Research Activities at the Hellenic Mediterranean University

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1 Introduction

The H.M.U. [1] is a particularly active University in conducting research. The H.M.U.'s research policy emphases on basic, technological, or applied research promoting science and education, while respecting the academic ethics. Among others H.M.U. focuses at promoting cooperation with national and international bodies in higher educational and research. A wide network of research collaborations has been developed, which is intensively supported through national and international research and development projects, the close collaboration with prestigious research bodies, the cooperation with the private sector in general and of course the interaction with the society.

The H.M.U. has achieved top performance and recognition among its peers as recognised by the external evaluators and reflected in the University ranking catalogues and the National Documentation Centre. As a result, students have many opportunities to actively participate in research and development programs, this being also one of the primary policies of the University.

H.M.U.'s researchers are actively involved in extensive scientific activities in collaboration with national and international research teams, which have led to results of great significance and have contributed to the development of internationally recognized innovative products. It is the significant distinctions of the members of H.M.U.'s staff in the international stage, as well as those of its students, that constitute the most convincing evidence of the impact of the research conducted in the laboratories and research units of the University.

The fundamental, technological and applied research at H.M.U. focuses on cutting-edge research in the following fields: exact and engineering sciences; health sciences; agriculture

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and environmental sciences; materials science; economics sciences; humanities and social sciences. For further information about the H.M.U. please watch the video at https://www.youtube.com/watch?v=EnKRE5Qcu8c.

2 The Research Landscape

The H.M.U. focuses in fundamental, technological and applied research aiming at promoting science and technology for the benefit of society [2]. Each of the five schools/faculties in H.M.U. focuses on research topics of their specialty conducted in the research laboratories of the faculties or the departments. Below a brief picture of these research topics is given, which composes the research landscape of H.M.U..

School of Engineering:

- Energy Systems / Grid Systems and Management
- Renewable and Clean Energy Sources
- Lasers and Optoelectronics / Plasma Applications / Electronics
- Control Systems and Robotics
- Advanced Materials / Nanomaterials for Energy and Environmental Applications / Graphene
- Informatics / Multimedia
- Internet of Things
- Telecommunication Networks / Antennas
- Geophysics / Seismology / Geology / Geoinformatics

School of Agricultural Sciences:

- Biotechnology
- Plant Protection / Ecotoxicology
- Olive Production Systems
- Climate Change
- Management of Natural Resources / Environment / Waste and Wastewater Management

School of Health Sciences:

- Social Work
- Human Health
- Road Safety
- Advanced Clinical Practice
- Food Technology
- Nutrition / Dietology

School of Management and Economic Sciences:

- Economics / Accounting / Finance
- Management
- Data Analysis / Modelling
- Tourism / Entrepreneurship

School of Music and Optoacoustic Technologies:

- Music Technology and Informatics
- Room and Structural Acoustics
- Environmental Acoustics
- Ultrasounds and Applications

University Research & Innovation Centre:

To further strengthen research at the university, the senate decided in 2019 to establish the University Research & Innovation Centre (U.R.I.C.) of the Hellenic Mediterranean University, based on the new legislation for the Higher Education which operates as a distinct research centre of the H.M.U. [3]. The purpose of U.R.I.C. is to conduct fundamental and applied research, exploit research results for the benefit of the society, support new scientists acquiring specialization, provide services to public and private entities, educate and train, collaborate with other national and international research institutions, engage in large research infrastructures, provide developmental and consultative activities with national and international institutions.

U.R.I.C. consists of the following Institutes:

- Institute of Plasma Physics and Lasers (IPPL) - https://ippl.hmu.gr/en/home-en/
- Institute of Emerging Technologies (i-EMERGE) - https://i-emerge.hmu.gr/
- Institute of Physics the Earth's Interior & Geohazards (IFEGG) - https://earth-phys.hmu.gr/en/home/
- Institute of Energy, Environment & Climate Change (IEECC) - https://ieecc.hmu.gr/en/home/
- Institute of Financial Analysis, Business Administration and Tourism - https://hmu.gr/en/research/university-research-center/
- Institute of Agri-Food and Life Science - https://agro-health.hmu.gr/en/home/

3 Outstanding Research

A large number of competitive research programs are being realized in H.M.U. within the research laboratories and the institutes of U.R.I.C.. Technologies of the 4th industrial revolution such as Analytics and Intelligence, Internet of Things, Optoelectronics, Lasers, Nanotechnology and Nanomaterials, Robotics, 3D manufacturing technologies, Ultrasounds are the spearhead for the research topic area of technology and the exact sciences.

In addition to the above, outstanding research activities are conducted in the areas of Energy, Environment and Climate Change (RES, Smart Grids, Circular Economy, Water and Waste Management), Agri-Food Complex (Sustainable Agriculture, Organic Crops, Plant Protection, Precision Agriculture, Food and Nutrition, packing and logistics), Health and Social Sciences, Accounting-Finance, Management and as well as in Tourism.

Only in 2022, 200 researchers, 150 PhD students and 20 Postdoctoral researchers have been recruited for the implementation of the aforementioned research. The U.C.R.I. on the other hand, has 220 affiliated researchers among them 60% external researchers proving the extroversion of the research in H.M.U. in line with its strategic plan. Research Institutes of the UCRI are members of ESFRI and National Research Infrastructures (e.g., HELLAS-CH,

HELPOS, EMERGE). Funding comes from competitive International and National programmes as summarised in Figure 1.

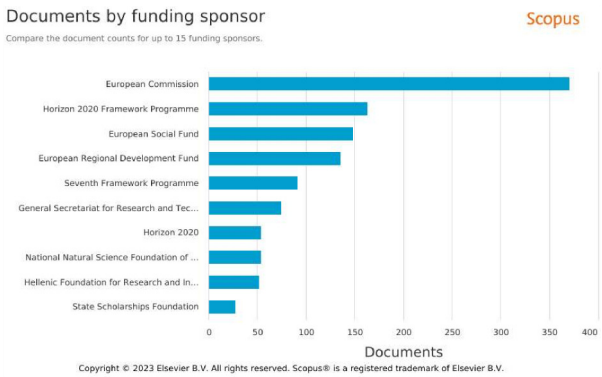

Figure 1. Funding of the Research at H.M.U.. Documents by funding sponsor, Source: Scopus

The research management is supported by the Special Research Fund Account unit and the decision making Research Committee. Furthermore, actions for the dissemination of H.M.U.'s research results to society and industry are taking place, among others the Researcher's Night funded by the European Commission, Horizon Europe Framework Programme (HORIZON), actions organised by the International Relations Office (IRO) [4] as well as actions organised by the research laboratories, the research institutes and the faculty departments of H.M.U.. They also significantly contribute to the creation of a connection between research and education, as well as lifelong learning and training.

4 From Research to Innovation

H.M..U's research policy focuses on creating a culture of quality and excellence leading to innovation, extroversion and societal benefits. Leading role for the realisation of this goal plays the development of an atmosphere of academic cooperation respecting the ethics and on recognition of values. The above policy is founded on four main pillars [5]:

- respecting and encouraging specialized knowledge while at the same time promoting the removal of any obstacles impeding cross-fertilization,
- supporting the production of new knowledge, both thematic and interdisciplinary within and between the scientific fields and disciplines,
- facilitating collective and collaborative work practices,
- encouraging strong national and international collaborations and establishing research infrastructure of high impact factor aiming to creating opportunities and prospects, all leading to a higher level of research.

In addition, H.M.U.'s quality policy emphases among others on the internal organization of the University's research units adapting good international practices, on the implementation of quality systems which guarantee the production of high-quality scientific research through procedures which are constantly improving, on the realisation of research in high added value for the society research areas. Furthermore, compensating high individual

performance with the unquestionable value of the teamwork and establishing an environment conducive to innovation, are all constituents of H.M.U's innovation policy.

Research at H.M.U. is conducted at research areas with high impact factor as published by the National Documentation Centre (NDC) and shown in Figure 2(a) while Figure 2(b) presents the distribution of the research outcome in the areas of research. An intense interdisciplinary result is shown following the strategic plan of the H.M.U..

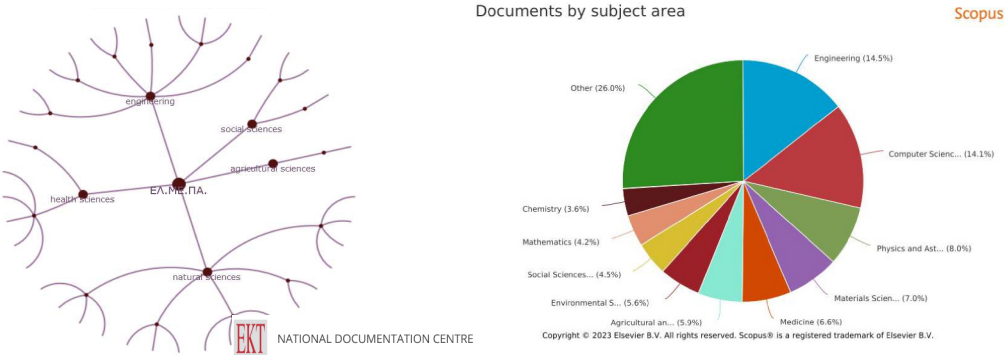

Figure 2. a) Research areas of H.M.U.'s research as recorder by the National Documentation Centre, b) Peer review publications per research area.

5 Involvement of Students

Universities in Greece enjoy full self-administration and academic freedom supervised by the Ministry of Education and Religious Affairs and Sports, in accordance with article 16 of the Constitution. In this frame, each university has the autonomy to determine the way in which its students participate in its research activities. H.M.U. has set the goal of the greatest possible participation of its students in research activities since its strategic position is that quality education and research are closely related concepts. Students at H.M.U. have indeed many opportunities to actively participate in research and development programs. This is achieved through four main pillars of actions.

- The first pillar is based on the personal interaction of the students with the coordinators of the research programs for the auxiliary execution of research within the research project.
- The second pillar is determined by the undergraduate study programme which assumes the compulsory diploma work for the students as part of it. During the diploma semester students are encouraged to participate in the research activities of their departments.
- The third pillar takes advantage of the student internship which is optional but important for the students who choose to use to use this feature. The action is organized and supervised by the Internship Office of H.M.U.. Internship positions are given upon request in the research laboratories
- The fourth pillar is based on the postgraduate programs of study and the doctoral study program where students are de facto part of the research process.

6 The vision of ATHENA research-based cooperation

The research mission of the ATHENA University is as important as the educational mission and consists in the systematic support and promotion of scientific research.

The research policy document of the ATHENA University is under development and defines the mission and priorities of the University and its alliances. The policy focuses on innovative, including interdisciplinary, research aiming at creating immediate, medium and long-term benefits to the students society as well as the European society, economy and humanity in general. The policy is focused on creating a culture of quality and excellence based on cooperation and a synergetic academic environment. In this spirit, it was launched by the author of this article at the 1st ATHENA research board meeting in Orleans on 28th February 2022, the idea of establishing common research infrastructures within the ATHENA University. The "Challenges of a step by step Research Integration" manifesto was presented and analysed by the author, and discussed within the board. The advantages are presented below:

- Will strengthen the ATHENA university entity in EU and national authorities,
- Such action is in line with the EU policy for the European higher education era including research integration,
- Is rather the most efficient path for ATHENA to be developed as an entity of excellence in research and education,
- Will reinforce the efforts to attract research funds within the present competitive environment,
- Is the appropriate way to elaborate the new knowledge into the education curricula of ATHENA university.

The benefits of the creation of common research infrastructures giving research access to ATHENA partners are summarized below:

- Reduce breaking up of the research and innovation ecosystem of ATHENA University and avoids duplication of expenses and efforts,
- Launch policies for the ATHENA, offering well-established inter-institutional or Research Infrastructures or to develop strong bonds with national RI's,
- Join forces to construct and run large, complex or expensive infrastructures, respond to global challenges and/or foster combining skills, data and efforts of the world's best scientists,
- Foster the innovation potential of Research Infrastructures by making industry more aware of opportunities offered to improve their products and by the co-development of advanced technologies,
- Need for personnel costs covered partially by the EC.

Such integrated research infrastructures will strengthen the creation of ATHENA Doctorate School and the establishment of joint doctoral programs. Furthermore, the action will support activities building a strong research osmosis between the partner Institutions.

The aforementioned actions, are being implemented and developed by the WP4 working group supported by the ATHENA research board.

References

[1] https://hmu.gr/

[3] https://hmu.gr/ereyna/ereyna-sto-elmepa/

[3] https://hmu.gr/en/research/university-research-center

[4] https://iro.hmu.gr/

[5] https://hmu.gr/en/research/research-in-hmu