Int. Forum* **2018**, *70*, 32–38. [CrossRef]
41. Ramírez, Y.; Tejada, Á. University stakeholders' perceptions of the impact and benefits of, and barriers to, human resource information systems in Spanish universities. *Int. Rev. Adm. Sci.* **2022**, *88*, 171–188. [CrossRef]
42. Gadár, L.; Kosztyán, Z.T.; Telcs, A.; Abonyi, J. A multilayer and spatial description of the Erasmus mobility network. *Sci. Data* **2020**, *7*, 41. [CrossRef]
43. Breznik, K.; Skrbinek, V. Erasmus student mobility flows. *Eur. J. Educ.* **2020**, *55*, 105–117. [CrossRef]
44. De Soto, P. Network Analysis to Model and Analyse Roman Transport and Mobility. In *Finding the Limits of the Limes*; Verhagen, P., Joyce, J., Groenhuijzen, M.R., Eds.; Springer: Berlin/Heidelberg, Germany, 2019; pp. 271–289.
45. Hossmann, T.; Spyropoulos, T.; Legendre, F. A complex network analysis of human mobility. In Proceedings of the 2011 IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS), Shanghai, China, 10–15 April 2011; pp. 876–881.
46. Cao, J.; Li, Q.; Tu, W.; Gao, Q.; Cao, R.; Zhong, C. Resolving urban mobility networks from individual travel graphs using massive-scale mobile phone tracking data. *Cities* **2021**, *110*, 103077. [CrossRef]
47. Xin, R.; Ai, T.; Ding, L.; Zhu, R.; Meng, L. Impact of the COVID-19 pandemic on urban human mobility—A multiscale geospatial network analysis using New York bike-sharing data. *Cities* **2022**, *126*, 103677. [CrossRef]
48. Create Spider Diagram (Desire Lines)—ArcMap | Documentation. Available online: <https://desktop.arcgis.com/en/arcmap/latest/extensions/business-analyst/create-spider-diagrams-desire-lines.htm> (accessed on 19 March 2022).
49. Lanari, P.; Piccoli, F. New horizons in quantitative compositional mapping—Analytical conditions and data reduction using XMapTools. In Proceedings of the IOP Conference Series: Materials Science and Engineering, Chennai, India, 16–17 September 2020; IOP Publishing Ltd.: Bristol, UK, 2020; Volume 891, p. 012016.
50. Szwedrański, S.; Kazak, J.; Sylla, M.; Świąder, M. Spatial data analysis with the use of ArcGIS and Tableau systems. In *The Rise of Big Spatial Data; Lecture Notes in Geoinformation and Cartography*; Springer: Cham, Switzerland, 2017; pp. 337–349. ISBN 978-3-319-45122-0.
51. Kazak, J.; Chalfen, M.; Kamińska, J.; Szwedrański, S.; Świąder, M. Geo-Dynamic Decision Support System for Urban Traffic Management. In *Dynamics in GIScience. GIS OSTRAVA 2017; Lecture Notes in Geoinformation and Cartography, Dynamics in GIScience*; Springer: Cham, Switzerland, 2018; pp. 195–207.
52. Kazak, J.K.; Szwedrański, S.; Pilawka, T.; Tokarczyk-Dorociak, K.; Janiak, K.; Świąder, M. Changes in water demand patterns in a European city due to restrictions caused by the COVID-19 pandemic. *Desalin. Water Treat.* **2021**, *222*, 1–15. [CrossRef]
53. Salcedo-López, D.; Cuevas-López, M. Analysis and assessment of new permanent teacher training activities under the Erasmus+ program from the perspective of the participants of Spain in times of COVID-19. *Sustainability* **2021**, *13*, 11222. [CrossRef]
54. Liu, T.; Willis, K. Cut and paste pedagogy?: Academic mobility, teaching practices and the circulation of knowledge. *Geoforum* **2021**, *119*, 11–20. [CrossRef]
55. Trinity College Dublin. *Erasmus Exchanges. Changing Lives. Opening Minds*; Trinity College Dublin: Dublin, Ireland, 2020.
56. Cerdeira Bento, J.P.; Martínez-Roget, F.; Pereira, E.T.; Rodríguez, X.A. (Eds.) *Academic Tourism: Perspectives on International Mobility in Europe*; Tourism, Hospitality & Event Management; Springer International Publishing: Cham, Switzerland, 2021; ISBN 978-3-030-57287-7.
57. Ranking Szkół Wyższych Perspektywy. 2021. Available online: <http://ranking.perspektywy.pl/2021/ranking/ranking-kierunkow-studiow/kierunki-rolnicze-lesne-i-weterynaryjne/weterynaria> (accessed on 7 February 2022).
58. Hou, Y.C. Quality assurance of joint degree programmes: What Asia can learn from Erasmus Mundus joint degree programmes in Europe. *Glob. Soc. Educ.* **2020**, *18*, 19–29. [CrossRef]
59. Santamarta, J.C.; Mora-Guanche, A. Impact of Erasmus Master Programmes on Regional Innovation and Higher Education: The Case of The Canary Islands. *Procedia-Soc. Behav. Sci.* **2015**, *191*, 1255–1260. [CrossRef]
60. Barata-Salgueiro, T.; Cachinho, H.A.P. Joint Degrees in Geography Higher Education: Potentialities and Constraints. *Eur. J. Geogr.* **2010**, *1*, 29.
61. ScienceNet/Uniwersytet Przyrodniczy we Wrocławiu. Available online: <https://upwr.edu.pl/en/research/projects/polish-national-agency-for-academic-exchange/sciencenet> (accessed on 7 February 2022).
62. PROM/Uniwersytet Przyrodniczy we Wrocławiu. Available online: <https://upwr.edu.pl/en/research/projects/polish-national-agency-for-academic-exchange/prom> (accessed on 7 February 2022).
63. INCREaSE/Uniwersytet Przyrodniczy we Wrocławiu. Available online: <https://upwr.edu.pl/wspolpraca/projekty/increase> (accessed on 7 February 2022).
64. Economy by Space | EYE Project | Fact Sheet | H2020 | CORDIS | European Commission. Available online: <https://cordis.europa.eu/project/id/101007638> (accessed on 7 February 2022).
65. Action CA17107—COST. Available online: <https://www.cost.eu/actions/CA17107/> (accessed on 7 February 2022).
66. Action CA17125—COST. Available online: <https://www.cost.eu/actions/CA17125/> (accessed on 7 February 2022).
67. Action CA17133—COST. Available online: <https://www.cost.eu/actions/CA17133/> (accessed on 7 February 2022).
68. Perez-Lopez, J.-B.; Orro, A.; Novales, M. Environmental Impact of Mobility in Higher-Education Institutions: The Case of the Ecological Footprint at the University of A Coruña (Spain). *Sustainability* **2021**, *13*, 6190. [CrossRef]
69. Pedersen, T.D. Mobilising international student mobility: Exploring policy enactments in teacher education in Norway. *Eur. J. Educ.* **2021**, *56*, 292–306. [CrossRef]

70. Gunn, A. The European Universities Initiative: A Study of Alliance Formation in Higher Education. In *European Higher Education Area: Challenges for a New Decade*; Springer International Publishing: Cham, Switzerland, 2020; pp. 12–30, ISBN 9783030563165.
71. Mobility Project for Higher Education Students and Staff | Erasmus+. Available online: <https://erasmus-plus.ec.europa.eu/programme-guide/part-b/key-action-1/mobility-project-for-higher-education-students-and-staff> (accessed on 10 February 2022).
72. Carthy, Ú.R. Telecollaboration: Creating International Bridges in Socially Distanced Times. *TEANGA J. Ir. Assoc. Appl. Linguist.* **2021**, *28*, 331–339.