



Deliverable 1.1

Analysis submitted to the SC of EPICUR:

Foundations for a future EPICUR Common Research Agenda

European Partnership for an Innovative Campus Unifying Regions
EPICUR Research Agenda
Shaping European Society in Transition

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¹ For the University of Freiburg, the acronym ALU-FR has recently been changed recently to UFR.



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Table of content

1.	Executive Summary	5
2.	Context	7
2.1	The EPICUR Alliance & EPICUR-Research (H2020 Project)	7
2.2	Listing prime research foci of partners	7
2.3	Purpose of analysing the Foundations for a Future EPICUR Common Research Agenda	10
2.4	Some Specificities of this Analysis	10
3.	Process Undertaken for Analysing Foundations of the Common Research Agenda.....	12
3.1	Definition of Key Performance Indicators (KPIs).....	12
3.1.1	KPIs & Rationales Used	12
3.1.2	Relevance of Traditional KPIs for Early Career Researchers (ECRs)	13
3.2	Analysis of the Research Environment	14
3.2.1	Survey Period: 2016-2020	14
3.2.2	Challenges in the Data Collection	15
3.2.3	Payed Services.....	15
3.3	Step by Step Process for Establishing the Report.....	16
3.3.1	Workshop I (October 21, 2021).....	16
3.3.2	First Draft Outline	16
3.3.3	Writing Group	16
3.3.4	Additional Meetings.....	17
3.3.5	Workshop II (February 24, 2022).....	17
3.4	Structure of this Document	17
4.	Chapter I: EPIChallenges	19
4.1	Definition of EPIChallenge	20
4.1.1	Current EPIChallenges	22
4.1.2	Sustainability	24
4.1.3	Mobility and Migration	25
4.1.4	Identity and Values	26
4.1.5	Public Health and Global Health	27
4.2	Identification & Set-up of Future EPIChallenges	28
4.3	Proposition of a Set of Future EPIChallenges	30
4.4	Definitions and Validation of Future Challenges.....	35
4.5	Recommendations for Infrastructures and Policy Changes to Support the EPIChallenge Procedures.....	35
5.	Chapter II: New Forms of Collaboration	36
5.1	Data on Current Collaborations.....	36
5.1.1	Early Career Researchers (ERCs) as a Special Target Group.....	38
5.1.2	Encouraging Interdisciplinary and Transdisciplinary Research.....	38

5.2	Good Practices within EPICUR	39
5.2.1	Supporting Early Career Researchers (ECRs).....	39
5.2.2	Cross-disciplinary Research Centers	39
5.2.3	Interdisciplinary Graduate Schools	40
5.2.4	Common Chairs	41
5.2.5	Open Data	41
6.	Chapter III: Benchmarking EPICUR’s Progress	45
6.1	Status Quo of the Alliance	45
6.1.1	EPICUR’s Research Potentials along Traditional Indicators	45
6.1.2	Bibliometrics	46
6.1.3	Third Party Funding	48
6.1.4	Research Staff – Insights from the EPICamps.....	50
6.1.5	Example of Good Practices on Research Data Management Systems	51
6.2	Tracking EPICUR’s Progress	51
7.	Appendix	54
7.1	Research Outputs of Partner Universities Pertaining to the Sustainable Development Goals (SDGs) – recorded from InCites	54
7.2	Minutes of Workshop “EPICUR Common Research Agenda”	59

1. Executive Summary

As our alliance believes that international collaboration fosters scientific and societal progress, EPICUR has developed the foundations of a Common Research Agenda (CRA) and deployed an inter- and transdisciplinary approach to tackle pressing research questions, which we call EPIChallenges. The current EPIChallenges, which serve as a starting point are: Sustainability; Mobility, Migration, Identity, and Public Health. According to the grant agreement, this deliverable contains the suggestions of a set of future EPIChallenges to be approved by the Steering Committee.

This Common Research Agenda is created as a 'living document', initial scrutiny and basis on which a more substantial research agenda for the alliance in the following years can be developed. It represents a first analysis of the status quo of EPICUR partners, which can evolve and adapt in the following years to mirror changes within the European Research Ecosystem, the EPICUR Alliance and Society in general. Our EPICUR-Research project is laying down the foundations of a possible future common research agenda by identifying research strengths of the EPICUR universities, defining EPIChallenges, scoping future ones, and identifying appropriate resources, incentives and research infrastructures to support the growing common research ecosystem.

This analysis for the future Common Research Agenda of EPICUR:

- offers a broad overview of current research foci (information)
- offers some preliminary recommendations for potential future research (recommendations)
- offers new EPIChallenges and
- serves as a point of reference for the development of new joint research projects (monitoring and evaluation).

By pursuing three actions, the Common Research Agenda will help us to encourage as many of our researchers as possible to team-up and partake in joint ventures. These actions are:

1. Identifying potential areas of research which will be clustered in the form of EPIChallenges (Chapter I)
2. Creating new formats that incentivize, encourage and enhance collaborative research (Chapter II)
3. Regularly assessing whether the topics and the formats contribute to achieving EPICUR's goals of creating more inclusive, collaborative and challenge-based research with inter- and / or transdisciplinary perspectives (Chapter III).

These three chapters provide a basis for more discussion and work, including an exploration of the status quo, outlining the methodological and organizational shortcomings as well as the potentials that lie within more in-depth analyses.

After consultation with experts from several partner institutions, the different research disciplines are grouped in three domains and the following six key performance indicators (KPIs) were selected for analyzing the period between 2016 - 2020:

1. third party funding
2. scientific awards
3. research staff
4. collaborative research / partnerships
5. publications
6. research output beyond publications

Data collection on research output beyond publications could not be included so far, as partner data were insufficient and data from the metrics approach were sparsely and biased. For methodological reasons and due to insufficient capacities and resources for data mining and processing, the underlying data analysis is not holistic but rather exploratory and will provide a first overview of the ecosystems of EPICUR's partner institutions with recommendations on how a more holistic analysis could be achieved in the future.

Using an overarching "Top-Down-Bottom-Up Metrics" approach, the KPIs were analyzed in a six-step model resulting in the following suggestions for further EPICChallenges:

- Governance of Environmental Change
- Ecosystem Change & Ecological Sustainability
- Society – Nature – Interaction
- Energy – clean, affordable, secure & safe
- Transport & Habitat
- Sustainable Materials and Technologies
- Human & Environmental Health

Once the Steering Committee has chosen the set of future challenges, these should be defined as outlined in Step 5 of the Identification of EPICChallenges – Suggested Procedures.

EPICUR-Research strongly support the following main recommendations for changes in Infrastructures and Policy to support the EPICChallenges procedures:

1. Engaging society & partners outside academia in defining future EPICChallenges.
2. Finding ways to provide and make use of Meta-Data to identify researchers' interests more efficiently.
3. Undertaking standardized regular surveys of EPICUR's graduate population.
4. Establishing a research council, including the Board of Early-Career-Researchers, into its governance
5. Developing a common research data information system or creating a link between the partners' existing ones to ensure that data about ongoing research can flow more easily in order to get more real-time information & the ability to use predictive statistical approaches about what researchers are actually working on.
6. Embracing and developing a culture of self-reporting for researchers from the very beginning to keep information about research activities and transdisciplinary events updated.

2. Context

The analysis towards an EPICUR Common Research Agenda is a living document that will evolve and adapt to changes of the European Research Ecosystem, the EPICUR Alliance and Society at large. It represents a first analysis of the status quo of our EPICUR partners, on which we can build to develop an agenda for the alliance in the following years.

2.1 The EPICUR Alliance & EPICUR-Research (H2020 Project)

EPICUR, the European Partnership for an Innovative Campus Unifying Regions, belongs to the first-generation European University Alliances, dedicated to shaping European Society in Transition through the development of collaborative inter- and transdisciplinary teaching and learning. The EPICUR Alliance is a transnational European alliance of eight diverse and complementary universities. The University of Southern Denmark is intended to join the consortium in November 2022:

- Karlsruhe Institute of Technology (Germany): KIT
- University of Strasbourg (France): UNISTRA
- Adam Mickiewicz University (Poland): AMU
- Aristotle University of Thessaloniki (Greece): AUTH
- University of Natural Resources and Life Sciences in Vienna (Austria): BOKU
- University of Haute-Alsace (France): UHA
- University of Freiburg (Germany): ALU
- University of Amsterdam (The Netherlands): UvA
- University of Southern Denmark (Denmark)²: SDU

2.2 Listing prime research foci of partners

The following is a brief description of the research focus of each partner. This mainly serves to provide context and a first brief overview of the different research areas the consortium spans.

AMU

The Adam Mickiewicz University of Poznan covers a wide range of research topics such as Agriculture, Biochemistry, Material Science, Physics, Computer Science and Arts & Humanities. More specific research interests like Sustainable Development, Bio- and Nanotechnology as well as Artificial Intelligence, Astronomy and Digital Humanities can also be singled out.

AUTH

The Aristotle University of Thessaloniki in Greece shows a widespread research focus as well; a few of its primary research categories include Health, Food, Environment, and IT and Telecommunications. The university also does a good amount of research on Education and Language, and History and Archaeology.

BOKU

The University of Natural Resources and Life Sciences focuses its research on three broad key areas: a) the Preservation and Development of the Environment and Quality of Life; b) Natural Resource and Environment Management; and c) Safeguarding Food and Health. Beyond that, its research is specialized

² Although SDU is not yet part of the consortium for the EPICUR-Research project, we are including their data partly in our work. The University of Southern Denmark (SDU) will officially join the EPICUR Alliance in November 2022.

towards Green Economy, Renewable Raw Materials, and Biotechnology. Much research has also been done on Ecosystems and Biodiversity.

KIT

The Karlsruhe Institute of Technology carries a hint to its main areas of research in its name: the university conducts pioneering research in fields like Energy Transition, Future Mobility, and, more generally, Technology. Research projects include work on Materials Research, Environmental Science and even Particle Physics.

UFR

The current research foci of the University of Freiburg include but are not limited to Biological Signalling Research, Neuroscience and -technology, Epigenetics and Immunology, Data Analysis, Artificial Intelligence and Civil Security Research, and Cultures of the Past and the Present. Research areas in development that are sure to become future research foci of the UFR as well are: Future Ecosystems, Transregional Studies, and Metabolism Research.

UHA

The French University of Haute Alsace has three main research foci. The first is a combination of natural sciences, namely Chemistry, Physics, Materials and Environmental Science. The second comprises Humanities and Social Sciences and the last focus is on Engineering Science.

UNISTRA

The University of Strasbourg pursues advanced research in fields like Sustainability and Environmental Studies, Global Water topics and Space Science. It is also highly interested in Collective and European Identities as well as research on Pharmaceutical Drugs. Moreover, UNISTRA is strongly involved in the development and advancement of Humanities and Social Sciences.

UvA

Research foci of the University of Amsterdam are provided in their Strategic Plan and include Responsible Digital Transformations, Healthy Future, Resilient and Fair Society, and Sustainable Prosperity. These broader research foci split up into a variety of fields of expertise, e.g., Arts and Culture, Artificial Intelligence, Cybersecurity and Privacy, Refugees and Migration, Politics and International Relations, Sustainability and Climate, or Quantum Technology, to name just a selection.



EPICUR's vision of a European University for the future is to create a place where all students, researchers of all career stages and staff can participate in an academic life strongly rooted in European traditions, irrespective of their nationality, mother tongue, cultural or socio-economic background.

In synergy with the education dimension, the EPICUR Alliance is developing a joint long-term research strategy for the consortium and its ecosystem. The work of EPICUR-Research is funded by the European Commission in the framework of the Horizon 2020 “Science with and for Society” (SwafS) program. The project was launched in January 2021 and is running for three years under the coordination of KIT. In reference to the Horizon 2020 transformation modules³, EPICUR-Research is laying down the foundation of its future common research agenda by identifying research strengths of the EPICUR universities, defining EPIChallenges, scoping future ones, and identifying appropriate resources and research infrastructures to support the growing common research ecosystem.

The H2020 project roadmap unfolds on several levels (of collaborations):

- the establishment of new types of research collaborations at a European level for Early Career Researchers (ECRs) by supporting the interdisciplinary approach.
- the design of a prototype for a European social network of researchers that aims to form a European Research Community in the EPICUR context – EPICommunity.
- the inclusion of partners outside academia in research projects through the testing of an open format, the EPICluster.
- Establishing links with other peer European university alliances and other research cooperation projects.

With this roadmap, several levels of stakeholders should be involved in the project and beyond the Alliance. Early career researchers are primarily targeted, with EPICUR being committed to integrate them into all activities and in its decision-making structures. The Alliance believes that the new generation of European research leaders is instrumental in driving institutional transformation. In addition, EPICUR seeks to

³ [other-doc_h2020-iba-swafs-support-1-2020_h2020-iba-swafs-support-2-2020_en.pdf \(europa.eu\)](#)

collaborate with stakeholders outside the academia (including Science, Technology, Innovation & Health; Business, Industry & Entrepreneurship; Government & Public Administration; Civil Society, Media & Culture)⁴. In this pilot project, all EPICUR partners are collectively developing new ways of connecting, collaborating, sharing infrastructures and resources, shaping, and assessing academic careers and defining mission-driven research questions relevant to society at large.

2.3 Purpose of analysing the Foundations for a Future EPICUR Common Research Agenda

Organizations and institutions formulate research agendas to state their key research areas and interests alongside plans on how to pursue them. As a European University Alliance of eight partner universities, EPICUR brings together an immense variety of research strengths and interests. The range of disciplines and programs offered at each of the partners is equally a source of great strength and a challenge to forming a cohesive research agenda.

In addition, all our partner universities are well-connected within academia and their regional and national environments. They are often members of several different consortia and have long-standing partnerships on different levels and for different purposes across Europe and the world. Each of our partners has its own research agenda and this will not change - although the results of EPICUR-Research will have an influence on further developments of our partner institutions in this regard. The same obviously holds true for smaller units within each of our partner institutions and perhaps even more so for every individual researcher – a direct result of academic freedom, which is cherished and protected by our universities.

An analysis for the future Common Research Agenda for the Alliance can therefore offer

- 1. a broad overview of current research foci (information),**
- 2. some preliminary recommendations for potential future research (recommendation),**
- 3. and serve as a point of reference for the development of joint research projects (monitoring)**

On an alliance level, in addition to activities pursued by partners individually. Its purpose will always be directed at encouraging as many of its members as possible to partake in joint ventures by identifying potential areas of research which will be clustered in the form of EPICChallenges (Chapter I), by creating new formats that encourage and enhance collaborative research (Chapter II), and by regularly assessing whether these two contribute to achieving EPICUR's goals of creating more inclusive and collaborative research with inter- and/or transdisciplinary perspectives (Chapter III).

2.4 Some Specificities of this Analysis

In the spirit of institutional change, a future Common Research Agenda will embrace the principles of Equity, Diversity, and Inclusion (EDI) and seek to encourage ECRs to participate more widely in the research ecosystems of Europe.

⁴ To define the partners outside academia, EPICUR-Research refers to the categorisation of associated partners suggested by the Erasmus+ Executive agency (EACEA).

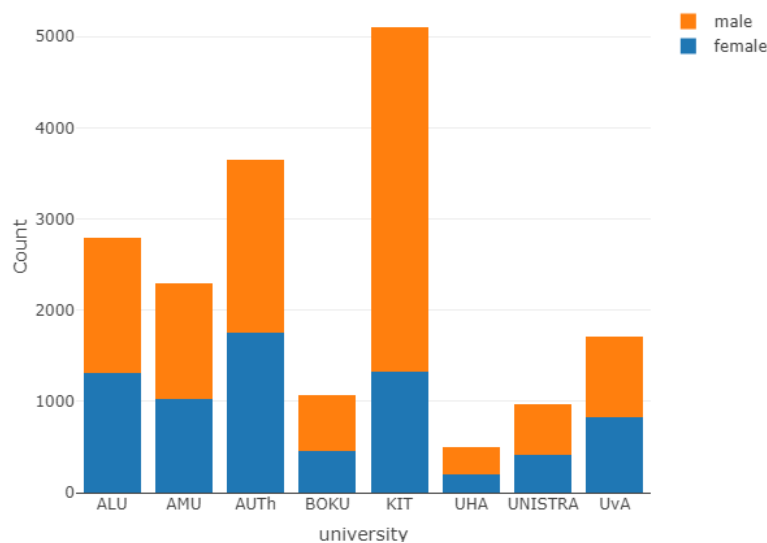


Fig. 1 Number of researchers per partner differentiated by biological sex (average between 2016-2020).

To foster diversity, inclusiveness and gender equality should not be a goal in itself. Instead, EPICUR partners are convinced that opening spaces to people who have not traditionally inhabited academia will fundamentally change our research ecosystems for the better. It is our conviction in EPICUR that including a more diverse population in academia will engender different kinds of research questions and inspire innovation with regards to methodologies and theories alike. Several studies^{5,6} have shown that research developed by more inclusive groups of researchers creates more holistic solutions and outcomes. Given EPICUR's orientation towards societal challenges, adherence to EDI principles is imperative. To provide one example, **Fehler! Verweisquelle konnte nicht gefunden werden.**⁷ showcases the distribution of researchers a cross biological sex for the different partners.

The EPICUR Alliance is convinced that ERCs are an untapped source of innovation and cutting-edge research.

Having to adopt to an increasingly competitive market and needing to be equipped early with extensive skill sets, ranging from research to professional management, from teaching to communicating their science effectively. This new generation is essential for the way we do and will do science. EPICUR seeks to encourage and support these changes by empowering ECRs in their role as important drivers of future change. While other actions of the EPICUR-Research project are dedicated to enhancing careers and assessment that reflect these new demands (EPIQAssess, EPIGame, EPICommunity), the present analysis will reflect this in the action plan as well as in the recommendations for the identification of new research topics and new forms of collaboration.

Finally, by suggesting different ways to assess success as an alliance, EPICUR's benchmarks will include indicators that not only show increasing scholarly impact but hopefully also mirror the increasing Europeanization of research careers and the successful development of collaborative research on different levels.

⁵ Talia H Swartz, Ann-Gel S Palermo, Sandra K Masur, Judith A Aberg, The Science and Value of Diversity: Closing the Gaps in Our Understanding of Inclusion and Diversity, The Journal of Infectious Diseases, Volume 220, Issue Supplement_2, 15 September 2019, Pages S33–S41,

⁶ Page, N. (2018). Understanding and implementing inclusive teaching and learning initiatives in the bioscience curriculum to close the attainment gap.

⁷ Please note that the final figures of number of researchers will be checked once again by partners. This also pertains following figures which use the number of researchers.

3. Process Undertaken for Analysing Foundations of the Common Research Agenda

The work towards the development of the future EPICUR Common Research Agenda is embedded in the Work Package 1 co-led by ALU-FR and BOKU in close collaboration with all EPICUR partners and with the support of research and strategy departments. To prepare the ground, the WP1-R team and the partners have conducted an analysis of research strengths of EPICUR universities with the goal of identifying potential synergies at the level of the alliance.

3.1 Definition of Key Performance Indicators (KPIs)

To compile a first overview of each university, a basic status quo within the dimension of research had to be established. Due to EPICUR's mission of enhancing European collaboration and its focus on transdisciplinary, additional key indicators for the dimensions of internationalization, transfer and innovation were included in the selection process for the key indicators. After consultation with experts from several partner institutions, the following **six key performance indicators** (KPIs; see Fig. 2) were finally selected for a mapping exercise for the partners. While other indicators are available for the research dimension in university benchmarking, it was concluded that the following indicators were the most suitable and the most readily available, as they form the basis of most international rankings.

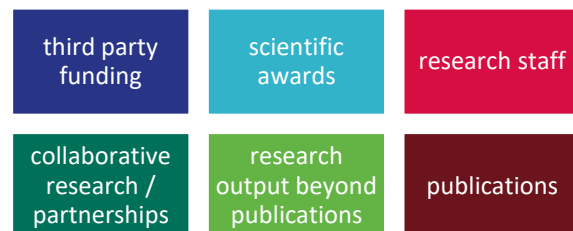


Fig. 2 Key Performance Indicators Used for Basic Analysis.

All data points for these KPIs were collected along the [disciplinary panels of the European Research Council \(ERC\)](#) from 2020 as requested in the Grant Agreement. Partners unfortunately report in strongly differentiating disciplinary schemes, which makes possible only the simplest differentiation into the three domains of

- Physical Sciences and Engineering (PE)
- Social Sciences and Humanities
- Life Sciences

Suggestion: A further mapping of some of the KPIs to the next level would potentially be possible. This would require the creation of a mapping sheet between the local disciplinary regimes and the ERC panel. This process should be fairly easy and only require input from all partners. Chances are that partners already have such a mapping sheet or can easily develop it. However, as such a mapping can be very time consuming, it is strongly suggested that EPICUR first identifies the disciplines or research areas of particular interest. In particular, if EPICUR decides to focus on research areas rather than traditional disciplines, it may be necessary to map disciplines in all three dimensions.

3.1.1 KPIs & Rationales Used

The following section lists the rationales and offers first reflections on how well they worked in the mapping exercise as well as how the data could be mined (more effectively) in the future.

- **Third party funding:** third party funding – as we learned through this exercise – takes on a different meaning in different national research ecosystems. However, it can always serve as an indicator for research success (as these funds must be applied for and are usually competitive), attractiveness of research areas; gender distribution of research funding; excellence of individual researchers, in particular young researchers (e.g., the ERC Starting and Consolidator Grants); the attractiveness for diverse sources of funding; and in some cases, the engagement of industry and society. Some data on third-party funding can be collected from the granting institutions, making the collection of this indicator easier than others. For this analysis, data on ERC grants are taken from the European Research Council. We collected data on Horizon funding through the European Commission's statistical database, CORDIS⁸.
- **Scientific awards:** scientific prizes and awards are indicators of the success and quality of research undertaken by individual researchers and/or research groups. Unfortunately, this data can be difficult to collect because not all institutions collect it centrally. For the current analysis, too few partners have submitted data to make this a useful indicator, but it may be possible to include it in the future.
- **Research staff:** the number of employees and graduates are indicative of the workforce (human capital) of an institution by discipline. It enables the correlation between third-party funding and human resources. Including the number of PhD candidates, postdoctoral researchers and equivalent individuals in qualifying positions offers insights into an institution's potential for EPICUR's targeted ECR offerings. Most partner institutions provided this indicator, which shows that this data is widely available and should be considered for the metrics.
- **Collaborative research/partnerships:** these can be used as indicators in the area pertaining to transfer and innovation as well as the connection(s) of a partner with other institutions. This would be an excellent indicator to measure the impact of the alliance. Although it does not seem impossible to obtain this data, the partners struggled to collect and deliver this data, which they had to request from various colleagues in their institution.
- **Research output beyond publications:** including patents, start-ups and businesses, licenses, policy papers and other forms of transfer and outreach activities. This was mainly intended to collect ideas on how to EPICUR can fulfill its third mission, which is reflected in the goal of enhancing transdisciplinary research. As with data on collaborative research and partnerships, these data were rarely provided by our partners, which unfortunately prevents them from being included in this first analysis. However, given the raising importance that these alternative outputs are acquired, it makes sense to further define indicators and to collect research outputs more substantially in the future.
- **Publications:** including all types of publications, citations, co-publications, and doctoral theses. These data are indicators of any quantitative analysis and usually the most accessible. Unfortunately, most bibliometric analyses are profoundly biased in their focus on disciplines which publish in articles rather than books. To remedy this bias, EPICUR has added data on doctoral theses which should include information on all types of qualifying work. This addition should give us insights into the interests and work of ECRs.

3.1.2 Relevance of Traditional KPIs for Early Career Researchers (ECRs)

⁸ <https://cordis.europa.eu/>

Traditional KPIs are not necessarily useful for ECRs because they prioritise the quantity of results that can only be achieved over long periods. The same applies to the acquisition of funding and awards. These two activities are more suited to and undertaken by experienced experts. Indeed, ECRs are often prevented from participating in programmes. In many institutions and disciplines, ECRs are not allowed to supervise students and/or advise them on their research projects. Even if they are, these activities are often formally entrusted to the chair/head of the research group. In this case, a self-declaration system could be useful, but such a system does not exist and the implementation of such a system soon may face additional legal hurdles.

As EPICUR embraces a particularly broad definition of ECRs (outlined in Chapter II), it is also necessary to differentiate the actual career levels studied. From the data delivered by partners, it is possible to consider the following academic identities: PhD candidates and research assistants: R1, post docs: R2, research group leaders and profs: R3/R4.

- PhD candidates / Doctoral candidates: be aware that some partners have schemes where PhDs are not hired by the institution but instead are registered or enrolled in some way.
- Research assistants: some partners hire PhDs (in some disciplines, not in others), creating an additional category of research assistants (people hired by the university but not necessarily).
- Post-doctoral researchers / Recent PhD holders: usually approx. 6 years after completion.
- Research group leaders: traditionally more in the physical sciences and engineering as well as the life sciences
- Assistant professors: post-docs who have developed a level of independence in leading an own research group. For some partner countries, this is equivalent with postdoctoral researchers.
- Junior professors⁹: a distinction can be made between Junior professors with and without tenure track (usually limited contracts of up to 6 years to advance a habilitation project; for some partners this is equivalent with Postdocs).

3.2 Analysis of the Research Environment

To complete the analysis of the research ecosystems, partners were asked to gather data on the KPIs outlined above. In addition, free, publicly available data bases were used to supplement data. Unfortunately, several challenges prevent a truly holistic analysis of the research ecosystems at this point. More time and human resources, institutional commitment and the equal support of all partners would be needed to do an in-depth analysis of the EPICUR partner universities and their extensive social and entrepreneurial ecosystems.

The WP1-R team had to rely on the data provided by partners with all its short-comings and biases, which will be discussed within the chapters below in more detail. While these conditions prevented a holistic analysis as envisioned in the original proposal, the document includes an informative – even if explorative at best – first overview of the ecosystems of EPICUR's partner institutions. This will be a baseline for making decisions on future work alongside recommendations on how a more holistic analysis can be achieved in the future. The following section gives an overview of the work undertaken as well as the challenges encountered.

3.2.1 Survey Period: 2016-2020

⁹ The position of a "Junior professor" may have different equivalents and names in different countries.

Data was collected for the period between 2016 and 2020 for several reasons. Most importantly, it reflects the collection period of several partners for their own benchmarking processes, which should have eased the process. Secondly, the period between 2016 and 2020 also ensured that the EPICUR-Research project could not have had a significant impact on the chosen KPIs yet. The Alliance only received its research grant in 2021 and activities for connecting researchers just began later that year. Therefore, the data collection should reflect a status quo prior to EPICUR Research and can be used in a benchmarking focusing on EPICUR's progress as an alliance. Thirdly, the length of this survey period set at five years is a common period for most partners and therefore synchronizes EPICUR's benchmarking with that of their partners in many cases. Five years are also a reasonable period to expect a yield of significant changes in several of the KPIs. For example, third-party funding should result in publications within about 1-2 years (depending on disciplines) after the reception of the grant.

3.2.2 Challenges in the Data Collection

Despite all partners participating in national and international rankings, it became apparent that data management systems vary enormously between the partners. The human and financial resources each of the partners dedicates to central data collection created an unexpected delay in the compilation at the partners' level as well as within the project. In attempt to remedy the situation, the collection period was extended multiple times, so that it lasted from August 2021 to February 2022.

In addition, there is limited data available that could be collected from external sources on partners. Due to a lack of human resources within the EPICUR project staff, the analysis could not be extended beyond the basic statistical databases provided by the EU (e.g., to include national or even more regional data sets). In addition, much of the statistical data collected centrally by third party companies entails significant additional costs that were not foreseen in the original SwafS application.

3.2.3 Payed Services

Elsevier's Data Analysis provider SciVal *has offered to provide additional data sets and analysis at a cost of approximately 10.000 – 20.000 €, which EPICUR could make use. However, such investment requires further discussion at the level of the Steering Committee, as it would involve a considerable reallocation of the available funds and therefore cannot not be integrated in this report.*

The same issue applies to services such as PlumX or Altmetrics. These systems offer additional KPIs that are much more individualized, both regarding individual researchers and research groups and regarding the impact of research output. These for-profit-systems provide, for example, tracking data of researchers and research output on social media, in policy discussions and papers, etc. However, the costs of such programs run up to 20.000 EUR (or more) depending on the size and number of licenses needed per institution and depth of analysis. They also tend to not be available for the alliance but must be purchased by each partner, which requires institutional support far beyond the EPICUR-Research project timeline. Alternatively, it is possible to order tailored made data reports for the Alliance from Incites or SciVal for a one-time fee. Another alternative for future analyses might be to use institutional accounts from partners, in case they are made accessible.

Suggestion: Apart from the costs involved in such elaborate analyses, it is questionable to whether such detailed evaluations at the alliance level would even make sense.

Instead, it could be useful to develop data on the mentioned KPIs, in particular on collaborations and third-party funding that EPICUR should be able to solicit from its partners without having to rely on third party providers.

In addition, self-reporting by researchers of results beyond publications could and should be encouraged, as they can also benefit from increased visibility in the EPICUR network as well as in their own university reporting systems. Therefore, these incentives need to be chosen in close collaboration with the strategy and research departments of the partner institutions.

3.3 Step by Step Process for Establishing the Report

Next to the data collection, the WP1-R team undertook several steps towards the establishment of the report in line with the tasks of the Work Package, which will be recounted in brevity here.

3.3.1 Workshop I (October 21, 2021)

A workshop with the (vice) presidents and/or rectors for innovation and international affairs, for academic partnerships and governance, for research services and high-ranking research managers was held in October 2021. The purpose of the meeting was to investigate the complementarities and the commonalities, as well as to explore together new research areas. The presentations given by each of the partners were scanned for good practices and additional potential EPIChallenges. It allowed us a better understanding of our universities research profiles and potentials. In addition, for several partners, it raised the awareness of the work being undertaken in EPICUR Research, which apparently remains very much isolated from the general strategic developments at our partner institutions. A full executive summary is available in the appendix.

3.3.2 First Draft Outline

Based on the collected analytical data and the discussions at the workshop in October 2021, the WP1-R team prepared the first rough draft of the EPICUR Common Research Agenda outlined in three main chapters:

- The Top Down – Bottom Up – Metrics Approach to EPIChallenges
- Good Practice Needs New Forms of Collaboration
- Collect, Build, Suggest – Benchmarking EPICUR's Progress

The first draft outline of the Common Research Agenda was presented at the PMT meeting of December 2021 as well as at the WP1 Contacts Meeting in January 2022. No concerns were raised regarding the content or chapters.

3.3.3 Writing Group

In the spirit of transparency and involvement of all partners envisioned in the SwafS proposal, the Common Research Agenda did not only include partners' data and strategic input but was also written in a collaborative effort. To this purpose, a writing group led by ALU-FR and BOKU was set up to meet weekly. This group was open to participation of all partners and multiple invitations were communicated to partners

at the PMT, WP1-R Meetings, and via email. KIT, AUTH, UHA and UNISTRA expressed an interest and contributed to varying degrees according to their resources.

The writing group discussed the available data, organized the chapter, and progressively developed the content. It was also responsible for sharing updates and informing the partners regularly on the progress of the final Common Research Agenda drafts. Partners had access to the document most of the time and were invited to share their thoughts and comments in various ways.

3.3.4 Additional Meetings

During the WP1-R Contacts meeting (January 27, 2022), the WP1-R team presented the foreseen timeline for the completion of the deliverable with the engagement of the partners. To feed the EPICUR Common Research Agenda, the need for more discussion with research and strategy departments was identified as crucial but not possible within the timeline of the deliverable. *Consequently, the WP1-R Team strongly recommends that a regular meeting between the partners' strategic research departments and/or their VP responsible (vice) presidents & rectors is established to ensure that EPICUR fulfils its own goals while also benefitting the institutions which partake in it.*

The WP1-R team invited each partner to bilateral meetings between mid-October 2021 and February 2022. The objective was to allow more in-depth discussion, and to include each vision from the partners in the establishment of the common research agenda. Unfortunately, only AMU, UNISTRA, as well as to a degree AUTH and UHA took advantage of this opportunity.

3.3.5 Workshop II (February 24, 2022)

The WP1-R team invited the participants of the workshop in October 2021 to a second workshop end of February 2022. During this workshop, the WP1-R team presented the draft version of the EPICUR Common Research Agenda. The Project Officers of EPICUR-Research and representatives of the Early Career Researchers Board participated, shared their thoughts and some ideas. The meeting showed that partners were generally satisfied with the work of WP1-R and there were no objections to the proposed outline and focus.

3.4 Structure of this Document

The following three chapters on *EPICChallenges*, *New Forms of Collaboration* and *Benchmarking* are an ordered discussion of the results of this first attempt at a holistic analysis. The order and format of the chapters are a result of the many discussions with diverse stakeholders and a response to the challenges of the data collection and the diversity of expectations for this document.

Ideally, the following three chapters build the basis for more extensive and collaborative work on content, structures, and processes for building a common research agenda for the EPICUR alliance with which all partners, but perhaps more importantly, our community of research may identify.

Each Chapter outlines the specific procedures undertaken and contextualizes the results gathered. Furthermore, each chapter offers suggestions and recommendations on additional data, research, and in some cases, implementation. And it provides a basis for more discussion and work, including an exploration of the status quo, outlining the shortcomings as well as the potentials that lie within more in-depth analyses.

The three Chapters offer a lot of inspiration for discussions on the content of the EPICUR alliance's research pursuits, the needed structures, and services to enhance collaboration across partners and disciplines, and the systematic tracking of EPICUR's progress. It is highly encouraged to understand the graphs and results provided in their context and their limitations as well as their potentials.

4. Chapter I: EPIChallenges

The EPICUR Alliance is convinced of the urgent need to address the most significant global societal challenges within research as much as education and other sectors. This conviction is reflected within the EPICUR-Research project, which aims to supplement the educational activities of the alliance with new research activities. Before exploring the operational modalities (Chapter II) and evaluation methods of our research activities (Chapter III), their content needs to be clarified. **As global societal challenges evolve and change, this chapter will not only outline the current set of challenges but will also suggest procedures to define and adapt current and new challenges in the future.** The aim is to ensure that the research content of EPICUR's future Common Research Agenda is rooted within the research interests of the EPICUR community. This means that procedures will be crafted to integrate the more strategic aspects with the realities of those engaged in research in the systematic formation of the "EPIChallenges". The so-called "Top-Down Bottom-Up Metrics" approach will allow EPICUR to triangulate their EPIChallenges.



The Top-Down step ensures that the future EPICUR Common Research Agenda reflects the larger interests of each partner university regarding their European collaborations. In this first step towards the Common research Agenda, the two workshops (I & II) for the (vice) presidents, rectors, and other high-level representatives of each partner institution, as well as the bilateral meetings were provided (university-wide strategic orientation). In addition, the EPICUR team was systematically apprehending output from the EU on what are considered socially relevant research areas. We will make suggestions below on how this process can be better institutionalised in the long-term (end of this Chapter I).



Acknowledging that the most accurate and detailed information on on-going research is localized de-centrally within departments, faculties and institutes, and that including as many researchers as possible in the process of defining the content of the Common Research Agenda will be key to making it implementable, the Bottom-Up step is an essential element. Given that together we have more than 40,000 researchers of all career stages, the inclusion of bottom-up must be organized very well. Therefore, the focus will be on providing recommendations for a long-term strategy (end of this Chapter I).



The metrics included in the first analysis are restricted by the aforementioned challenges and biases, but they can serve as a starting point and there are promising exploratory data which ground the sections below. From these emerge a couple of recommendations on how this process can be organized effectively and successfully in the future, thereby ensuring that EPICUR has the capacity to address these EPIChallenges or at least has the potential to develop such capacity within a reasonable framework in terms of time and money.

All the three steps were based on a matrix of self-imposed principles. EPICURs partners are convinced that they will create a more balanced, innovative, and inclusive research environment, not just in terms of who can participate and succeed, but also in terms of outputs. These principles apply to the EPIChallenges in the following way:

- It is ensured that all ERC-Panels are represented within the data collection. A analyses used to determine new research areas will ensure equitable consideration, if not representation, of all disciplines;
- The chosen indicators are suitable to ECRs and ensure that their research activities and interests are reflected as the future-building elements;
- The themes and topics are measured against the real potential of our partner universities and therefore represent either common strengths or complementary strengths;
- The entire knowledge square is taken into account when formulating the EPIChallenges;
- EPIChallenges are always interdisciplinary;
- Potential for transdisciplinary work is considered;
- Each EPIChallenge is considered from an EDI perspective and to this purpose, EPICUR will always invite commentary from the newly formed EDI Group.

The following chapter is structured as follows: first, a definition of the EPIChallenge notion will be given, including a description of the three current EPIChallenges, as they have evolved since their conception in the original proposal. Secondly, the procedures for adapting and identifying (new) EPIChallenges will be presented. Finally, new EPIChallenges will be suggested to illustrate the proposed procedures. It has to be noted, that the size of the University as well as a potential thematic specialisation has an effect on the number of publications. There is significant chance that a lot of the publications created around the topics do not appear in searches using English (or even EPICUR-language) keywords.

4.1 Definition of EPIChallenge

A definition of EPIChallenge is necessary because the idea of an EPIChallenge in the original proposal was not used consistently. This led to many discussions and diverse conceptions about what turned out to be a central term in communicating and implementing EPICUR-Research. To facilitate the use of the terminology, a common definition of EPIChallenge will be presented in this analysis¹⁰.

EPIChallenges are inspired by the “Six Transformations to achieve the Sustainable Development Goals¹¹”¹² as well as the Green Deal, “Missions of Horizon Europe”, and forthcoming update of the EU Skills Agenda” (cp.

¹⁰ According to the Grant Agreement, EPICUR will “deploy an **inter- and transdisciplinary approach** to tackle **pressing research questions**, which we call EPIChallenges (WP1)” (Annex 1, Part A, p.3). At the same time, EPIChallenges were also considered a “set of **priority areas for future collaborative research**” (Annex 1, Part A, p.9), which were supposed to undergo “gradual refinement “(Annex 1, Part A, p.9). A little further down, they became “**future potential interdisciplinary research fields** (EPIChallenges), [which were] defining a possible technology roadmap at alliance level.” (Annex 1, Part A, p.9; see also Annex, Part A, p. 13). Elsewhere, EPIChallenges were considered “**umbrella-topics** that will provide theoretical and methodological frameworks for EPICUR networks of early career researchers”, of which more in form of “new promising EPIChallenges allowing for profiling EPICUR’s specific research strength” were to be revealed by the analysis and activities (Annex 1, Part A, p.11). Last but not least, the Grant Agreement also specified them as “**inter- and transdisciplinary research themes**, based on research strengths of the EPICUR partners on the one hand and pressing societal demands on the other” (Annex 1, Part B, p.2). While this may appear to be semantics, each of the terms loaded EPIChallenges with different expectations.

¹¹ <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

¹² i.e.: Education, Gender, and Inequality; Health, Wellbeing, and Demography; Energy Decarbonisation and Sustainable Industry; Sustainable Food, Land, Water, and Oceans; Sustainable Cities and Communities; and Digital Revolution for Sustainable Development (<https://resources.unsdsn.org/six-transformations-to-achieve-the-sustainable-development-goals-sdgs>).

Grant Agreement, Annex 1, Part B, p.2). The EPICChallenges are an invitation to understand and address the root causes and perpetuating forces of the problems we face as an European community. At the same time, we must recognise that the EPICUR research community is deeply embedded in global networks and engaged in the dynamics emerging from historical and current crises all over the world. Ideally, the idea of EPICChallenges engenders both applied and basic research inviting a multitude of researchers and including a wide range of disciplines. Fig. 3 shows the current research focus of the EPICUR alliance on the Sustainable Development Goals (similar figures for individual partners are to be found in the Appendix).



Fig. 3 Web of Science Documents, Publications by EPICUR Partners according to the SDG Mapping. Area size of each SDG represent their proportions as in research output pertaining to specific SDGs.

Scoping the content nodes of the common research agenda so broadly also invites more interdisciplinary connections, which has become an imperative of the research community at large. Therefore, EPICChallenges provide the content-based justification of interdisciplinary work, which remains at odds with the disciplinary restrictions of much of academia today. As such, EPICChallenges can indeed aid in the production of new theoretical and methodological frameworks by inspiring researchers to enter dialogues beyond their disciplinary traditions. However, the EPICChallenges can only provide the impetus for such development and do not bear this within themselves. In the same vein, this opens a pathway to transdisciplinary research, meaning that non-university partners from the areas listed below become part and participate in the research supported by EPICUR Research. This is explicitly a two-way street, in which partners outside academia are met at eye level and not as objects of investigation or consumers of results.¹³

Lastly, EPICUR understands that building new research from scratch is time-consuming and requires both human and financial capital which are unevenly distributed across the European research area (and by consequence, also our partners). Therefore, EPICUR adopts a more pragmatic approach to connecting our

¹³ To this purpose EPICUR is developing an entire program for these partners in WP3.

partner institutions along with our researchers. Namely, to ensure that these politically and strategically framed themes can engender collaborative research, they are tested – via metrics, for now traditional ones, in the future they should also include more innovative measures – against the research output of our partner institutions and against the articulated interests of our common research community.

With these preliminary considerations in mind, EPICUR defines the EPIChallenges, which are the thematic and strategic nodes of its common research agenda in the following way:

An **EPIChallenge** represents the pressing global societal need to respond (through adaptation or mitigation) to changing environmental, social, and economic conditions, which EPICUR-Research addresses

- by undertaking interdisciplinary and/or transdisciplinary research
- in new collaborative formats.

Taking into consideration the multitude of changes occurring simultaneously, **the EPICUR Common Research Agenda will feature multiple EPIChallenges** at the same time. EPIChallenges will therefore be 5 to 10 themes which combine societal “hot” topics with research questions being pursued by EPICUR’s partner institutions.

Formulated this broadly, EPIChallenges are intended to appeal to a wide range of researchers and ideally inspire them to rethink their work in terms of its contribution to larger societal concerns. As EPIChallenges are meant to relate to existing research strengths, this is of particular importance, as EPICUR currently does not fund emerging research work but rather builds on the achievement of the individual partner institutions. By focusing on existing research strengths, EPICUR will significantly contribute to the establishment of new connections and networks among researchers, which are the seedbeds of new research.

The EPIChallenges are particularly important as they will provide more detailed information on existing research at the partners and thus facilitate knowledge about potential collaborations which are based on content, while also providing the necessary political leverage by offering easy access to geographically balanced partnerships.

In the long-term, EPIChallenges, if they prove valuable to the research community, may lead not just to the emergence of new, more interdisciplinary, and even transdisciplinary research fields, but may also become a founding element in new research paradigms reflective of these principles.

4.1.1 Current EPIChallenges

The current EPIChallenges represent a starting point for the activities of the alliance. The first set of EPIChallenges is:

- Sustainability,
- Mobility, Migration, Identity,
- Public Health.



Fig. 4 The three initial EPICChallenges how they are understood within EPICUR Research.

The following sections discuss the relations of the current EPICChallenges to the Sustainable Development Goals and present figures on the publications of each partner university that fall within the area of an EPICChallenge. Numbers for co-publications (between partners) are presented in Chapter II: New Forms of Collaboration.

Observations in these sub-sections are based on the bibliometrics, which contain several biases, including the fact that the humanities and several disciplines in the social sciences prefer books as publication formats over research papers. In addition, the current analysis is only based on the Web of Sciences database, which again has a disciplinary bias. Further analysis should be undertaken to confirm this first overview. Such an analysis should integrate additional information on different forms of publication (monographs, special collections, etc.) to balance out the disciplinary bias, which can only be obtained by the partners themselves. In addition, the data are cross-referenced against staff (data available), which allows important insights on the productivity of a research institution with regards to such traditional output as publications (please note that for the stratified version of the publications output, data for SDU are not yet included). Furthermore, data on policy briefs and other forms of contributions to societal advancement emerging from our research environments could be considered. Advanced and for-profit analytical systems such as *Pure* or *Altmetrics* would offer these kind of data points. Thus far, we did not have access to these analytical systems.

4.1.2 Sustainability

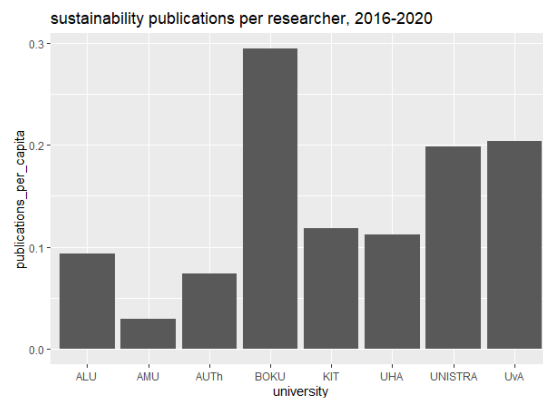
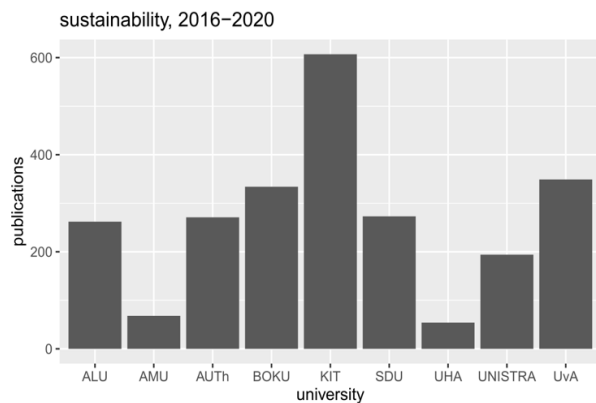


Fig. 5 Web of Science-based search results for “sustainability”; not stratified for size of universities

Fig. 6 Web of Science-based search results for “sustainability”; stratified for size of universities.

The EPICChallenge Sustainability can be linked to several of the Sustainable Development Goals: 2 zero hunger (esp. sustainable agriculture); 6 clean water and sanitation; 7 affordable and clean energy; 11 sustainable cities and communities; 12 responsible consumption and production; 13 climate action; 15 life on land (esp. Biodiversity conservation, sustainable forest management, and protection of urban green space). In the EPICUR context, the first EPICChallenge of Sustainability has a particular focus on climate change, energy, water, and materials. It aims at finding solutions and roadmaps towards clean and affordable energy systems and circular economies with reduced industrial pollution. It is meant to complement a related study track developed in EPICUR’s Liberal Arts and Sciences program. It refers to a concern of very high political priority (“Fridays for future”, climate change, loss of biodiversity, loss of green space and urbanization, pollution, etc.).

Our partners have strong publication records regarding “sustainability” (see Fig. 6).



Fig. 7 Most commonly assigned WOS Keywords in Papers filtered with the search query on “sustainab*”

Strong research capacities of EPICUR’s members within the area lie mostly within the ERC Panels of Physical Sciences and Engineering as well as the Life Sciences. The notable exceptions from the Social Sciences and Humanities Panel, which also seems to have much potential, are the areas of geography (and related fields, such as building technologies, urban studies, and transportation) and economics, which is mostly tied to questions of business development (cp. Fig. 7). The humanities, ethics, and social sciences, on the other hand, are severely under-represented and can be counted only among potentially emerging fields, and not among the research strengths within the framework of the consortium.

4.1.3 Mobility and Migration

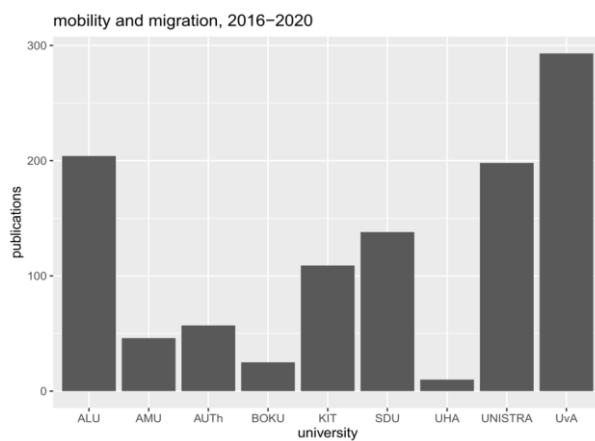


Fig. 8 WOS- based search results for "mobility and migration"; not stratified for size of universities

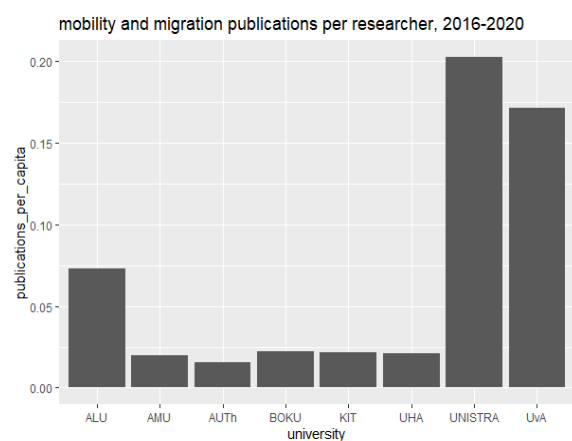


Fig. 9 Web of Science-based search results for "mobility and migration"; stratified for size of universities.

For this bibliometric analysis we split the second EPICChallenge into Mobility and Migration, and then present numbers for Identity in the subsequent section. The second EPICChallenge Mobility, Migration, Identity can be linked to several Sustainable Development Goals: 4 quality education; 5 gender equality; 9 industry, innovation, and infrastructure (sustainable transport); 10 reduced inequalities; 16 peace, justice and strong institutions. It also corresponds to the first of the transformations: "Education builds human capital, which in turn promotes economic growth, the elimination of extreme poverty, decent work, and overcoming gender and other inequalities". This transformation comprises three sets of interventions to promote education and gender equality and to lower inequalities.

Mobility and Migration complements another of the study tracks to be developed in EPICUR's Liberal Arts and Sciences program focusing on European Identities as well as the outcomes pertaining to European multilingualism.

This EPICChallenge refers to intricate political and societal areas, touching on topics such as identity and dignity of humans (refugee movements, poverty, disparity of economic and social status, virtual life, cultural belonging / cultural change, interculturality, and multilingualism).

A bibliometric analysis shows that some of the partners are particularly strong at publishing on the aspects of mobility and migration (here stratified for human movement only); however, other partners are much less involved in these thematic areas (Fig. 9).

In addition, topics of identity and migration come up within different philologies (such as linguistics and cultural studies) in which it is more than common to publish within the target language / language of origin. An easy foregone conclusion would be that such publications and their authors would not be of interest in the EPICUR framework, but the intensive collaboration between Slavic & Nordic languages emerging from the network's orientation towards these languages prove how ill-conceived this would be. In this sense basic bibliometric analysis runs the high-risk of diminishing the potential for substantial growth of collaboration in these philological contexts.

Suggestion: As a result, we recommend that the alliance extends this analysis by inviting focus groups of chosen subsets of researchers from these philologies to determine which keywords (and therefore which semantic groups) best reflect the research response to this EPICChallenges. Along these keywords a combined search within the bibliometric systems would yield much more representative results, which would indeed give much more accurate input about the actual potential for collaboration.

4.1.4 Identity and Values

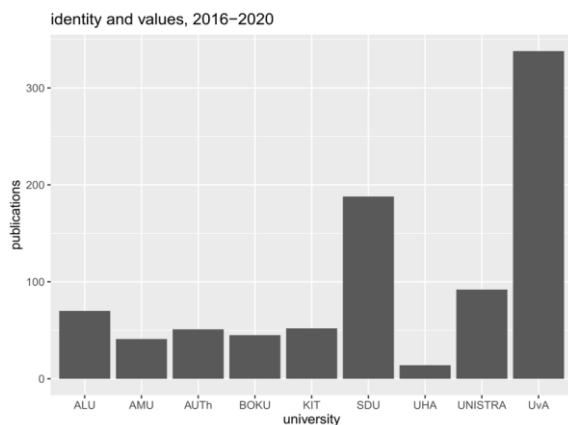


Fig. 10 WOS-based search results for "identity and values"; not stratified for size of universities

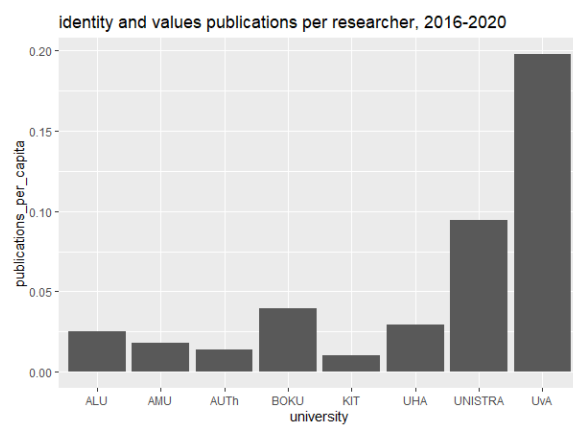


Fig. 11 WOS-based search results for "identity and values"; stratified for size of universities.

There has been a slight adaptation of the original thematic areas within EPICUR (European Identities and Migration/Mobility/Identity) and **"European values"** now adds to the EPICChallenge. In addition to the bibliometric analysis of migration and mobility, we therefore ran an analysis around European values and identity. The Universities of Southern Denmark and Amsterdam have a particularly strong output. It might be worth looking into other data sources that better considers the humanities and social sciences, particularly regarding the research areas of law, economics, philosophy, and media studies.



Fig. 12 Most commonly assigned WOS Keywords in Papers filtered with the search query on Identity, European Values, Migration and Mobility.

In an extended analysis of the research areas assigned to the publications within these areas via WOS Keywords, the most common fields in these four areas of migration, mobility, identity, and values with European as a qualifier, turned out to be political sciences, environmental sciences, management and multidisciplinary sciences from a broad range of areas. This can be read as an indication that these terms attract a broad disciplinary audience. However, it also shows that these terms can be used in a broad context and that a careful definition of each EPICChallenge, including the indication of research areas is needed to avoid confusion and turn an EPICChallenge into a meaningful umbrella for interdisciplinary collaboration.

4.1.5 Public Health and Global Health

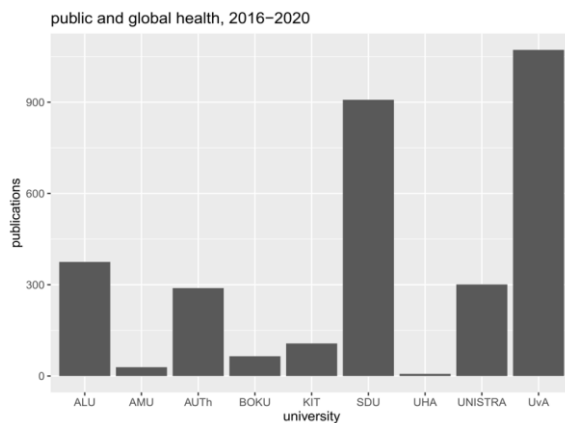


Fig. 13 WOS- based search results for “public and global health”; not stratified for size of universities.

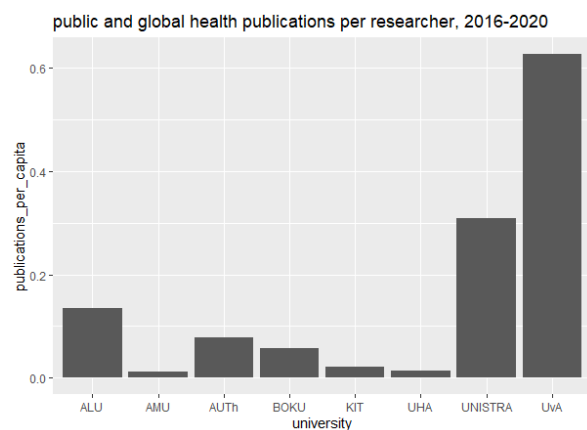


Fig. 14 WOS-based search results for “public and global health”; stratified for size of universities

With the COVID-19 crisis and its implications, Public Health is currently the focus of much needed new attention, as both health systems and human behavior are currently undergoing a significant transformation with regards to prevention of the spread of infectious diseases. Scientific supervision of these processes is of utmost political, societal, cultural, and economic interest, and should be supported by highly interdisciplinary research projects. Increasing resilience to be able to better respond to shocks and crises is a goal reaching far beyond the public health sector. Furthermore, this EPIChallenge corresponds to particularly strong research capacities of some of the EPICUR’s members and surrounding knowledge-processing-institutions (including university medical centers and hospitals). It can be linked to several Sustainable Development Goals: 2 zero hunger, 3 good health and well-being, 6 clean water and sanitation, and it corresponds to the second of the transformations: “Health, well-being and demography”, which is oriented towards investments in the public health sector.



Fig. 15 Most commonly assigned WOS Keywords in papers filtered with the search query on public and global health

A bibliometric search of these topics (including the reformulated one of global health) rendered results for some of our partners, especially those partners who have medical faculties. Again, there seems to be enough output that makes this a valid EPIChallenge but given that for at least three partners this is a marginal field.

4.2 Identification & Set-up of Future EPIChallenges

Suggested Procedures for Identifying (New) EPIChallenges:

The EPICUR research community is contributing to societal challenges in manifold ways. However, as the discussion on the three existing challenges has shown, it is difficult to match data from top-down and bottom-up approaches with the metrics readily available. This is due to both data-related issues and more systemic challenges:

- Biases within the available data systems (WOS/SCOPUS disciplinary biases)
- Biases caused by linguistic challenges (translation of keywords, interpretation of keywords)
- Lack of data on monographs, non-journal publications, grey literature etc.
- Our partner universities' foci on basic research (which cannot easily be mapped onto societal challenges of other political/strategic framed issues)
- Applied research or challenge-based research is often output-driven (available third-party funding; industry collaboration), these resources may not always correspond with political and strategic decisions.

In addition, especially research undertaken by ECRs, which in many parts reflects an intense awareness of critical issues, often slips the net of the bibliometric analysis. While there will be suggestions for additional bibliometric analysis to remedy this issue, it has become clear that additional measures should be undertaken to identify viable EPIChallenges. For this reason, we propose that in the future, EPIChallenges may be revisited and identified with more attention to detail and tapping into a bigger multitude of resources (more bibliometric and other data; focus groups etc.). We suggest, therefore, the following procedures to identify viable EPIChallenges.

We propose that about every 5 years, existing EPIChallenges should be assessed, and new ones identified. The time period of 5 years for measuring scientific impact has been chosen, as scientific impact reflects the influence that a finding or publication has on science or on society. Furthermore, this is to ensure that the limited funding available in EPICUR are allocated to the right areas and to monitor EPICUR's development as an alliance that encourages challenge-based research. Furthermore, we suggest that **the formulation and evaluation of EPIChallenges should be organized systematically by a cross-partner team and supervised by a committee of senior research managers** from all partner institutions. In addition, a wide range of the research community within EPICUR should be involved in the bottom-up approach towards EPIChallenges.

The following step-by-step process may be considered as a triangulation between different forms of data that ensure that the actual EPIChallenges meet the definition given above. Careful consideration of all potentially stratifying disciplinary, linguistic, and other biases should be undertaken in each step. Keywords are always a stark reduction and therefore oversimplification of complex scientific discourses and should therefore be chosen with the utmost care.



**Top-Down
Approach:
Societal
Considerations**

Conduct a thorough research of current societal challenges: whether and/or how they are reflected in official EU documents and policies. It might also be useful to consider national frameworks and larger foundations etc.



**Top-Down
Approach:
Strategic
Considerations**

Organize regular meetings with (vice) -presidents and rectors for research or their representatives (senior research managers) to discuss the ongoing developments in each partner university.

It is important to note that these workshops should focus on those developments that partners are actually interested in sharing and working on collaboratively within EPICUR.

→ From steps 1 and 2, relevant topics for EPICUR should have been identified for potential joint collaborations.



**Metrics Approach:
Publication Data**

Conduct an analysis of bibliometric data on the topics identified in the previous steps.

- 1) Keyword analysis of all dissertations → Are graduates publishing on the topics envisioned?
- 2) Keyword analysis of co-publications between partners (WOS & SCOPUS, disciplinary biases must be taken into account)
- 3) If possible: self-reported overviews of monographs & other publications that are not systematically recorded in WOS/SCOPUS should be taken into consideration.



**Bottom-Up
Approach:
EPICommunity /
EPICUR Activities**

To ensure that steps 1 to 3 not only match with past and present work of EPICUR researchers, but also indicate long-term research interests and foci of our institutions, it seems imperative to add more qualitative steps in the identification of EPIChallenges:

- 1) Regular surveys of researchers: These could easily be integrated into other activities taking place within EPICUR or become part of the EPICommunity metrics.
- 2) An analysis of themes and topics addressed through our various EPICUR Activities. For this first status quo analysis, for example, an analysis of the EPICamp programs and research interests expressed by participating researchers will be undertaken.
- 3) In the long term, we suggest that focus groups of researchers of all career stages that are implemented along research areas favored by our EPICUR partner institutions should be established, which discuss the results of Steps 1-4. Such focus groups could serve as a

powerful congress of our research community and could even kick-start collaborations.¹⁴



Defining the Future EPIChallenges

Once steps 1-4 have taken place, a small and interdisciplinary diverse group of researchers should be invited to write the definition of the set of future EPIChallenges. These definitions should indicate a limited list of subtopics (keywords) to prevent arbitrariness, identify research areas and disciplines specifically suited to their exploration to enable targeted communication, and describe policy / strategic goals which may link to them – in short, these definition text should give a brief overview of the reasons and ideas behind each EPIChallenge.



Assessment

We suggest that every five years we assess the existing EPIChallenges and identify new ones. A benchmarking and tracking methodology will be proposed in Chapter III.

4.3 Proposition of a Set of Future EPIChallenges



According to our grant agreement, this current deliverable should contain a set of future EPIC challenges to be approved by the steering committee.

Limited resources and other challenges described in the methodology above prevented the full use of the proposed steps. Nevertheless, the following table contains a set of potential future EPIChallenges that should match the needs and interests of the partner universities, the alliance and our research community:

- During the first workshop, (vice) presidents, -rectors and other representatives named the areas in which their universities are strong and in which they wish to collaborate within EPICUR.
- The resulting list of keywords was clustered into broadly defined research areas.
- A desk research on the existing EPIChallenges was undertaken to examine if the current EPIChallenges were reflected in departments and ongoing projects at the partner level. This search again proved to be difficult given the language barrier on websites, yet it yielded results to start defining new subsets of EPIChallenges.

¹⁴ AMU has received a grant to bring together researchers from biology faculties across the alliance to serve a similar purpose of identifying common research interests and complementary strengths which can be harvested in prospective collaborations among partners. EPICUR should do well in following up with our Polish colleagues on the success of these meetings.

- Research areas¹⁵ in which the European Commission works and provides funding in their Horizon Europe scheme were taken into consideration:
 - ❖ [Agriculture, forestry and rural areas](#)
 - ❖ [Bioeconomy](#)
 - ❖ [Energy](#)
 - ❖ [Environment](#)
 - ❖ [Food systems](#)
 - ❖ [Frontier research \(any field /any discipline\)](#)
 - ❖ [Health](#)
 - ❖ [Industry](#)
 - ❖ [Information and communication technologies](#)
 - ❖ [Oceans and seas](#)
 - ❖ [Security](#)
 - ❖ [Small and medium-sized businesses \(SMEs\)](#)
 - ❖ [Social sciences and humanities](#) (democratic governance, cultural heritage, and social and economic transformations.)
 - ❖ [Space](#)
 - ❖ [Synergies with structural funds](#)
 - ❖ [Transport](#)
- The bibliometric analysis of the original EPIChallenges were used to identify research areas in which our partner universities are particularly active. The results also point to particular interests of our research community.
- The programs of the first five EPICamps were used to identify topics in which our researcher community is currently pursuing their research. Since EPICamps were geared toward ECRs but also attracted many established and even leading researchers, the topics listed in this column are indeed representative of a broad spectrum of research taking place in EPICUR.
- First possible EPIChallenges options were formulated (last column). These EPIChallenges listed in the table below will need to be complemented and finalized, ideally by researchers working in the respective fields.

¹⁵ https://research-and-innovation.ec.europa.eu/research-area_en

Suggestions for Future EPIChallenges (highlighted in orange)

Top-Down Approach: Strategic Considerations		Top-Down Approach: Societal Considerations		Metrics Approach: Publication Data	Bottom-Up Approach: EPICamps	Emerging EPIChallenge
Keywords / Themes supplied by VPs & RMs + Desk Research	Local Research Areas (National, Regional...)	Matching Research Areas of the European Commission	Global "Hot Topics"	WOS Keywords assigned to publications which were identified in the original bibliometric analyses of the current EPIChallenges. Numbers indicate how often they appeared in publications.	Topics that we addressed during the EPICamps	Potential Future EPIChallenges, based on the data collected.
<ul style="list-style-type: none"> - conservation and development of protection for habitats and the economic market as well as standards of living. - management of natural resources and the environment - complexity of nature and future ecosystems - climate action - metabolism research - atmospheric sciences - ecosystem management and biodiversity - landscape and water - habitat and infrastructure - human-river systems 	<ul style="list-style-type: none"> - Groundwater protection (regional) - sustainable production and use of (alternative) raw materials and of food products (international/global) - changes in atmosphere - Ecological efficiency region of Eastern Macedonia-Thrace (regional) - Low-carbon urban transport (regional) - Global waste management and knowledge transfer (global) - Nuclear energy (national and global) - Public Law with European administrative, information and Environmental Law (European) - global sustainable production (global) 	<ul style="list-style-type: none"> - Bioeconomy - Energy - Environment - Agriculture, forestry and rural areas - Oceans and seas - Transport - Water, nutrients and waste - Biodiversity - Climate Action - Water - Integrated Maritime Policy - Multimodal Travel - Urban Development 	<ul style="list-style-type: none"> - Sustainable Development Goals - Climate Change - Natural Resources for Energy - Energy Dependency (Ukraine Conflict) - Price for Energy - Waste Disposal - Ozone Layer Depletion - Ocean Acidification - Overpopulation 	<ul style="list-style-type: none"> - ecology 1276 - environmental sciences 1276 - science & technology 160 - engineering 554 - chemistry 289 - agriculture 177 - geography 144 - business 99 - economics 67 - forestry 88 - transportation 88 - biotechnology 77 - biology 74 - building technology 74 - management science 60 - Environmental Studies 84 - social sciences 54 - health care sciences 51 	<ul style="list-style-type: none"> - Hydrosphere - River Systems (historical and synchronic perspectives) - Restorations of Water Bodies - Aquatic Systems under climate change / in transformation - Ecosystems Approach - Interdisciplinary Research - Climate Neutral Cities - (Urban) Rainwater Management - Waste Management - Energy Storage - Planetary Limits - Carbon Inequality - Climate/Environmental Justice 	<p>Option 1: Governance of Environmental Change</p> <p>Option 2: Ecosystem Change & Ecological Sustainability</p> <p>Option 3: Society – Nature – Interaction</p> <p>Option 4: Energy – clean, affordable, secure & safe</p> <p>Option 5: Transport & Habitat</p> <p>Option 6: Sustainable Materials and Technology</p> <p>Option 7: Human & Environmental Health</p>
<ul style="list-style-type: none"> - European identities - European literary culture - Interculturality - European Studies 	<ul style="list-style-type: none"> - European Identities and Exchanges (Europe) - Plurilingualism in Europe (Europe) - European interculturality (Europe) - Globalization & Migration (Europe) - Migration, Ethnicity, multicultural Europe (Europe) 	<ul style="list-style-type: none"> - Cultural Heritage and Cultural and Creative Industries - Migration and Mobility - Reversing Inequalities 	<ul style="list-style-type: none"> - Social Policy - Regional Development - External Relations - Economic Disparities 	<ul style="list-style-type: none"> - History 54 - Political Science 80 - Management 96 	<ul style="list-style-type: none"> - European Values / Migration... - Online/Digital Community Building - Intercultural Competence and Mediation - Identity Politics and Racialisation - Cross- and Multidisciplinarity - Social Identity Theory - Narrative Identities & Narratology - Collective identities - Biographical Methods - Fragmented Identities - Legal Status of Identity - Refugee Crisis, Common European Identity - Everyday Multiculturalism - European Education - Migration and Identity - Peripheral, Border, Central Identities 	<p>Option 8: European Identities – digital Community Building</p> <p>Option 9: Regional Development & Cultural heritage and creative industries</p>
<ul style="list-style-type: none"> - food and health - agricultural production and food - Biomaterials and bio interfaces - AgriGenomics 	<ul style="list-style-type: none"> - Interactions between society, soils, water, vegetation and climate, and possibilities for sustainable management of the environment (local and global) - rural and agricultural sociology (regional) 	<ul style="list-style-type: none"> - Ecological approaches and organic farming - Genetic Resources and Breeding - Plant Health - Public Goods - Rural and Farming Dynamics - Sustainable Food Systems 	<ul style="list-style-type: none"> - Soil Erosion/Depletion - Food Security - Farming Insects - Food Finance - Digital Agriculture - Invasive Species - Land Scarcity 	<ul style="list-style-type: none"> - Forestry 140 - Nutrition & Dietics 72 	<ul style="list-style-type: none"> - Food & Health - Sustainable Agriculture - Forestry 	<p>Option 10: Sustainable Food System Learning Pathway</p>

<ul style="list-style-type: none"> - societies and cultures of the present, past and future, - civil security research - comparative area studies - regional studies - climate action - European identities: law, history, sociology - Public health transitions - industrial property - resources and societal dynamics - hazards and risks under global change - social ecology and transition management - intelligent systems (smart cars, smart buildings) - Law / Risk and Disaster Research (Nuclear Plants etc.) - Big data for research & society - Human(e) AI, Information, communication / the Data Society 	<ul style="list-style-type: none"> - Globalization & migration (Europe) - Integration of migrants in Europe (Europe) - Sustainable urban planning (regional) - Governance of Integrated Urban Sustainability (Europe) - Intercultural management and international affairs (global) - Integration policies, international migration (global) - Research on European migration (Europe) - Border region studies (global) 	<ul style="list-style-type: none"> - Migration and mobility - Democracy and Governance - Man-made disasters - Home Affairs - Cyber Security - Advanced computing and big Data - circular Industries - AI and robotics - Digital transformation in rural areas - nitrogen and phosphorus pollution 	<ul style="list-style-type: none"> - Disaster Response Planning - Citizen Intervention - Disaster Recovery - Third World Debt - Ecosystem Collapse - Job Automation - Autonomous Weapons - Privacy/Security - Real-Time Big Data - Cloud Computing (Platforms) 	<ul style="list-style-type: none"> - Green & Sustainable Science & Technology 53 - Biomedical Social Sciences 56 + Social Sciences 54 - Multidisciplinary Sciences 96 - Sociology 77 - Operations Research & Management Science 60 	<ul style="list-style-type: none"> - Society / Development - Urban Policies - Refugee Management and Common European Identity - Foreigners in Healthcare Institutions - Social Metabolism - Carbon Inequality - Climate/Environmental Justice - «Unchained Rurality» - Sustainability Research - Multilingualism of the Past - Multilingualism and Migration - Multilingual Environments and Education - Multiple Language Acquisition and Development 	<p>Option 11: Sustainable urban planning (regional) & climate action</p> <p>Option 12: Digital transformation in context of privacy and security</p>
<ul style="list-style-type: none"> - linguistics and digital humanities - Digital humanities and digital economies 	<ul style="list-style-type: none"> - Amusia and language - Logic and language - Language and computation - Psycholinguistics - Intertextuality - Interlinguality - Intermediality 		<ul style="list-style-type: none"> - Cultural Heritage - Digitization - Digital Archaeology - Digital History - Gamification - Sentiment Analysis 	<ul style="list-style-type: none"> - Communication 77 	<ul style="list-style-type: none"> - Methods & Paradigm Shifts - Digital Corpus Exploration - Multilingual Data - Media Identities - Narrative Identities - Shared/Connected Identities (NEPOSTRASNS) - Biographical Methods - Metropolitan Borderscapes - AI culture shaping - Major and Minority Languages 	<p>This will be evaluated in a future round</p>
<ul style="list-style-type: none"> - bioinspired materials - biological signalling research - renewable raw materials and new technologies - bioinformatics - advanced bio refineries, - chemistry & materials - Nano-structured and porous materials 	<ul style="list-style-type: none"> - Wood-based materials - Natural fiber materials - Natural Materials Technology (Wood Processing) - Material characterization, Biological and bio-inspired materials - Sustainable use of materials 	<ul style="list-style-type: none"> - Advanced manufacturing, materials, chemicals - Bio-based products and processes - Energy Storage - Hydropower 	<ul style="list-style-type: none"> - Photodynamic Therapy - Nanomaterials - Molecular Dynamic and Microstructure - Resource Consumption - Urban Circular Economy - Food Supply Chains - Megacities 	<ul style="list-style-type: none"> - Chemistry 289 - Geology 57 	<ul style="list-style-type: none"> - Materials - Dynamic Material Flow Analysis - Material and Land Use - Urban Metabolism - Biophysical Economics - Renewables and Legal Framework 	<p>Option 13: Pathways towards a sustainable social metabolism</p>
<ul style="list-style-type: none"> - neuroscience and neuro technology - Brain & Cognition, 	<ul style="list-style-type: none"> - Human-machine interactions - Motorics and Rehabilitation - Dense matter - Soft matter - Chemistry of complex systems and materials - Cognitive Linguistics 	<ul style="list-style-type: none"> - Brain Research - Human Development and Ageing 	<ul style="list-style-type: none"> - AI - Social Isolation - Stem Cell Therapy - Computational Neuroscience - Cognitive and Behavioral Neuroscience - Molecule Signatures - Small Nervous System - Connectomes 	<ul style="list-style-type: none"> - Neurosciences 51 - Neurology + Neuroscience 148 	<ul style="list-style-type: none"> - Neuroscience 	<p>Option 14: Development across the Lifespan (can include neurological, biological, linguistic, and even sociocultural aspects)</p> <p>Option 15: Social Robots and Computational Psychiatry (relating to the neuroscience behind addiction, depression; self-help chatbots; research on social robots and anxiety patients)</p> <p>Option 16: Neuroprosthetics and BCIs for patients with speech- and communication impairments</p>
<ul style="list-style-type: none"> - medical epigenetics - immunology and cancer research - metabolism research - Global Health 	<ul style="list-style-type: none"> - Analysis and optimization of processes in the health care sector (national and global) 	<ul style="list-style-type: none"> - Cancer - Chronic Diseases - (Re-)Emerging infectious diseases 	<ul style="list-style-type: none"> - Euthanasia - AI in Medicine - HIV and PrEP 	<ul style="list-style-type: none"> - Surgery 52 - Rheumatology 52 - Experimental Medicine 52 - Hematology 52 	<ul style="list-style-type: none"> - Medicine 	<ul style="list-style-type: none"> - (Re-)Emerging infectious diseases - Microbiome & Health - AI in Health decision making - zoonotic diseases

<ul style="list-style-type: none"> - Urban Mental Health - Artificial Intelligence for Health Decision-Making, - Personal Microbiome Health 	<ul style="list-style-type: none"> - Language Communication in Health Care (national) - Genetics - Cell biology - Molecular biology - Immunology - SARS-CoV-2 related research ; SARS-Cov-2 Spike protein models (global) 	<p>Public Health Research</p>	<ul style="list-style-type: none"> - Abortion (Rights and Access) - Medical Cannabis - Health Tourism - Obesity - Homeopathic Treatment - Medical humanitarianism 	<ul style="list-style-type: none"> - Rehabilitation 55 - Public/Environmental & Occupational Health 470 - General & Internal Medicine 233 - Health Care Sciences & Services 187 - Infectious Diseases 154 - Psychiatry 170 - Psychology 162 - Physiology 57 - Immunology 135 - Oncology 128 - Cardiology & Cardiovascular System 79 - Endocrinology & Metabolism 59 - Parasitology 71 - Pharmacology & Pharmacy 73 		<ul style="list-style-type: none"> - Medical Cannabis
<ul style="list-style-type: none"> - Quantum technology - elementary particle and astro-particle physics 	<ul style="list-style-type: none"> - Magnetism - Gravitational wave astronomy - Numerical relativity - High-energy astrophysics - Relativistic cosmology - Atmospheric physics - Environmental physics 		<ul style="list-style-type: none"> - Quantum Computers - Quantum-based Encryption - Critical Infrastructure Grids 	<ul style="list-style-type: none"> - Physics 58 	<p>Physics – Theoretical and Applied</p>	<p>This will be evaluated in a future round</p>
<ul style="list-style-type: none"> - automotive systems and robotics - cyber security and technology futures and assessment - artificial intelligence, big data - biotechnology - bioprocesses engineering, - smart building and energy management - Photo-polymerization - additive manufacturing and 4d printing - electrical measure - Big data for research & society - Human(e) AI, Information, communication / the Data Society 	<ul style="list-style-type: none"> - Artificial Intelligence and public health (national and global) - Biorobotics 		<ul style="list-style-type: none"> - Autonomous Vehicles - Human-Machine Interfaces - Assistive Systems - Synthetic Cells and Genomes / Synthetic Biology in general - Therapeutic - Biomanufacturing - Pharmacogenomics 	<ul style="list-style-type: none"> - Science & Technology 160 - Biotechnology & Applied Microbiology 77 - Microbiology 117 	<p>Technological Development</p> <ul style="list-style-type: none"> - AI culture shaping 	<p>This will be evaluated in a future round</p>

4.4 Definitions and Validation of Future Challenges

Once the Steering Committee has chosen the set of future challenges, these should be defined as outlined in Step 5 of the [Identification of EPICChallenges – Suggested Procedures](#).

4.5 Recommendations for Infrastructures and Policy Changes to Support the EPICChallenge Procedures

In order to ease the process and to develop actual EPICChallenges which are of worth to the research community and partners outside academia, EPICUR and its partners will have to develop procedures on how to make available existing infrastructures to EPICUR partners more easily available and introduce policy changes. Here are a few recommendations that emerged from the process of working through the EPICChallenges and their identification process:

- EPICChallenges are responding to societal challenges: engaging citizens in defining challenges that they face via public fora or educational offers might be a great way to localize / regionalize EPICChallenges and thus make them less abstract and aloof. EPICUR-SHAPE-IT addresses this goal. This would benefit EPICUR's reception as a useful tool by:
 - Governing bodies, as it would show that EPICUR is looking to address challenges they are struggling with on a daily basis.
 - Industry / Economic actors as EPICUR would become visible as a player who takes local issues seriously but embeds them in the European context, connecting problems and solutions.
 - Researchers who are interested in dealing with local questions but need European dimensions in order to receive funding.
- Meta-Data from the EPICCommunity should be made use of to identify researchers' interests and key areas.
- Regular surveys of EPICUR's graduate population (Master Students to PostDocs) about their research interests and projects should be undertaken to get a more complete picture of what the next generation of EPICURians is working on
- EPICUR should include a research council, including the Board of ECRs, into its governance in order to be more in touch with researchers at all career stages and thus represent their true interests in the agenda. While bibliometric research delivers images of past research, they are not a particularly reliable tool for foresight.
- EPICUR should develop a common research data information system named EPICCommunity or create a link between the partners' existing ones to ensure that data about ongoing research can flow more easily and is actually streamlined. This will allow EPICUR to get more real-time information about what researchers are actually working on and would be a basis for supporting collaboration more effectively.
- EPICUR should embrace and develop a culture of self-reporting for researchers from the very beginning: from offering information sessions on ORCID and Google Scholar to monetary incentives for updating information about one's research activities could prove extremely useful and would reign in the power of commercial offers such as SciVal.

5. Chapter II: New Forms of Collaboration

From the beginning, EPICUR-Research has been interested in how networks of researchers within our alliance could be fostered. Most networks within research emerge from a common interest and are not politically motivated. When researchers strive for excellence in their work, they naturally look to institutions and individuals that represent or help them to achieve or hold that excellence. ECRs are more likely to look for disciplinary mentors and opportunities for advancement within their field than outside it.

If the European Commission emphasizes geographical balance in its funding decisions, researchers need to find new collaborations not only based on their pursuit of content excellence, but also distributed more strategically. Interdisciplinary projects can therefore be an essential bridge to get in touch with partners who are not specialized in the same field or do not have a specific profile in the field and thus broaden the research perspectives.

New collaborations become necessary as funding schemes change and problems become more complex. Therefore, the need to establish new forms for the dialog between disciplines and the exchange of researchers within new types of mobility is a direct result of changing research contents.

EPICUR-Research's initial point is its strategic strength focusing on developing new collaborative infrastructures (in terms of standards of collaborative instruments for planning and implementation) for fostering inter- and transdisciplinary research.

Importantly, in addition to developing new collaborative infrastructures, the following chapter will also present collaborative formats that already exist at the partner institutions, thus providing good practice examples that carry the potential to be either extended to other partners or serve as role models for similar establishments of our partner institutions. Furthermore, the chapter scrutinizes current practices related to how scholars start, build, and expand collaboration within their fields and beyond. Here, specific lessons drawn from the implementation of EPICUR-Research formats will be presented. Finally, the chapter will point out recommendations for legal framework and policies that EPICUR and/or partner institutions might need to implement to create the conditions needed to engender new collaborative formats of different types and for different purposes.

5.1 Data on Current Collaborations

The data about current collaboration is rather sparse. There are multiple reasons for this:

- Not all our partners have had previously been working together in meaningful ways, therefore there are a very few institutional ties that bind more than 3 partners together except for Eucor - the tri-national European Campus of ALU, UHA, UNISTRA; KIT and the University of Basel (Switzerland).
- The data on collaborations between partners was supposed to be delivered by the partners themselves. Few could deliver this data in time and/or in ways that would have allowed an analysis that would render any significant insights.
- Data on collaborations which does not come from partners is limited to funding (Horizon 2020 Data) and co-publications (web of science or Scopus data).

- To get more interesting insights, it would take much more human and financial resources to undertake what will essentially be a qualitative analysis of how these collaborations can be salvaged for the alliance.

Despite these challenges, find below a brief treatise of the collaboration-data (ERC funding and co-publications) that could be collected and made informative.

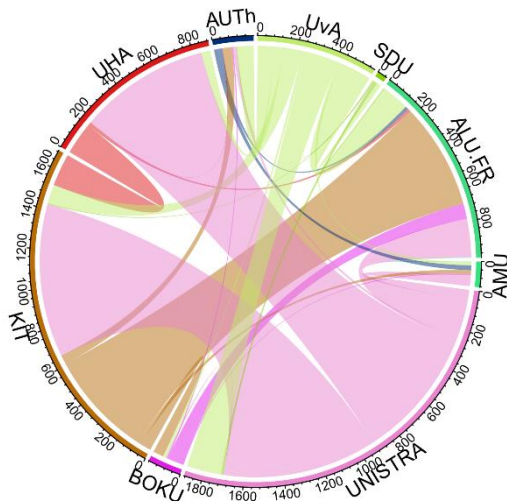


Fig. 16 Co-publications between at least two partner universities according to WOS / SCOPUS, 2016-2020. Values outside the circle show the number of co-publications

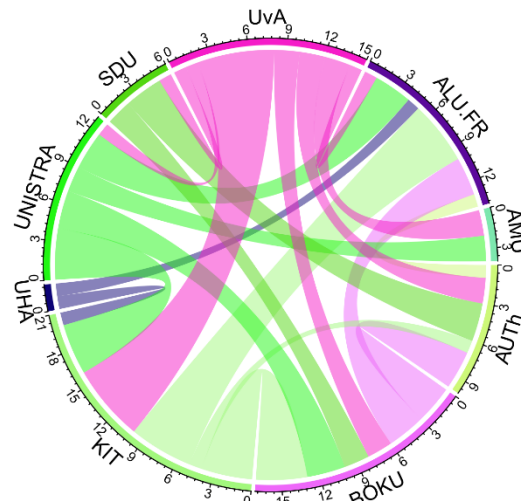


Fig. 17 Collaborations of Alliance Members in existing Horizon Projects, 2016-2020. Values outside the circle show the number of collaborative projects.

The data most readily available is that on co-publications and on third-party funding from the European Commission given to our partner universities. The circular network plot on the left (Fig. 16) shows the co-publications (i.e., at least one co-author from at least two partners) from 2016-2020. It reveals that UNISTRA had strong co-publications ties with UHA and KIT which itself had strong connections with ALU-FR. However, as described in the paragraph below, most of these links stem from recurring co-publications of the same (hundreds of) co-authors which collaborate in physics. These strong connections somehow mask other significant links, but they can also not be simply taken out. Keeping this in mind, in general it seems that SDU, AMU, BOKU, and AUTH all have only few co-publications so far. For a deeper understanding of whose, how, and which connections via co-publications already exist, one would have to zoom into specific links. Here we provide the overview capturing all co-publications for the entire reporting period.

The picture turns a bit when examining collaboration via Horizon Projects that run between 2016-2020 (Fig. 17). Keeping in mind that some partners are much larger than others (and that this resembles how many ERC projects they host in general), KIT collaborated with UvA on six Horizon Projects, with ALU-FR on five, and KIT with UNISTRA and BOKU on four each. These are the highest numbers of project collaborations within the consortium. BOKU, the second largest host of Horizon Projects within EPICUR, collaborated additionally with ALU-FR, AUTH, and UNISTRA on three projects each.

Limitations: Most of these collaborations also include lots of non-EPICUR partners. And co-publications might be biased as they do not say much about how institutionalized these connections are, whether researchers work individually with each other or if they emerge because of more extensive partnership. Finally, different disciplines are hardly comparable with regards how much they publish and who is taken on board as a co-author. For instance, the strong co-publication ties between UNISTRA, UHA, KIT, and ALU-

FR mostly stem from collaborations in physics where all researchers who contributed to any task of a project are listed as co-author, which leads to hundreds of co-authors and accordingly also hundreds of publications for individual researchers. The situation may be quite different in other disciplines and therefore makes the interpretation of co-publications rather challenging.

5.1.1 Early Career Researchers (ERCs)¹⁶ as a Special Target Group

With more than 39,000 young scholars pursuing research in more than 150 disciplinary and interdisciplinary fields, the EPICUR Alliance contributes significantly to the advancement of early career research in Europe. To design its actions, EPICUR is paying a careful attention to the major concerns and interests that ECRs can have in their early career stage, such as:

- Gender inequality in the early research career phase and in their professional environment
- Pressure from publish-or-perish culture
- Lack of training, consulting, and networking
- Lack of teaching opportunity and course/module development
- Lack of mobility (finance and host problems)
- Difficulty to get leadership roles or a lack of proper plan/steps
- Dependency on the good will of the doctoral advisor / PI and funding possibilities
- Difficulties in reconciling academic career and family planning
- Short-term temporary contracts with less salary than comparable jobs outside academia
- Lack of access to institutional resources (secretaries, mechanics, expensive infrastructures, etc.)

ECRs need more flexibility and support (than established scientists) as well as less barriers to job satisfaction and career advancement (increase support from institutional superiors, leadership and management skills, recognition, work-life balance). EPICUR recognizes their struggle, needs and challenges and consequently wants to introduce concrete changes.

EPICUR, through diverse actions, seeks to equip the ECRs with tools and spaces to help them gain visibility and autonomy, develop transferable skills, and expand academic research networks, therefore enhancing the curriculum. By facilitating virtual, blended and hybrid mobility opportunities, EPICUR aims to boost interdisciplinarity amongst early-career researchers to develop their necessary skills for successful joint research projects.

EPICUR is empowering ECRs by initiating bottom-up collaborative processes and building new networks for researchers in all their career stages, thereby forming a new kind of research community that crosses over disciplinary borders and opens universities to their communities.

5.1.2 Encouraging Interdisciplinary and Transdisciplinary Research

At the heart of the Common Research Agenda is the objective of encouraging interdisciplinary and/or transdisciplinary research. Both aspects are not common in the current academic landscape of most EPICUR partners. Although interdisciplinary research has gained ground in recent years, the research ecosystem in Europe (including funding systems, publications, and metrics) still remains somewhat hostile to interdisciplinary work (also due to the fact that evaluators are only chosen for their disciplinary expertise), side-lining researchers who engage in it at a deeper level than that of single publications. Transdisciplinary

¹⁶ In the EPICUR context, the term “early career researchers” includes doctoral candidates, researchers engaged in postdoctoral research and pursuing further qualifications, as well as researchers who are on their pathway to become a full professor (e.g., leaders of young investigators groups, junior professors, lecturers, and “maîtres de conference”).

research faces an even more difficult battle. As lay participation tends to raise questions about the scientific quality of the studies undertaken, it is difficult for many researchers to include them in a meaningful way. This is not to say that transdisciplinary work has not had a significant impact or that these studies do not demonstrate the same - if not greater - scientific rigor as more traditional studies. On the contrary, challenge-oriented research, which is one of key elements of EPICUR, should offer more opportunities and provide the institutional support that is still missing on a large scale.

5.2 Good Practices within EPICUR

During the first Workshop on the Common Research Agenda, it became clear that our partners have many good practice examples to offer regarding interdisciplinary and even transdisciplinary research. The following section highlights some of the concepts, offers ideas on how to adjust them for the specific benefit of ECRs, and foreshadows the recommendations which will conclude the chapter.

EPICUR build on and help implement the ideas and concepts developed by [SHAPE-ID](#), an EU-funded project addressing the challenge of improving inter- and transdisciplinary cooperation between the Arts, Humanities and Social Sciences (AHSS) and other sciences, particularly Science, Technology, Engineering and Mathematics (STEM) disciplines.

5.2.1 Supporting Early Career Researchers (ECRs)

Formats that bring together and support ECRs already exist at different EPICUR partner institutions and could be either extended to other partners or serve as role models for similar establishments of our partner institutions, thus providing a strategic support to ECRs.

Example 1: [Amsterdam Young Academy](#) at UvA is an independent platform where talented young scientists from different disciplines meet to develop views on science, scientific policy and how to build bridges between science and society in Amsterdam.

Example 2: [SciNet](#) - Network for Young Scientists and Academics at ALU-FR aims at young, independent researchers from the postdoc level working at Freiburg and striving for a career in science or who want to pursue a career in academia.

Example 3: Karlsruhe House of Young Scientists ([KHYS](#)) at KIT aims to promote junior KIT researchers and foster an open scientific and interdisciplinary exchange of ideas and knowledge.

Example 4: Young Investigator Network ([YIN](#)) at KIT - the platform and democratic representation of interests for independent junior research group leaders and junior professors at KIT.

5.2.2 Cross-disciplinary Research Centers

EPICUR institutions support researchers seeking to collaborate with other disciplines, by means of providing specific trainings, offering funds for preliminary research, and offering specific infrastructure to foster cross-disciplinary research.

Example 1: At AUTH, the **Center for Interdisciplinary Research and Innovation** (CIRI) has the mission of promoting and developing cutting edge interdisciplinary research in an open and collaborative excellence environment that utilizes AUTH research infrastructure at a local, national, and European level, broadens the University collaboration with the society, and contributes to the country's economic and societal growth.

Example 2: At KIT, **Collaborative Research Centers** (Sonderforschungsbereiche - SFB) are institutions established at universities for a long-term period. SFB can provide doctoral candidates and junior researchers with opportunities to pursue an outstanding research programme that crosses the boundaries of disciplines, institutes, departments and faculties.

<https://www.kit.edu/research/collaborative-research-centers.php>

Example 3: At AMU, the **NanoBioMedical Centre** (NBMC) was established in partnership with Poznan University of Medical Science, Poznan University of Life Sciences, and Poznan University of Technology. The main goal of NBMC activity is to stimulate interdisciplinary research and provide trainings on both master and doctoral level in the field of nanoscience and nanotechnology. Interdisciplinary profile of NBMC is based on combining physical, chemical, biological, medical, and materials sciences within the nanotechnology.

<http://cnbm.amu.edu.pl/en>

5.2.3 Interdisciplinary Graduate Schools

EPICUR universities offer highly interdisciplinary graduate schools, thus bringing together ECRs representing different fields and disciplines without immediately requiring their interdisciplinary collaboration. Crucially, such interdisciplinary graduate schools offer incubators for new research, also fostering relations between doctoral candidates' supervisors.

Example 1: All [13 different doctoral programmes](#) at BOKU, have an interdisciplinary character, some even an explicit transdisciplinary component. PhDs can be obtained, for example, in the fields of '*Social Ecology*', '*Build like Nature: Resilient Buildings, Materials and Society*', or '*Hazards and Risks in Alpine Regions under Global Change*'. BOKU furthermore hosts the 'Doctoral School T2S' which promotes and supports inter- and transdisciplinary research in the field of sustainable development. Research projects are problem-oriented, address real-world problems and aim at real-world solutions. Thereby T2S supports BOKU's responsibility to address the growing societal challenges ('Third Mission') and the UN Sustainable Development goals.

Example 2: The ALU-FR is home to several interdisciplinary graduate schools covering a wide range of research fields. Subjects like history, sociology, literature and political sciences are represented by the DFG Graduate School Empires, while natural and life sciences are found in the Spemann Graduate School of Biology and Medicine and environmental studies in the Graduate School Environment, Society and Global Change. Some can take in additional pride in their international background – the Hermann Paul School of Linguistics Basel-Freiburg, for instance, provides an international and interdisciplinary program in state-of-the-art research in language sciences. There is also a good number of smaller graduate schools (e.g., RTG, ConFoBi, MeInBio, ProtPath) increasingly offering interdisciplinary tracks and workshops in order to advance exchange between disciplines and experts.

Example 3: Doctoral schools in France are not attached to faculties or departments, and several research labs take part in the same doctoral school. For about ten years, UNISTRA and UHA have shared their doctoral schools within a domestic legal framework called the “Alsatian education site”. Doctoral candidates receive a diploma from the university they register in, although their director or co-director may be a member of the doctoral school through the other university. UNISTRA has eleven doctoral schools and UHA takes part in seven of them. The doctoral schools are based in UNISTRA and UHA has a physical antenna for the ones they take part in – a structure repeated for some labs, though some other labs are UHA-only, and some are even shared with other French universities beyond Alsace.

5.2.4 Common Chairs

Common Chairs between two or more partners seem to be a desirable for several of our partners. Such constructions already exist or are currently being explored in the Eucor context. It would be interesting to consider this for EPICUR as well. Such common Chairs could be temporary (up to six years, interesting for ECRs to launch their careers or senior professors wanting to make a last change before retiring) or long-term (much administrative work would have to go into this).

Common Chairs encourage exchanges on all levels – from students to professors – and can initiate collaboration from simple student exchanges, staff visits and common course all the way to large-scale research projects. Such common chairs also allow prolific researchers to spend more immersive time in institutions and affect more sustainable change.

5.2.5 Open Data

EPICUR universities place a considerable emphasis on open data policies that enable and facilitate access to data and science infrastructures.

Example 1: At UvA, the **Data Science Center** (DSC) is a coordinating hub within the UvA Library with the mission of enhancing the university's research across all its faculties by developing, sharing, and applying data science methods and technologies.

The DSC offers opportunities to acquire skills related to digital and data-driven research and will have engineers and data scientists working with all faculties. This is to strengthen the use of digital technology in research across disciplines. To facilitate the collaboration of disciplines that traditionally do not overlap, the DSC also comprises the SoBe DSC hub, which focuses on the intersection of data science and social/behavioral sciences. The aforementioned collaborations also refer to networking outside the university, i.e., with parties outside the research domain. Additionally, the DSC is in the process of funding and developing an interdisciplinary innovation program, which will include several funded PhD positions. Overall, collaborative and innovative research as well as consultancy and tool/software development are the primary goals of the DSC.

<https://dsc.uva.nl/>

Example 2: At AMU, the **Rector's Representative for open access publications and research results** is responsible for, among others, sharing good practices regarding open access and open data policies among AMU researchers, organizing workshops dedicated to these topics, implementing the AMU strategy regarding open data policies, as well as coordinating the maintenance and development of open access infrastructure at AMU.

5.2.6 Academic-Corporate Collaboration

An effective collaboration between academia and external stakeholders needs to be enabled by specific units that allow for a systemic support and strategic development of such collaboration, thus fulfilling the role of a higher education institution as a socially responsible entity. Such units are present at EPICUR Universities, such as:

Example 1: **Citizen science** at BOKU, which places a special emphasis on citizen participation in research. Citizen science aims to let society, from whose services BOKU is maintained, participate in its work, and to address the societal questions in its scientific and teaching endeavors. Consequently, BOKU scientists are encouraged to develop their research results as far as possible in transdisciplinary research with those affected, but in any case, to make them accessible to society, e.g. via freely accessible publications, reports in journals or public lectures and discussions.

<https://boku.ac.at/citizen-science>

Example 2: At KIT, the service unit **Innovation and Relations Management** is the central partner for industry, alumni, sponsors as well as for KIT students and employees. The services include career service ([the Career Service Portal](#)), technology transfer of research results to industry, start-up consulting, support of KIT alumni, private sponsors, foundations, and awards for students and sponsoring. Furthermore, the TRIANGEL Open Space brings knowledge transfer to life for students, scientists, citizens, and companies. It connects science from Karlsruhe far beyond the city limits.

<https://www.irm.kit.edu/index.php>

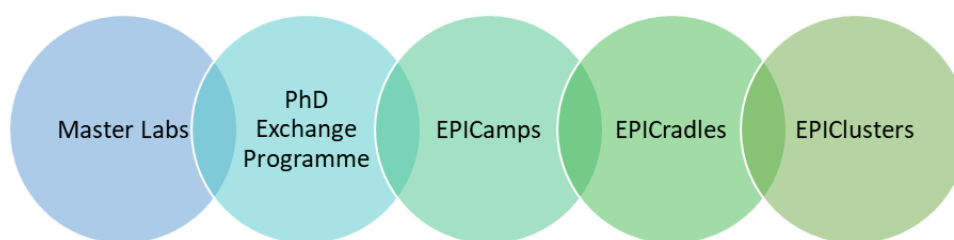
Example 3: The **Technology Transfer Office** at AUTH has been operating since 2012 and is the contact point between the academic community and the market. It is responsible for:

- Communication & dissemination of research results
- Commercialization assessment of research results
- IPR management procedures
- Creation of spin-off companies
- Business development and access to finance (i.e., from competitions, angel investors, VCs)
- Network with public, private institutions and enterprises

Example 4: The **Economic Council** at AMU was appointed in 2021 and aims for building long-lasting relationships between the academic socio-economic environments. The AMU Economic Council is an advisory body to the Rector and supports AMU in the areas of cooperation with the economic environment, research, and joint projects. It supports the organization of internships for students and doctoral candidates and helps introduce new university courses that are desired by the external stakeholders.

5.3 Development and Pilot Implementation of New Collaborative Research Formats

In the pilot projects, the EPICUR Alliance is developing, implementing, and testing a bottom-up process for master students strongly interested in the research career pathway and for groups of ECRs. The new collaborative formats are supporting different aspects of this process and are placed along a pathway from Master Labs to EPIClusters. The EPICUR Pathway to Research aims to promote challenge-based research and build interdisciplinary research communities and projects from the ground-up.



- a. **Master Labs** offer a research-oriented blended mobility programme for highly motivated master's students interested in pursuing a career in research and making a meaningful contribution to society. The programme gives participants the opportunity to be directly involved in cutting-edge research projects at an early stage in their studies and to collaborate in an international team with students from other EPICUR universities on inter-/transdisciplinary topics related to the EPIChallenges. This research component is complemented by training in scientific methods, research approaches and transversal skills.
- b. The **PhD Exchange Programme - Research, Training and Skills Development** is a flexible mobility programme offering doctoral/PhD candidates the opportunity to complete a cross-border exchange and gain access to research infrastructures in one of the EPICUR universities' locations. With its emphasis on interdisciplinarity and skills development, participants may choose from a variety of modules, tailoring the programme to their specific needs and interests. In addition to receiving ongoing guidance and support from a mentor at the receiving institute, participants can collaborate on an interdisciplinary research project related to the EPIChallenges, receive training in academic and transversal skills and network with peers and researchers in other regions and

disciplines. Applicants have the option of applying for specific positions or submitting a general application for the tailor-made approach to receive support in securing a research stay at research institutes at the EPICUR universities or in their regions.

- c. **EPICamps** are virtual, interactive events aimed at young scientists from the EPICUR Alliance (and beyond). It offers a space for open exchange, collaboration, and academic matchmaking between scientists from different disciplines and areas. Networking and exchanging with peer researchers and senior researchers as well as the development of joint inter-and transdisciplinary research projects on societal challenges is at the heart of these events.
- d. **EPICradles** are short-term, hybrid, well-funded fellowships enhancing European collaboration. As such EPICradles function as 'incubators' for innovative research led by ECRs. For three months and thanks to stipends as well as a group budget, young researchers will have ample opportunities:
 - to acquire new research skills and competences, especially in interdisciplinary and transdisciplinary collaboration in a European context,
 - to gain information on funding schemes,
 - to connect to ECRs and to develop collaborative projects,
 - to engage with senior scholars, administrators, and experts from universities and beyond.

➤ EPICradles fill a gap in funding and support programs for the developmental stage of research projects, ideally encouraging ECRs to think more boldly and lay the basis for successful collaboration.
- e. **EPIClusters** are up to six months fellowships during which ECRs can explore inter-and transdisciplinary projects, take on leadership roles in innovative research projects and interact with the European civil society at large.

Testing these new collaborative formats should help the alliance to foster cooperation between the universities of the EPICUR alliance and their regional academic partners, paving the way for new interconnections (cross-institutional and cross-disciplinary), networking opportunities, and serving as a bridge to joint research activities within EPICUR.

6. Chapter III: Benchmarking EPICUR's Progress

This chapter makes use of the available data to establish the status quo of our alliance. We draw some important conclusions about our research strengths and on how they can filter into the further development of our alliance.

After the analysis, we establish a model of how EPICUR's Progress could be tracked, and which KPIs lend themselves to supporting this model.

6.1 Status Quo of the Alliance

6.1.1 EPICUR's Research Potentials along Traditional Indicators

As mentioned before, the status quo of the alliance covering eight (since April 2022 for EPICUR Education: nine) universities can be analyzed in multiple ways. Data that was made available in some form has been compiled here, the data holds even more analytical potential but given the limited resources of this project, the analysis presented below – and throughout the paper – is exploratory.

To get the figures presented in this section into perspective, we show the number of researchers employed at each partner university as an average over the period 2016-2020 and differentiated by the ECR research panels into three groups (life sciences; physical sciences and engineering; social sciences and humanities, see Fig. 18). Please note that the total numbers given still may not be completely comparable since some partners include different types of researchers, e.g., PhDs, in their reporting while others do not.

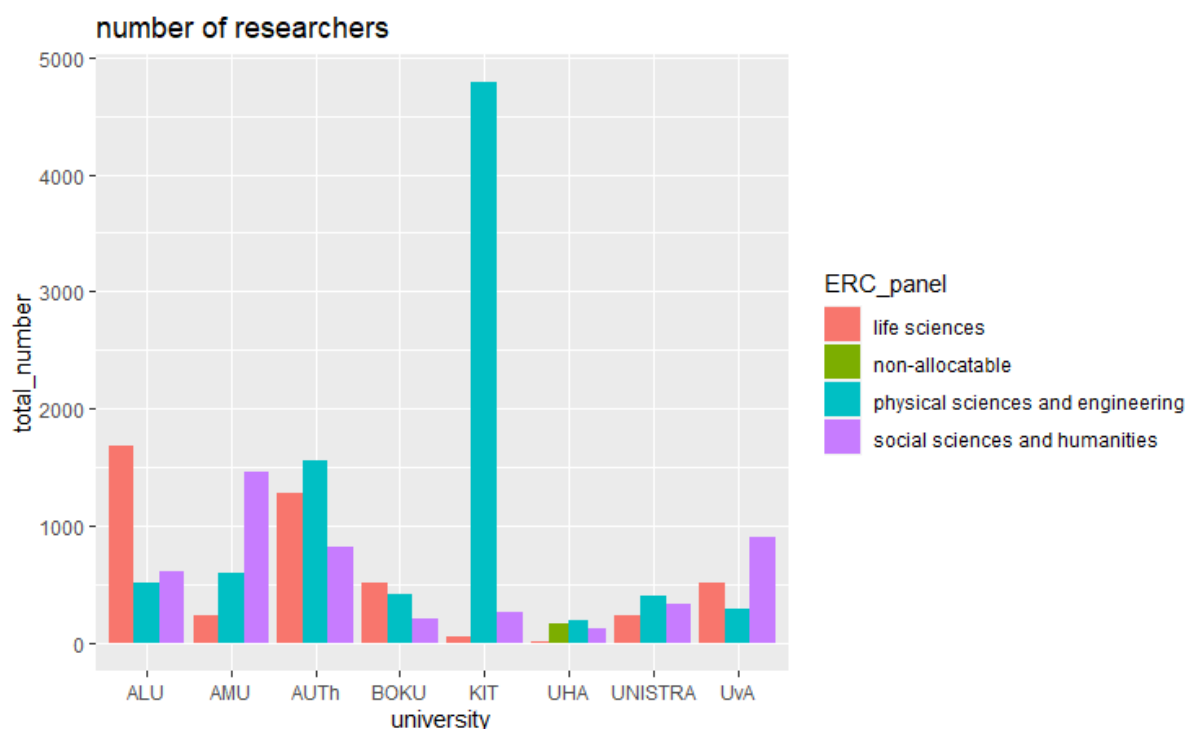


Fig. 18 Number of researchers per partner and ERC-panel (average per year for the period 2016-2020). Numbers between partners may not be completely comparable since some include PhDs while other do not.

6.1.2 Bibliometrics

In the previous section “Data on Current Collaborations” we already presented some data on co-publications of EPICUR partner universities but without addressing the topics that the consortium is scientifically engaged with. An analysis of publications by subject area reveals that medicine, computer science, physics and astronomy, as well as engineering are among the most important research areas of EPICUR (Fig. 19). However, as Fig. 20 shows below, there is a much larger range of research subject areas that are prominent topics for the consortium.

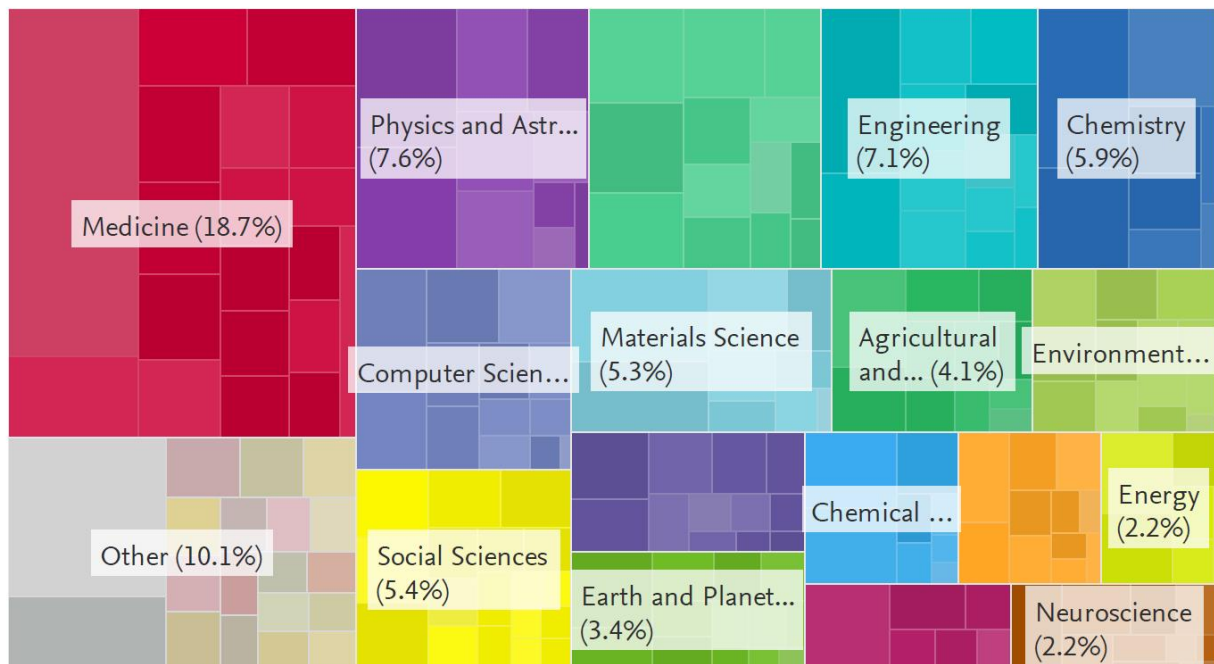


Fig. 19 SCOPUS: Publications by Subject Area, 2016 - 2020, summed up for all EPICUR universities

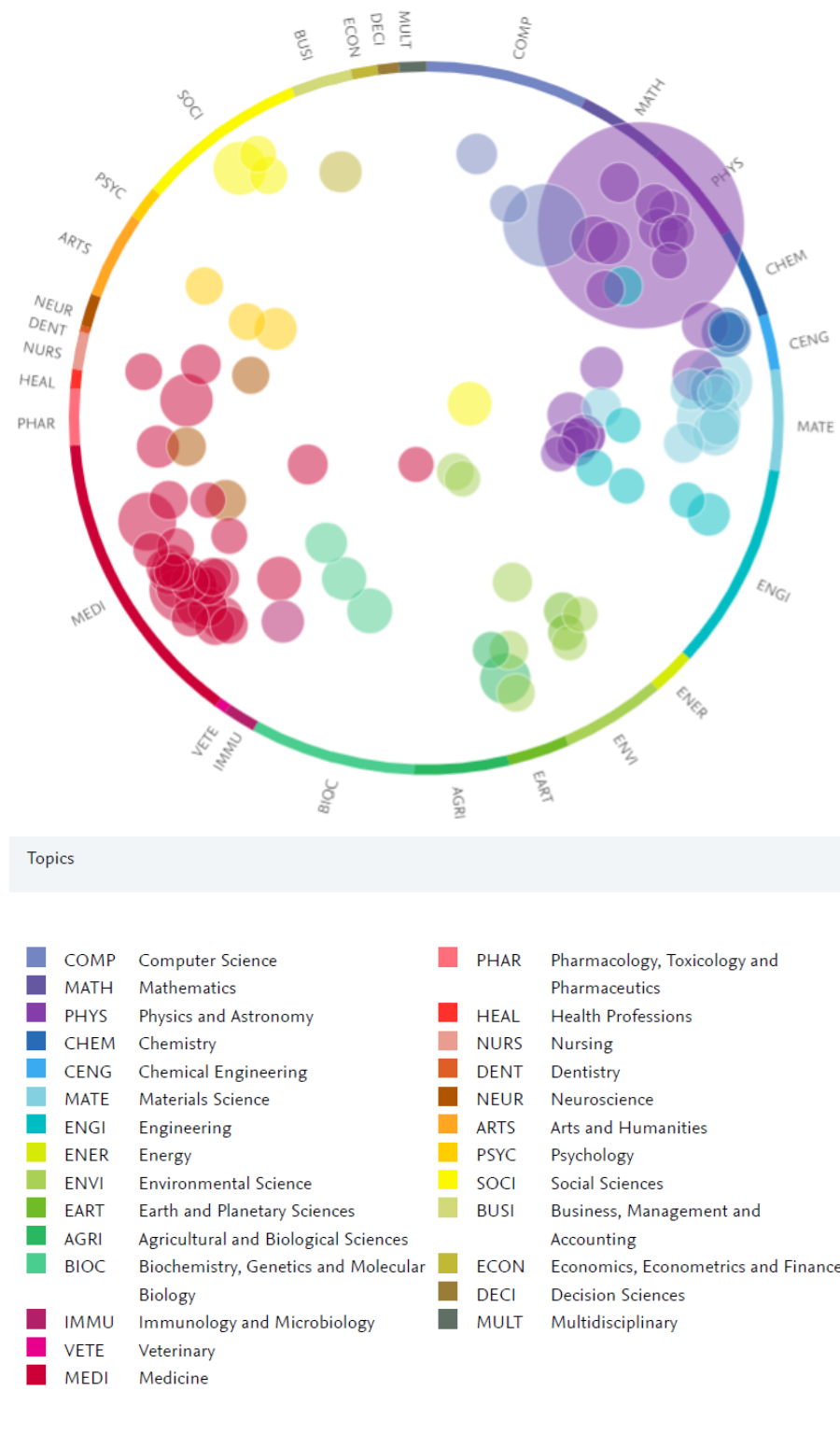


Fig. 20 SCOPUS: Prominent Topics in EPICUR, 2016-2020

To get a sense of what ECRs work on, we assessed the PhD dissertations over the years 2016-2020 and assigned them to the three broad ERC panels (life sciences, physical sciences and engineering, social sciences and humanities). In total terms, AUTH registered the highest numbers of dissertations in all three panels and recorded a very much balanced proportion between these three areas of research (Fig. 21). Other partner universities reports indicate often a stronger focus on one of the three areas. For example, at ALU-FR, most

PhDs finished their dissertations in the life sciences. Life sciences are also the most important dissertation fields for BOKU and UvA. In comparison, AMU educates PhDs most often in the social sciences and humanities, followed by life sciences and to a much lower extent physical sciences and engineering. In contrast, PhDs at UHA had a much stronger focus on the physical sciences and engineering during the reported period.

In the future, and if this is of interest, a further and deeper examination of what ECRs at the EPICUR universities are occupied with could be carried out with the data provided by the reporting partners.

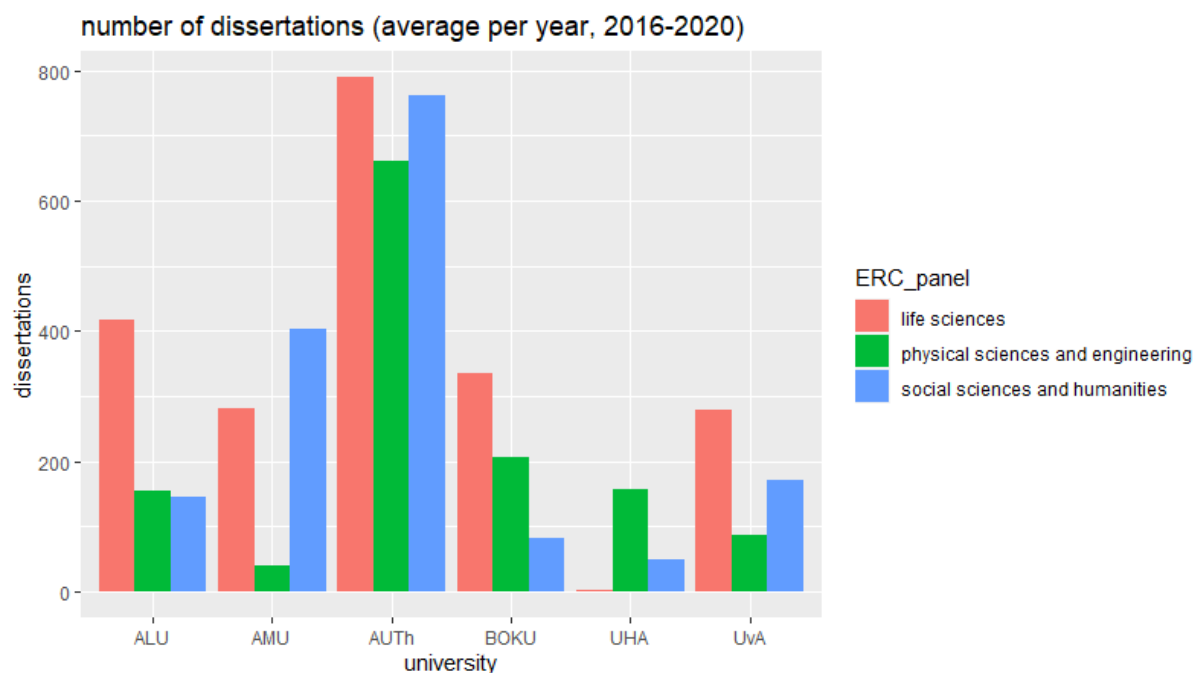


Fig. 21 Number of dissertations per partner and ERC panel, average per year from 2016-2020

6.1.3 Third Party Funding

In terms of third -party funding there is a large variety of different funding bodies for every partner university. For reasons of comparability, we here show ERC grant related funding only. First, we present which partner attracted proportionally which type of ERC grant (i.e., starting, proof of concept, consolidator, or advanced). Fig. 22 shows that, proportionally speaking, consolidator grants played a role for each partner (who could provide this type of information), but also starting grants are an important source, particularly for ALU-FR, BOKU, UvA, and to some extent also for KIT. In addition, some partners also attracted proof of concept or advanced ERC grants during the examined period.

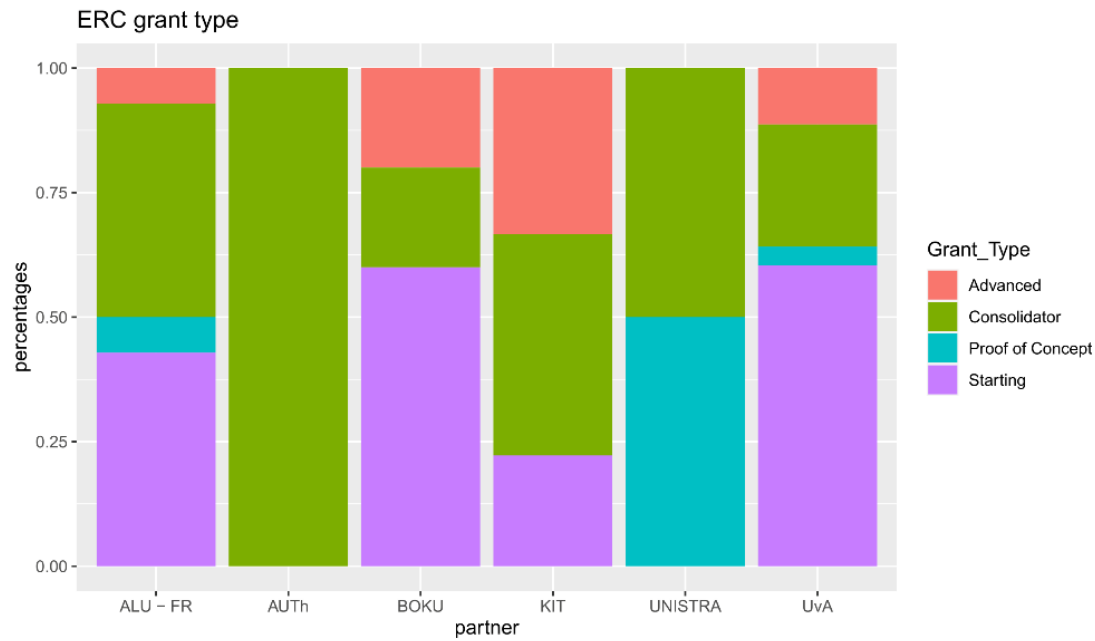


Fig. 22 ERC grants per partner and grant type, 2016-2020

Some more information on granted ERC is provided by Fig. 23. It shows how strong individual partners are in attracting ERC funding in different research panels (again expressed in percentages). AMU and AUTH attracted ERC funding only in the social sciences and humanities. The KIT has, in contrast, a very strong focus on the physical sciences and engineering when it comes to ERC grants. Others, like ALU-FR, SDU, or UNISTRA are pretty much balanced between the three different panels. Only 10% of ERC grants attracted by BOKU between 2016-2020 are in the physical sciences and engineering, 40% came from the life sciences as well as social sciences and humanities respectively. UvA again attracted many more grants in the social sciences and humanities (around 2/3), than in the physical sciences and engineering or in the life sciences.

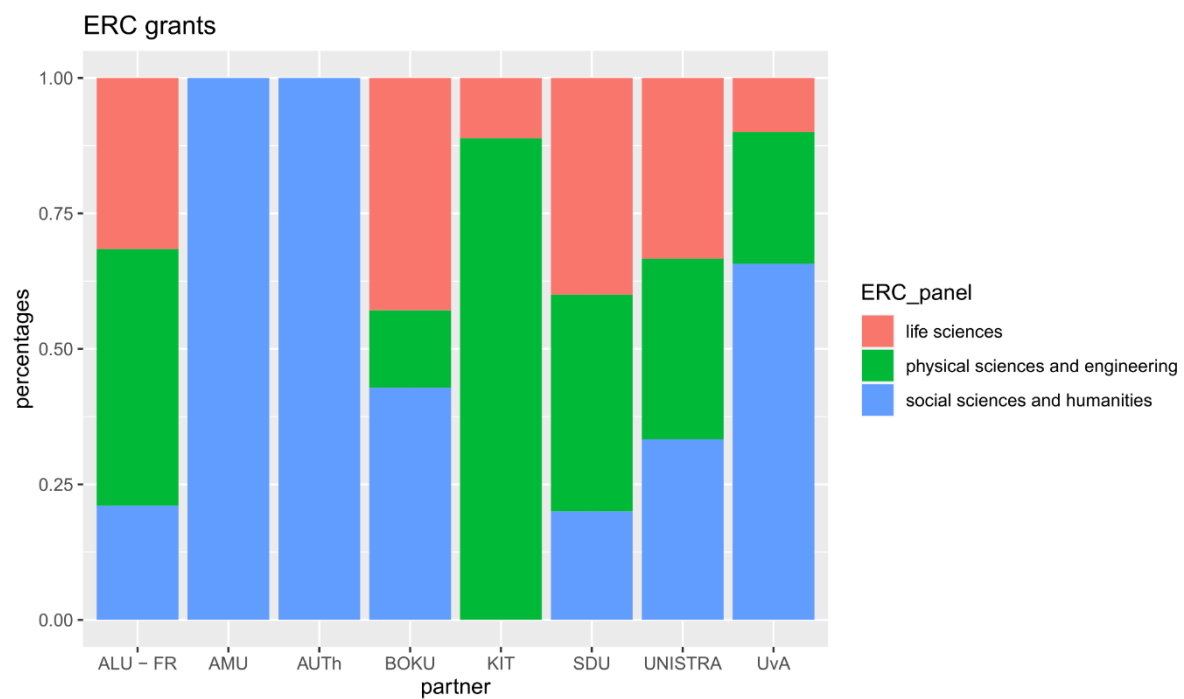


Fig. 23 ERC grants per partner, shares per ERC panel, 2016-2020

Below, in Fig. 24, we present also the total numbers of ERC grants that were actively running through the period 2016-2020 at each partner university, split into the three ERC panels. Here we can see that the total numbers vary greatly between partners. UvA has managed to secure the highest number of ERC grants, particularly in the social sciences and humanities, followed by physical sciences and engineering. ALU-FR as well as KIT had most ERC grants in the area of physical sciences and engineering as well.

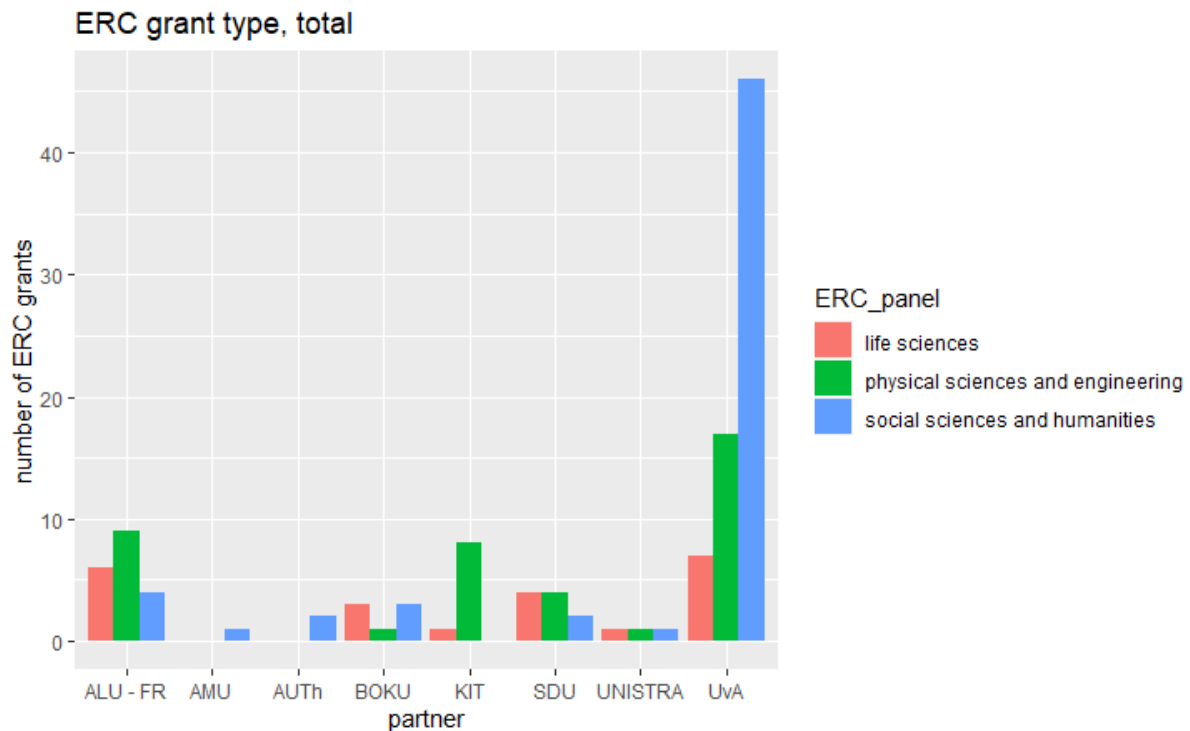


Fig. 24 ERC grants per partner, totals per ERC panel, 2016-2020.

6.1.4 Research Staff – Insights from the EPICamps

EPICamps were designed to primarily address ECRs. This goal was achieved: the number of ECRs among the EPICamp participants exceeded that of established researchers and university staff. Surprisingly, the EPICamps also encouraged quite many Master students to sign up. Looking at the distribution by biological sex, nearly twice as many women as men participated in the EPICamps; 15 participants chose not to disclose their gender identity. Across academic fields, researchers in the field of humanities dominated the EPICamp participants, followed by science and social sciences. This distribution is also reflected by the indicated research interests of participants with Multilingualism being at the top of the list. However, it should be mentioned that nearly half of the participants (220) did not specify their academic field. Lastly, most EPICamp participants came from AUTH, followed by ALU-FR and AMU. Only two participants from UvA signed up.

6.1.5 Example of Good Practices on Research Data Management Systems

Forschungsinformationssystem (research information system) at KIT

The project **Forschungsinformationssystem** (FIS), with KIT's Vice President for Research Prof. Kraft as the project owner, started its first project phase in 2016 within the framework of the Umbrella Strategy KIT 2025. The KIT FIS is planned as a modular system built from existing and new modules. The integrated FIS system is supposed to obtain its data from several base systems, which provide the data of the respective business unit. The base systems work with unified master data for persons, KIT organizations and POF (program-oriented funding) structures while delivering selected data to the central FIS system.

Forschungsinformationssystem (research information system) at BOKU

The Research Information System FIS is a database of the University of BOKU and serves the documentation of research achievements of its researchers. Publications, applications and projects, curriculum vitae and achievements for the own scientific environment are a few examples that can be entered by the scientific staff in the FIS. The recorded information is continuously quality-assured by the FIS team and prepared for various internal and external requirements (e.g., intellectual capital statement, target and performance agreements and evaluations). A complete researcher profile also serves as a business card both internally and externally.

Cortecs at UNISTRA and UHA

UNISTRA, as well as UHA shortly, take part in the CORTECS initiative. CORTECS, the Scientific Core Facilities Network, showcases research platforms present at the university, letting them offer their collaboration and service deliveries in partnership with the SATT Conectus Alsace, the French CNRS and the INSERM.

Structures must first show their interest in being labeled and listed as a platform at CORTECS by filling out a short questionnaire, after which an identity sheet is created, listing all relevant information on the platform. Finally, the label is given after an agreement has been signed by all involved stakeholders.

Once a structure is labeled, it receives the support of the CORTECS administration in updating their website, in creating a list of prices, in replying to prospective client requests, etc. as well as quality management and accounting. Small lump sums of money have been appropriated by the University of Strasbourg to give to the different research structures in support for procurement of equipment, purchase of software, etc.

6.2 Tracking EPICUR's Progress

In addition to EPICUR's original mission to develop new ways of sharing teaching and learning, all EPICUR partners are collectively developing new ways of connecting, collaborating, sharing resources and infrastructure, developing and evaluating academic careers, and defining mission-oriented research questions relevant to society at large in this pilot project. EPICUR supports the building of bridges between researchers, researchers and industry, researchers and policy makers, researchers and civil society.

In this section we present a monitoring process that will help the EPICUR alliance to observe its progress and evaluate the impact of its (project) activities. The tracking process should allow the consortium to stay focused on what is important to achieve its objectives and (re)adjust the strategic direction of the EPICUR common research agenda in the coming years.

We propose the following methodology for the tracking process:

- Define the key indicators that will enable the monitoring
- Set the process for collecting the data (e.g., identification of appropriate personal resources, agreement of core data set for research information in EPICUR easily readable)
- Collect data from institutional level and gather at alliance level (mixed mode approach)
- Once all data is received, it is verified and analyzed (set the process for analyzing, compare with this first analysis)
- Assess (give key results, discuss and prioritize the strategic orientations)
- Report

We propose the following KPIs to track progress:

- The traditional KPIs, publications, third -party funding and research outputs (beyond publications), seem relevant for monitoring progress. They allow us to get easily an overview of our status as an alliance: where and at what level we collaborate.
- We suggest incentivizing the self-reporting of researchers regarding output beyond publications, such as inventions, patents, participation in policy debates and processes, successful science communication (Twitter Stats etc.). EPICommunity, developed by WP2-R, should consider implementing automatic collections of these soft indicators.
- We also suggest measuring whether collaborations between industry and universities but also with partners from other sectors are increasing over time through the various activities developed within the EPICUR projects.

Core data set for research information in EPICUR:

- Number of co-publications
- Number of joint research projects
- Number of outputs beyond publications
- Number of organized joint workshops/debates/events (under an EPICUR label for example)
- Number of users and groups formed on the EPICommunity platform
- Number of partnerships (three or more EPICUR partner universities)

To measure social impact, we can still use the existing frameworks, such as the Sustainable Development Goals the Green Deal. For each EPIChallenge identified, a set of metrics, short and long-term outcomes can be defined (as it has been outlined in Chapter I).

If there is interest to continue and follow up with such an evaluation which benefit Common Research Agenda, we suggest the following rough time frames:

Every year

- **Regular meetings at operational level between partners' strategic research departments** to exchange on research priorities (during pilot phase, conduct SWOT analysis, discuss results from work packages for example)
- **Annual report**, including the missions/objectives of EPICUR, the strategy of EPIChallenges, joint strategic initiatives (research actions and projects, partnerships and cooperation, with society, in terms of innovation and transfer), scientific performance (publications and other research outputs)

Every three years

- **Conference with (vice) –presidents and rectors for research of the EPICUR universities** (at political & strategic level) to ensure that EPICUR fulfills its own goals while also benefiting the institutions which partake in it.

Every 5 years

- **Assessment of existing EPIChallenges and identification of new ones** (approximately 3 to 5 EPIChallenges).

Essential requirements

- The involvement of strategic level of the institutions and (young and established) researchers.
- The following principles are applicable for both benchmarking and tracking exercises: transparency, rigor, partner engagement, impartiality, efficiency, accessibility and improvement.
- Communicate the measurements, the key achievements, the process used.

7. Appendix

7.1 Research Outputs of Partner Universities Pertaining to the Sustainable Development Goals (SDGs) – recorded from InCites.

UNISTRA SDGs



Box size indicates Web of Science Documents ①

UvA SDGs



Box size indicates Web of Science Documents ①

KIT SDGs



Box size indicates Web of Science Documents ①

UHA SDGs



Box size indicates Web of Science Documents ①

ALU SDGs



Box size indicates Web of Science Documents ①

BOKU SDGs



Box size indicates Web of Science Documents ①

AMU SDGs



Box size indicates Web of Science Documents ①

AUTh SDGs



Box size indicates Web of Science Documents ①

SDU SDGs



Box size indicates Web of Science Documents ①

7.2 Minutes of Workshop “EPICUR Common Research Agenda”

October 21, 2021

Attending: Eva Rüska (ER), Verena Kremling (VK), Michael Zacherle (MZ), Konstantinos Aivazidis (KA), Anouk Tso (AT), Thrasyvoulos Tsiatsos (TT), Alain Dieterlen (AD), Guillaume Parodi (GP)

Invited Guests:

<i>Name</i>	<i>Position</i>	<i>Partner</i>
Jean-Marc Planeix	Vice President for Academic Partnerships and Governance	UNISTRA
Przemyslaw Wojtaszek	Vice Rector Research	AMU
Thomas Hirth	Vice President for Innovation and International Affairs	KIT
Sylvie Rivot	VP Research	UHA
Niek Brunsveld	Senior Policy Adviser, Research & Innovation; Scientific Secretary of the University Research Advisory Council	UvA
Elisabth Denk	Head, Research Services	BOKU
Georgia Petridou	Head of Administrative and Financial Unit, Research Committee	AUTH
Stefan Rensing	VR Research and Innovation	ALU

Additional guests: Sofia Tsipa, Chistina Famakioti, Costas Aivazidis, Julia Wandt, Manuella Werp

Protocol: Sarah Joeris (SJ), Eva Rüska (ER)

Contexts of the Meeting

EPICUR is composed of 8 partners in six different national research ecosystems and academic cultures, with 5 different languages in which we think, teach and do research. EPICUR was founded as a teaching program, an ERASMUS project that with the addition of the research funding through Horizon2020 will now grow into a real university project. Intertwining these two aspects (training, teaching & research) is a challenge, but only through building a partnership on all levels, on all tasks and dimensions of university life, we can become a European University.

EPICUR Research received only a very limited amount of funding (2 million Euro), split over three years for eight partner universities. As a result, the decision was made to focus on four main characteristics:

- Early Career Researchers (ECRs) as the main target group, which by definition includes the first two of four career stages identified by the European Commission
- interdisciplinary research, pushing the interconnection between disciplines on a more profound level
- transdisciplinary research: following the call's original goal of creating science with and for society, the inclusion of non-university including non-academic partners
- a challenge-based approach: supporting basic and applied research which tackle grand challenges of our society, such as sustainability

Work Package 1

The goal of this work package is to create a common research agenda for the eight partner universities.

The EPICChallenges are the basic building block of this shared agenda. The original three EPICChallenges (Transition of Public Health, Sustainability, and Migration, Mobility and Identity) are based on the most pressing issues of today's society (European and global). During the application for the Horizon2020 call these themes were framed in the broadest way possible as to create an umbrella for EPICUR Research, under which as many disciplines and fields as possible could find room. Now, we need to find ways to close in on these topics and make them more tangible for actual research collaborations. This will help us to connect our researchers, implement projects – especially in early career stages - and ideally make EPICUR Research attractive to additional funding through the European Commission or other national programs. Sharpening the topics, identifying potentials within disciplines, and addressing lacking infrastructures and services will profoundly enhance the implementation of the more practical parts of this project such as the EPIFormats and EPICommunity.

Formulating a Common Research Agenda based on EPICChallenges also poses a chance to reflect upon our collective research and science management, looking at different practices of inter- and transdisciplinary research, institutional organization and administration of data, knowledge and people. Confronting the issues of silos and strong specialization, creating a Common Research Agenda that focuses on inter- and transdisciplinary research will ideally open if not pave new pathways and interconnections between all levels of our universities as well as within universities.

Part of building the CRA is also defining new EPICChallenges. Drawing on conversations taking place in EPICUR, we have begun to collect additional challenges but these will of course grow and become more specialized with today and the analytics: artificial intelligence might be part of it, digitalization of our resources is definitely one of the things that we will have to address from different perspectives. But also within the three main challenges, we have already identified “sub-”challenges, for example water seems to be a hot issue for all our universities; creating inclusive and diverse European space has been discussed extensively.

Goals of the Meeting

One of the goals of this meeting is to understand who we are, because so far we are not quite sure of each of our universities research profiles and the potentials to the full degree that we might want to be before we create a common research agenda. We also seek to get a better understanding of what we have in common, at what we can be good (complimentary) or even great (common) together. Furthermore, we want to think about areas in research that we might explore specifically together (new). We understand that, just as we have private lives, our universities have “private lives” as well. Therefore, what we put in the common research agenda does not have to be what each and every one of our partners does as a university, but they might be only parts of each institution but become what we do as an alliance. This meeting will lay a groundwork for a common research agenda of EPICUR, which in the end will be a strategic if not political decision as much as it is one based on quantitative / qualitative data. Last but not least, we hope that this meeting will give us directions for the compilation of data, currently underway through bibliometrics, etc.

Executive Summary

During the meeting, all partners introduced their current research activities with a focus on areas which they would like to pursue in the future. In addition to creating a better understanding of research topics and areas, the meeting also helped to get more insights into how universities structure and support their research through infrastructure and services.



It became clear that many of the research areas which societies face as challenges in the 21st Century are present at all our universities (see the list below). This is an important base for collaboration between our researchers that is driven by their interests rather than by top-down-programs. The hard / natural sciences were mentioned more often than the humanities, which might be an issue to address in future meetings. In addition, there seems to be a lot of research ongoing in the area of

sustainability, raising the question of whether EPICUR can even offer any added-value (given its limited resources). The balance between applied and basic research was positively mentioned in multiple presentations and there seems to be agreement that encouraging more interdisciplinary and transdisciplinary research could be indeed central to a Common Research Agenda. In a similar vein, there was interest in building strong links between research and innovation, between research and teaching and between the universities / research and society.

A core theme to all the presentations was that of data science, which also occupied much of the discussion round later. Several of the representatives urged to approach “data” from different angles and perspectives but also to differentiate between instances, in which data is a tool, methodology, or research topic. ATh and KIT also pointed towards the importance of data science as central to education and societal engagement, identifying it as a potential link between the two projects of EPICUR. There seemed to be a strong agreement that “data” in all its forms should be part of the common research agenda. Engaging critically with data would also be an opportunity for more interdisciplinary and transdisciplinary research. UvA’s Data Science Center could serve as a good practice example to come up with interesting new projects within the alliance.

Another theme that seemed captivating to several partners was organizing more engagement between the arts / applied humanities and the natural / hard sciences. BOKU, KIT, ATh and AMU each shared that they have some experience in connecting these areas and expressed a strong interest to do so in the future. This was also identified as an area in need but also with the potential of getting more funding. Generally, the humanities were discussed in a manner that suggested EPICUR’s goal of furthering collaboration between disciplines but also across universities might actually be an important impetus for them and provide a good basis for more funding.

During the presentation, the question was raised whether the common research agenda of EPICUR should address not just topics (Deliverable: EPICChallenges) but also methodologies and infrastructures. As the presentations contained some interesting good practices for encouraging interdisciplinary and transdisciplinary research, there is an option that the CRA could contain some suggestions in this regard. For example, many partners seem to have cross-disciplinary center for research dedicated to different topics (e.g. Common Centers for Interdisciplinary Research (KIT) for “energy”, “mobility systems”, “information” or “climate and the environment”). Aristotle University also introduced the Centre for Interdisciplinary Research and Innovation and the Technology Transfer Office, of which the former supports researchers

seeking to collaborate with other disciplines. The latter, which in some form or other seems to exist at many of our partners, aims to help researchers to share their results and innovation with the business world and society. In general, partners seem to invest more and more into the collaboration between university and industry, such as “the establishment of spin-offs of high knowledge intensity, innovation and extroversion, and the development of entrepreneurship culture of the academic community at all levels”. BOKU’s Citizen Science Center also plays into this idea of more university/society interaction but more than transferring results into society seeks out opportunities to bring citizens into the academy. As transdisciplinary research is a key element of EPICUR, this good practice example might be very much worth recreating in some way for EPICUR.

The use of core facilities between partners was mentioned in some presentations and often alluded to in the discussion with regard to data management / storage. This is definitely on EPICUR’s working agenda but will be fed into by the WP3.

Last but not least Multiple partners pointed to shared PhD clusters / schools / colleges as a means to encourage more collaboration. The European Commission also provides funding for projects focused on co-supervising and co-working on the PhD level. Several of our partners have successfully set-up Marie Curie Actions, including the Eucor partners who have PhD clusters in the areas they identified as common research areas in the Upper Rhine region.



The collaborations thus carried by early career researchers also supports more links and exchange between established and leading researchers. The same partners also have been seeking ways to further intensify their relationships through establishing common chairs and there was a suggestion to have EPICUR chairs that focus on areas of interest for all partners. (e.g. quantum science). This would work particularly well for areas that are well-established and show strong links between researchers.

Topics (Basis for future EPIChallenges):

As an essential part of the Common Research Agenda will have to be topics because the deliverable asks for the identification of new EPIChallenges, you find below a list of topics / themes that came up in most presentations. We will use this list as a filter to our bibliometric analysis to differentiate between common, complimentary, and emerging fields.

[list can be found in Table 1, first column]