DESTINI

SMART DATA PROCESSING AND SYSTEMS OF DEEP INSIGHT

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DESTINI
Smart Data Processing and Systems of Deep Insight

Deliverable D2.2

Gap Analysis and Evaluation of Capacity Report

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Contents

LIST OF ABBREVIATIONS

CUT: Cyprus University of Technology

ERISS: European Research Institute in Service Science

JADS: Jheronimus Academy of Data Science

UNIROMA1: Sapienza Università di Roma

JRA: Joint Research Areas

PMS: Project Management Structure

SC: Steering Committee

PC: Project Coordinator

STCTM: Scientific-Technical Content and Training Manager

DELIC: Dissemination, Exploitation and Link with the Industry Committee

KPI: Key-Performance Indicator

1. Executive Summary

As reported in the description of work, the goal of this deliverable is to detect the gaps CUT exhibits in contrast to the international trends in the JRAs and to evaluate its current research standing and potential, assessing the capacity of the existing team compared to international standards in the area.

In order to perform this gap analysis, we asked people belonging to different research teams across Europe to fill-in a questionnaire composed by various parts, covering the different activities carried out by a modern research group.

Even if the main target of the JRA is research, current academic practices create strong relationships and side-effects between teaching, research and fund-raising: the more time is devoted in a research group to teaching (which is the main duty of a University) and to fund-raising (needed to sustain the group needs in terms of equipment, personnel and application-oriented ideas), the less time can be devoted to pure research-oriented activities. On the other side, research results are often inspired by funded projects, and improve the quality of teaching, by allowing the presentation to students of advanced concepts and practices. In addition, good research results can only be achieved through very good students and applicants, which are incentive to choose a research group on the basis of the quality of the teaching and available funds. Therefore, the relationship is a virtuous circle, in which a careful load balancing among the time spent in each of them should be carefully planned and optimized.

The analysis of the results gathered poivided very interesting insights about existing gaps between CUT and other institutions (referred to as NON-CUT in the following of this document). In particular, gaps were identified mostly with respect to research and industrial activities, and this is eactly the area targeted by this project, that is, to bridge gaps through the DESTINI project.

2. Introduction

As reported in the description of work, the goal of this deliverable is to detect the gaps that CUT exhibits in contrast to the international trends in the JRAs of interest and to evaluate its current research standing and potential, assessing the capacity of the existing team compared to international standards in the area. Such an analysis is quite complex, as it requires to consider many aspects of researchers' life, including teaching, projects, organizational duties inside research institutions, and, of course, research activities. In addition, the available infrastructure and access to datasets may influence the current performance and potential of a research group, and should be therefore taken into account.

In order to perform this analysis, we have chosen to distribute a questionnaire as a Google Form composed of seven parts, thoroughly described in the next sections, and covering all the different aspects of the work of a research group. The questionnaire was distributed to a large number of research groups in the scientific area of Smart Data Processing and Systems of Deep Insight scattered across Europe, asking to fill-in on a voluntary basis, praising to cover all the different roles inside a research group (e.g., full professors, associate professors, assistant professors, postdoctoral and PhD students, and researchers).

After sending the first version, some comments were reported by recipients suggesting ways to modify it in order to cover missing aspects and privacy concerns. After incorporating these comments, a second version of the questionnaire was produced and distributed.

The number of collected answers has been sufficient to make a comparison between CUT, which also carefully filled-in the questionnaire, and the sample obtained, starting from the raw data provided by other institutions and then abstracting some considerations.

Analysis has been conducted by grouping the above mentioned participant roles in three different categories: Head/full/associate professor as a whole, assistant professors, and research fellows. The latter category includes both post-doc and Ph.D. students.

The rest of this document is organized as follows: The second section describes the questionnaire and the rationale behind each part and question provided. The third and last section presents the gap analysis and concludes the document.

3. Questionnaire – Description and Rationale

The questionnaire was distributed to research groups in the research area of Smart Data Processing and Systems of Deep Insight across the Europe in the form of a Google form consisting of seven parts:

1 - General Information,

2 - Teaching and Institutional Duties,

3 - Academic Research,

4 - Publicly (National and EU) Funded Projects,

5 - Industrial Projects and Other Collaborations,

6 - Research Infrastructure and Support, and

7 - Access to Datasets.

Two of these parts, in particular part 6 and part 7, were exclusively intended for heads of research groups, as well as other selected questions from the other parts that have common answers across a specific research group.

The questionnaire is available for review and compilation at the address https://docs.google.com/forms/d/e/1FAIpQLSeFr8XoCPOGMZybXix4f222TC-QSdSgk7KalVzVWmICVQObyw/viewform.

In the following, we will describe the individual parts of the questionnaire with the rationale behind each proposed question.

Part 1 - General Information

The first part of the questionnaire, depicted in Figure 1, requires general information about the research group. According to the specific role in a research group, respondents have been requested to fill-in the section with different objectives. The head of the group is in charge of reporting the composition of the group and providing a group ID. All of the researchers from a group will use this group ID in order to identify a research group, and will use a specific person ID to refer to themselves and their positions (e.g., full professors, associate professors, post-docs, etc.). In this way we can record the information of the composition of the group, keeping the identity of single members private. Clearly this requires some collaboration among the respondents of a specific research group, but all persons involved demonstrated a very collaborative spirit on this point.

Additionally, the header of this part provides information about how researchers should fill-in the questionnaire. All the information about the workload is supposed to be personal, in order to make it possible to create statistics for specific roles in the research institutions. Information about the entire group was mandatory only for the head of each group.

In the following, a description for each question is reported:

- **University/organization, Department/unit, Research group [MANDATORY]:** Here, participants are required to identify their research group. If participants want to keep this information private, they may decide to use only a code to denote the group.
- **Composition of the group [TO BE FILLED-IN ONLY BY THE GROUP LEADER]:** Here, the head of each research group (only) describes how the research group is composed in terms of number of persons (units) for each role (e.g., 2 full professors, 4 associate professors, 3 post-docs, etc.).
- **Your ID, role [MANDATORY]:** In this field, participants are required to specify an ID in the context of the group ID. In addition to this ID, the participant specifies his/her role inside the research group (e.g., full professor).

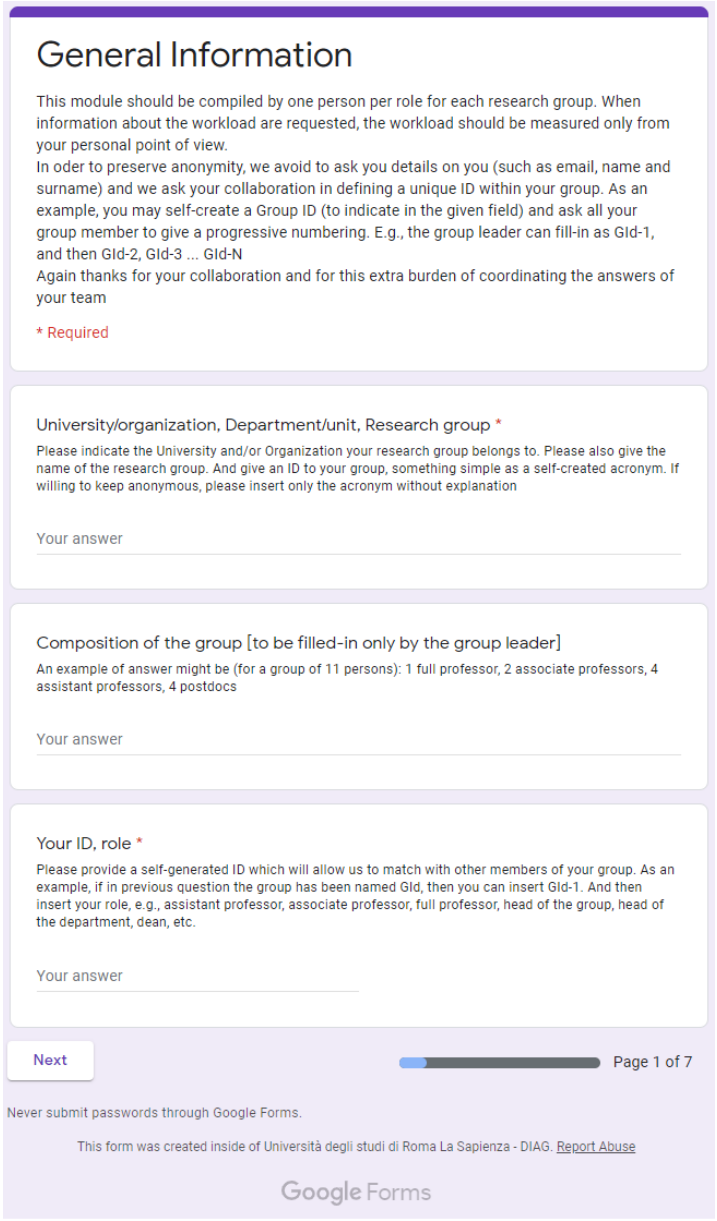


Figure 1. Part 1 of the questionnaire

Part 2 - Teaching and Institutional Duties

An important portion of the workload of members in a research group is represented by teaching and institutional activities. Workload related to teaching comes in different forms, not only including time dedicated to classes (face-to-face or online, as it is happening during the COVID-19 pandemic emergency), but also teaching material preparation, office hours, exams preparation and corrections. Besides teaching and institutional activities, tasks related to organizational duties and management of the university and research group, may also require a considerable amount of time. Even though these activities are of utmost importance in the life of the researchers, they should leave space for activities related to research and projects.

In the following, a description of each question appearing in this part is provided:

- **Taught courses (list) [MANDATORY]:** Here, participants are required to insert the name of courses they teach/taught in the current academic year.
- **Average weekly time (in hours) devoted to teaching material preparation [MANDATORY]:** Here, respondents are required to specify the number of hours they devote to prepare teaching material for each week. A high number of hours can be the effect of a new course to teach for which previous material was not available.
- **Average weekly time (in hours) devoted to face-to-face teaching (i.e., classes) [MANDATORY]:** A high number of courses usually requires teaching for many hours a week. In this field, participants are required to specify how many hours they spend in face-to-face teaching every week.
- **Total average weekly time (in hours) devoted to teaching activity [MANDATORY]:** This number is usually the sum of the two previous fields. In some cases, it can be higher if hours are spent to prepare or update e-learning or course web-sites and to prepare additional resources for courses.
- **Average weekly time (in hours) devoted to office hours and students' assistance [MANDATORY]:** This is the number of hours devoted to office hours and other assistance to students, as for example answering emails with questions about the course.
- **Number of exams' texts prepared per year [MANDATORY]:** This is another workload measure related to the number of taught courses. This field contains the number of exams prepared per year.

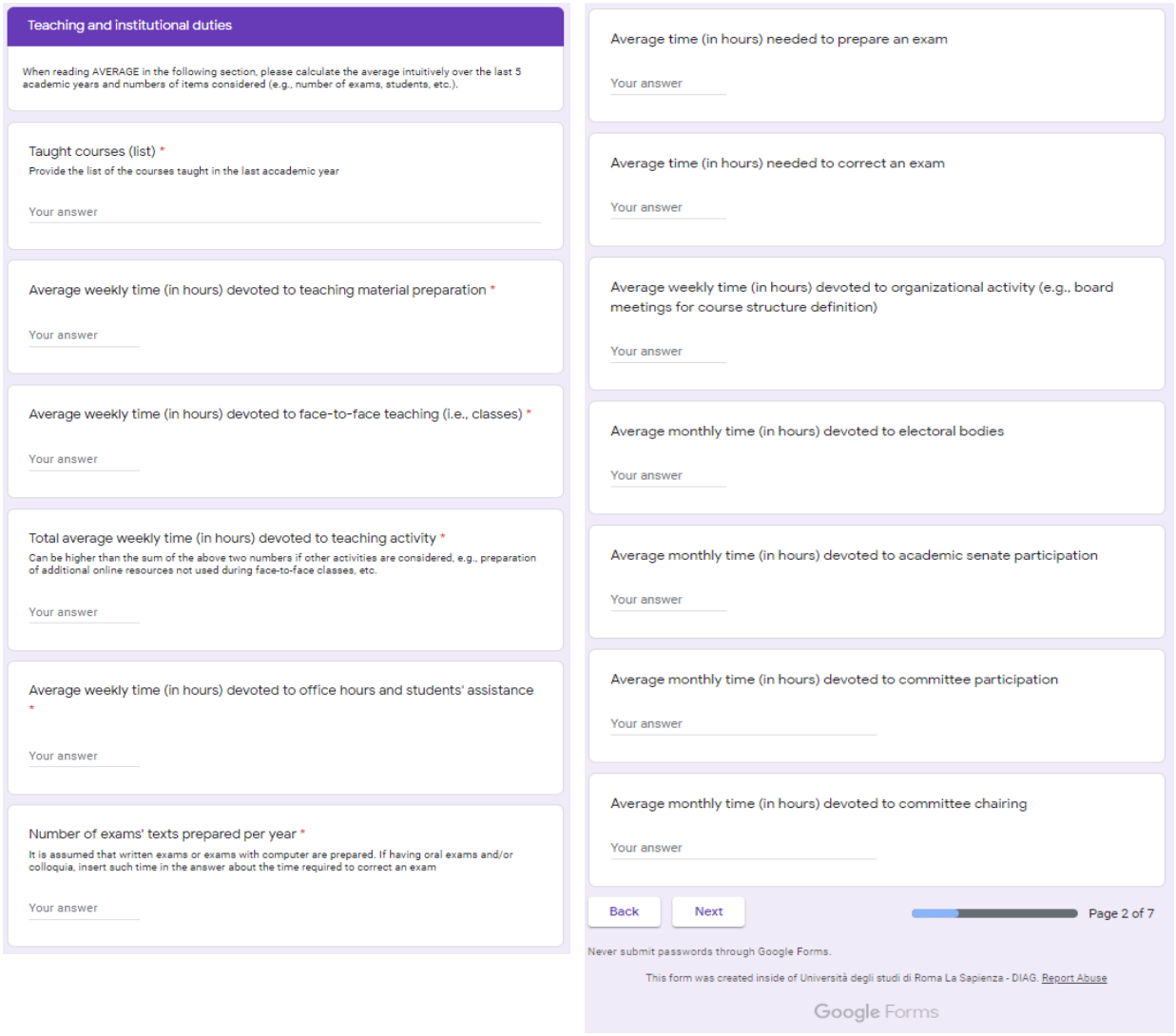


Figure 2. Part 2 of the questionnaire

- **Average time (in hours) needed to prepare an exam [OPTIONAL]:** Here, the participant specifies the average number of hours devoted to prepare a single exam paper.
- **Average time (in hours) needed to correct an exam [OPTIONAL]:** Here, the participant specifies the average number of hours needed to correct an exam (i.e. the answered papers for the whole class audience). The number of required hours can be dependent on the number of students enrolled in a specific class.
- **Average weekly time (in hours) devoted to organizational activity (e.g., board meetings for course structure definition) [OPTIONAL]:** The organization of a course requires to spend time not only for preparing teaching material, but also to

participate to organizational meetings. This field is used to specify the average number of hours spent every week for such activities.

- **Average monthly time (in hours) devoted to electoral bodies [OPTIONAL]:** This is the average number of hours spent to participate to electoral bodies for university roles (e.g. hiring new personnel, promoting existing).
- **Average monthly time (in hours) devoted to academic senate participation [OPTIONAL]:** For participants involved with the academic senate, this field is used to specify the monthly time spent to participate to such sessions.
- **Average monthly time (in hours) devoted to committee participation [OPTIONAL]:** Here, participants specify the number of hours spent in committees within the university. These committees may include, for example, budget preparations, IT purchases, Ph.D. admission exams, etc.
- **Average monthly time (in hours) devoted to committee chairing [OPTIONAL]:** Among the hours specified in the previous point, here it is specified how many of those have been devoted to chairing committees. Chairing is usually more demanding and time-consuming than simple participation as it is often required to present some issues to other bodies, prepare and review minutes, and manage scheduling of next sessions/sittings, etc.

Part 3 - Academic Research

The third part of the questionnaire requires the participant to describe the workload related to the research activities. This workload has many faces as it includes the time spent to conducting experiments and to write research papers, but also the time spent when participating in conferences, both organizing and attending.

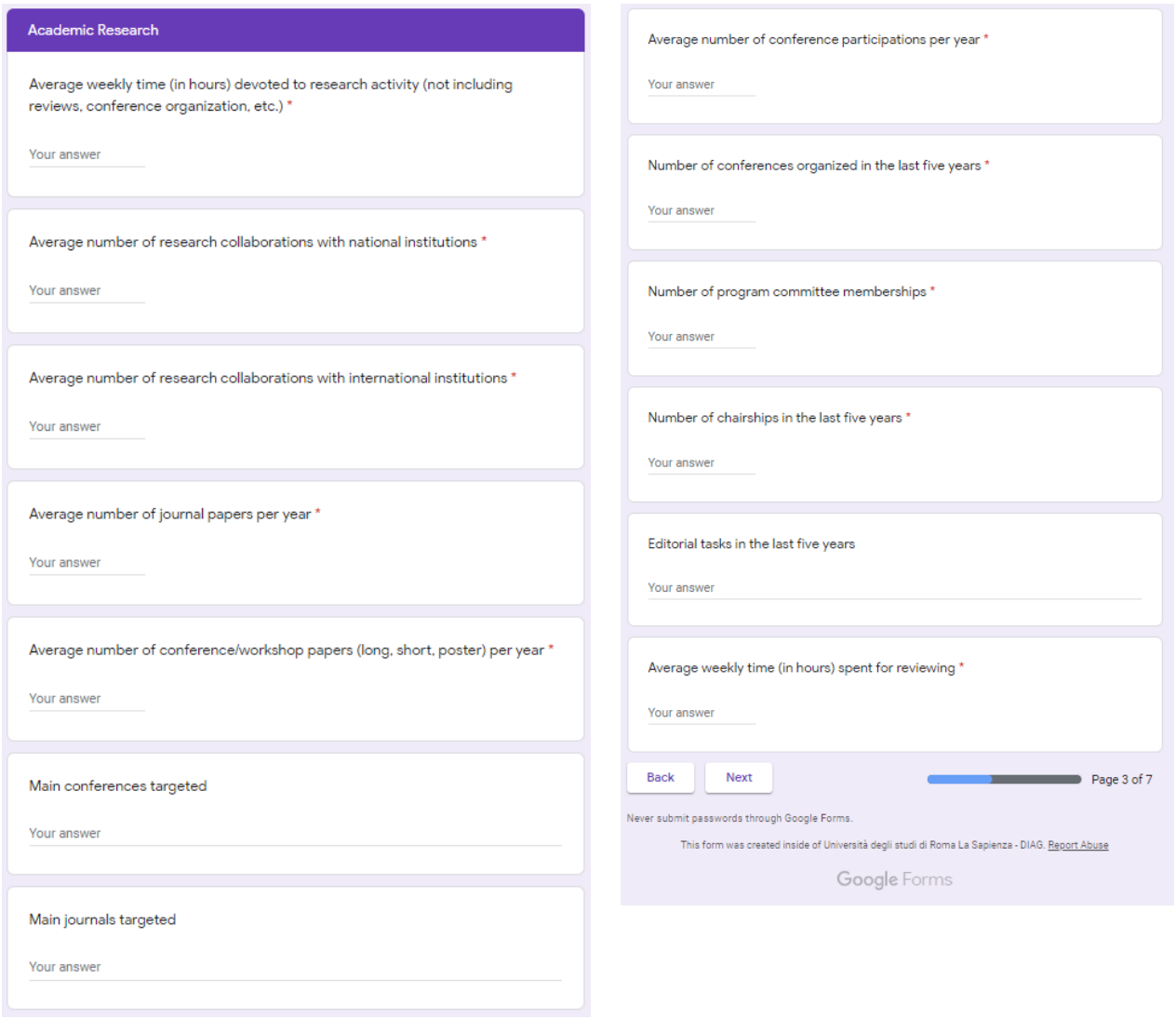


Figure 3. Section 3 of the questionnaire

A description of each question in this part follows:

- **Average weekly time (in hours) devoted to research activity (not including reviews, conference organization, etc.) [MANDATORY]:** This is the average weekly

time spent for performing research, including execution of experiments, brainstorming and writing papers.

- **Average number of research collaborations with national institutions [MANDATORY]:** An important part of research is represented by collaborations with other research groups from the same nation. In this field, the average number of active collaborations with other national research institutions is recorded.
- **Average number of research collaborations with international institutions [MANDATORY]** This field has the same puprpose of the previous one, but here international collaborations are considered instead.
- **Average number of journal papers per year [MANDATORY]** An important indicator of research activity is the number of journal papers produced each year as it is considered an important KPI in many European countries.
- **Average number of conference/workshop papers (long, short, poster) per year [MANDATORY]:** This value is complementary to the previous one and denotes the number of non-journal contributions created by the participant for the research community.
- **Main conferences targeted [OPTIONAL]:** In this text field, the participant can report the main conferences targeted for his/her research. Here we address only the main conferences; therefore, we report the most important ones in the area of research of the participant.
- **Main journals targeted [OPTIONAL]:** This field, similarly to the previous one, requires the participant to specify the main targeted journals.
- **Average number of conference participations per year [MANDATORY]:** Here, the participant specifies the average number of conference he/she participates per year.
- **Number of conferences organized in the last five years [MANDATORY]:** An important service provided to the research community is represented by conference organization. In this field, the participant specifies the number of conferences organized, with any role (e.g., general chair, local organizer), in the last five years.
- **Number of program committee memberships [MANDATORY]:** Reviews are important to the research community, but they also allow researchers to stay up-to-date with respect to recent research trends. In this field, the participants specify the number of program committees they are currently members of.
- **Number of chairships in the last five years [MANDATORY]:** This field requires the participant to specify the number of program committee chairships in the last five years.

- **Editorial tasks in the last five years [OPTIONAL]:** Here, the participants specify how many editorial roles he/she had in the last five years.
- **Average weekly time (in hours) spent for reviewing [OPTIONAL]:** Here, the average weekly time spent in reviewing journal or conference papers is reported.

Part 4 - Publicly (National and EU) Funded Projects

In this section, the participant is required to provide information about the workload he/she devotes to projects with public funding. This kind of activity is important to transfer research results to companies/industries/businesses/enterprises, as well as public administrations and bodies.

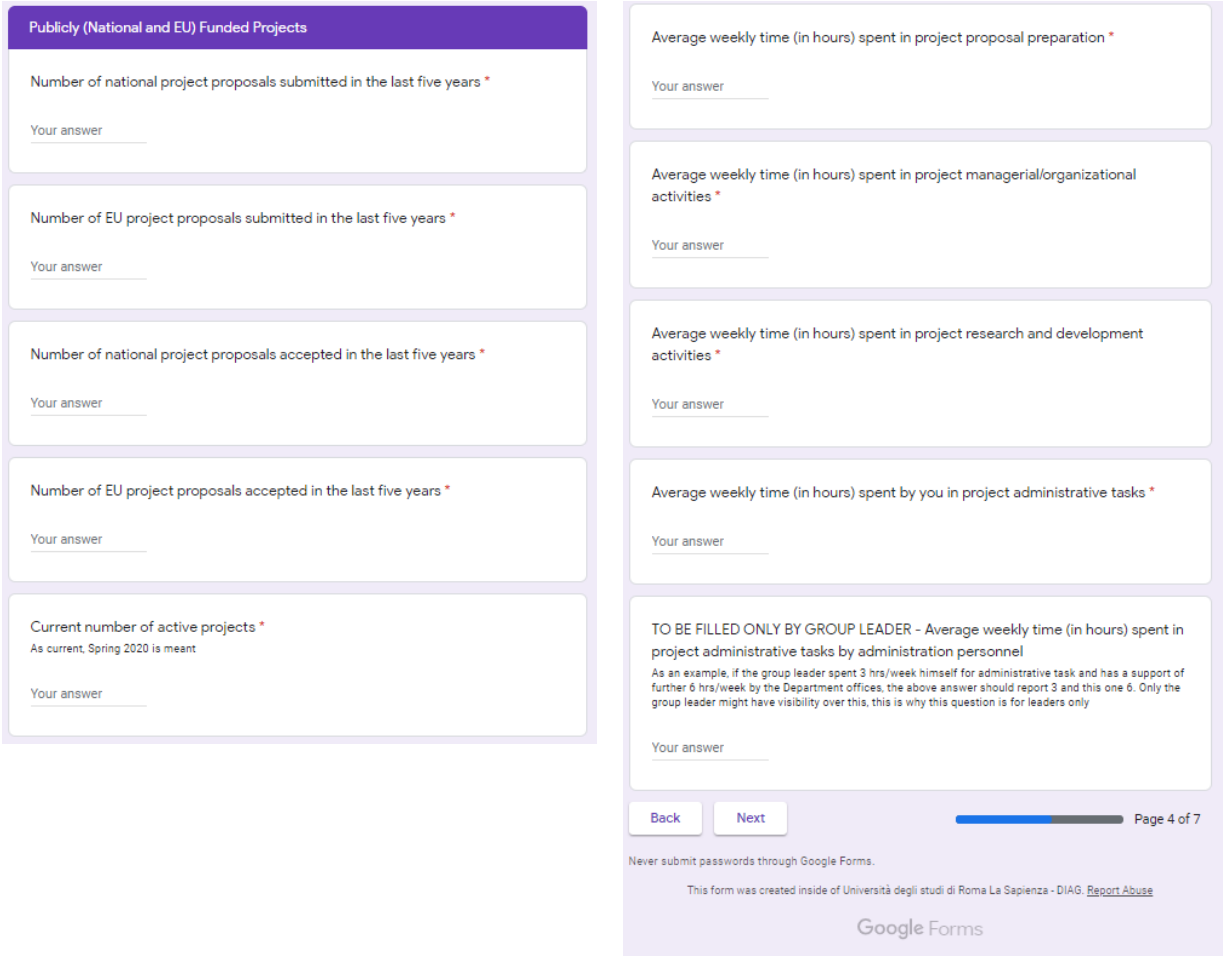


Figure 4. Part 4 of the questionnaire

In the following, the questions of this part are reported:

- **Number of national project proposals submitted in the last five years [MANDATORY]:** Here, participants are required to specify the number of project proposals prepared and submitted in the last five years to any national public funding agency. The term national here refers to both national level and local level (e.g., regional funding agencies).

- **Number of EU project proposals submitted in the last five years [MANDATORY]:** This field is similar to the previous one, but here only European level projects are considered.
- **Number of national project proposals accepted in the last five years [MANDATORY]:** Here, the participant specifies how many of the proposals specified in the first question have been accepted.
- **Number of EU project proposals accepted in the last five years [MANDATORY]:** Here, the participant specifies how many of the proposals specified in the second question have been accepted.
- **Current number of active projects [MANDATORY]:** Here, the number of currently active projects the participant is involved into is specified.
- **Average weekly time (in hours) spent in project proposal preparation [MANDATORY]:** Here, the average time spent weekly in proposal writing activities is reported.
- **Average weekly time (in hours) spent in project managerial/organizational activities [MANDATORY]:** For currently active projects, a certain number of hours is required for managerial and organizational activities. This kind of activities must be higher for specific roles (e.g., full professors) and lower for others (e.g., post-docs).
- **Average weekly time (in hours) spent in project research and development activities [MANDATORY]:** This kind of activities is complementary to the previous one, as it is related to the research and development activities in active research projects.
- **Average weekly time (in hours) spent by you in project administrative tasks [MANDATORY]:** Connected to research projects, there are a set of administrative tasks which are not directly related to the practical goals of the project. These administrative tasks can be performed in some cases by researchers, and the time spent for them can be specified in this field.
- **Average weekly time (in hours) spent in project administrative tasks by administration personnel [ONLY FOR GROUP LEADER]:** This field is supposed to be filled only by the group leaders of each group, reporting the number of hours spent for administrative tasks on projects by non-researching, administrative, personnel of the university.

Part 5 - Industrial Projects and Other Collaborations

This part is intended to specify the project tasks of members of research groups that are not publicly funded (i.e., industrial projects) and other technology transfer activities, such as consulting ones.

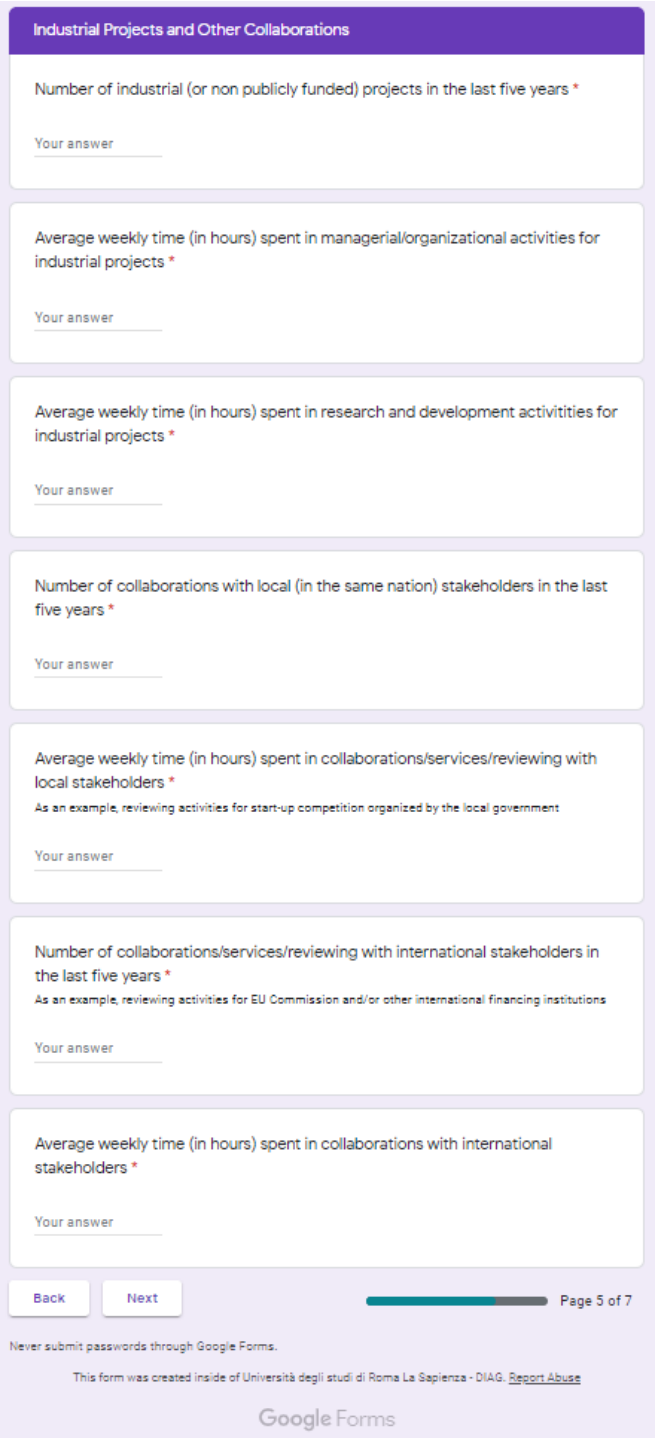


Figure 5. Part 5 of the questionnaire

In the following, the questions included in this part are described:

- **Number of industrial (or non-publicly funded) projects in the last five years [MANDATORY]:** In this field, the participant specifies the number of industrial projects funded to the specific participant in the last five years. Here we targeted the number of projects directly funded to a researcher, not including the ones he is only working at.
- **Average weekly time (in hours) spent in managerial/organizational activities for industrial projects [MANDATORY]:** Here, the participant specifies the time spent weekly for organizational activities in industrial projects.
- **Average weekly time (in hours) spent in research and development activities for industrial projects [MANDATORY]:** Here, the participant specifies the time spent weekly for industrial projects in core research and development activities.
- **Number of collaborations with local (in the same nation) stakeholders in the last five years [MANDATORY]:** Here, the participant specifies the number of consultancies performed in the last five years with national entities such as companies or boards.
- **Average weekly time (in hours) spent in collaborations/services/reviewing with local stakeholders [MANDATORY]:** With respect to the previous point, the participant specifies the time spent in consultancies for national entities.
- **Number of collaborations/services/reviewing with international stakeholders in the last five years [MANDATORY]:** Here, the participant specifies the number of consultancies performed in the last five years with international entities such as companies or boards.
- **Average weekly time (in hours) spent in collaborations with international stakeholders [MANDATORY]:** With respect to the previous point, the participant specifies the time spent in consultancies for international entities.

Part 6 - Research Infrastructures and Support

The research and development activities of a research group must be supported by an adequate infrastructure. In this section, the head of each group is required to fill information about the infrastructure facilities available for his/her research group.

In the following, the questions included in this part:

- **Number of rooms (non-labs) available to the research group [ONLY FOR GROUP LEADER]:** Here, the head of the group specifies the number of rooms available for the research group (rooms do not include laboratories).
- **Number of laboratories available to the research group [ONLY FOR GROUP LEADER]:** Here, the group leader specifies the number of laboratories available to the group. The term laboratory includes rooms where special equipment available and open-space rooms where several researchers can work together.
- **Number of square meters available for laboratories [ONLY FOR GROUP LEADER]:** Here, the group leader specifies the total number of square meters covered by laboratories available to his/her research group.
- **Description of hardware equipment (e.g., servers) available to the research group (non-personal computers or laptops) [ONLY FOR GROUP LEADER]:** Here, the head of the group specifies the availability of special hardware equipment including servers, GPUs and special robots.
- **Description of available cloud services (e.g., Amazon EC2, Azure, etc.) and cost/year for each service [ONLY FOR GROUP LEADER]:** Here, the head of the group specifies if cloud services (e.g., IAAS) are available and what is the cost for the research group.
- **Cost of software licenses per year and description of software [ONLY FOR GROUP LEADER]:** Here, the group leader lists the licensed software (e.g., CAD software) and the cost of the licenses.
- **Open source software employed by the research group [ONLY FOR GROUP LEADER]:** Here, specific open source software employed by the group, not including general purpose operating systems, are reported.
- **Other kinds of subscriptions (if any) and cost per year [ONLY FOR GROUP LEADER]:** Here, the group leader specifies whether the research group benefits from any other subscription (e.g., subscription to specific research journals).

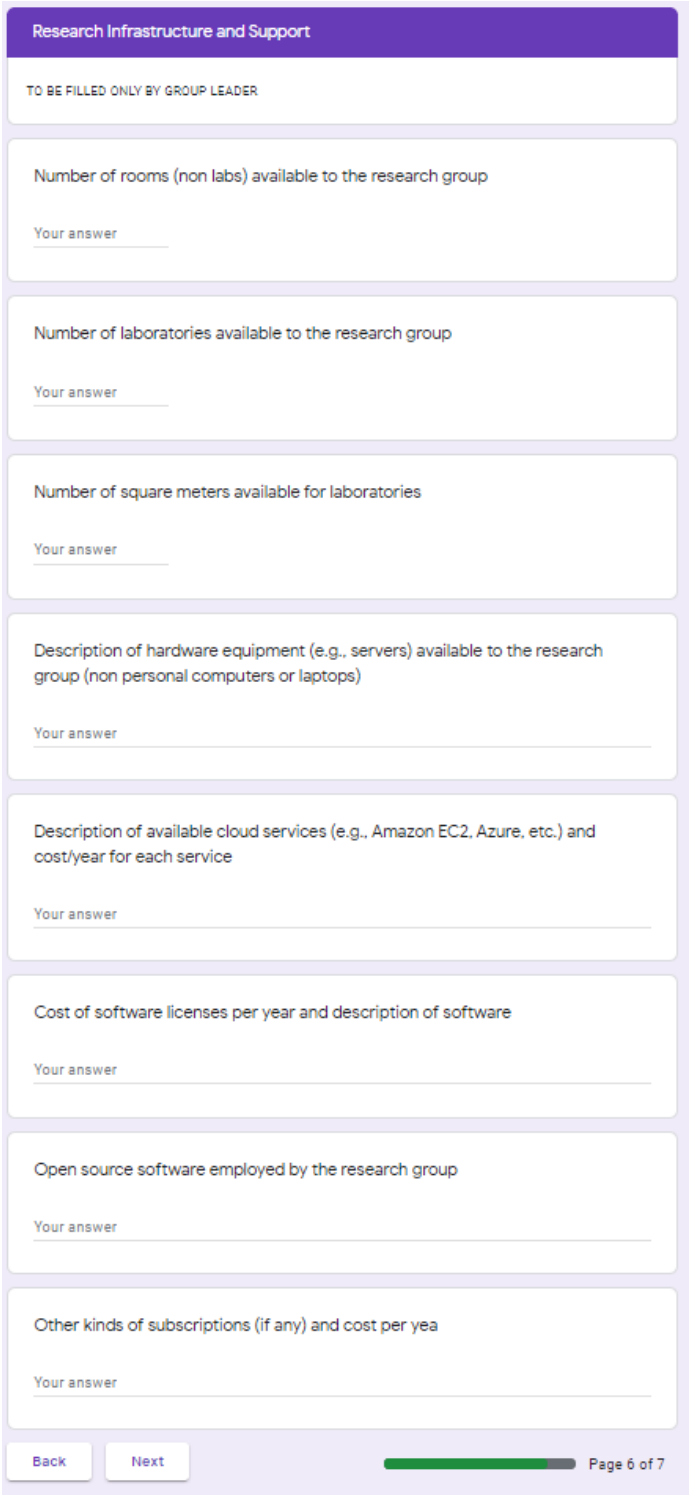


Figure 6. Part 6 of the questionnaire.

Part 7 - Access to Datasets

Many research tasks and activities require the use of datasets. Datasets are difficult to retrieve, especially for very specific research goals, and having good datasets can make a big difference. In this section, the head of the group describes the types of datasets the research group has access to.

In the following the questions included in this section:

- **Number of freely available datasets employed by the research group in the last five years [ONLY FOR GROUP LEADER]:** Here, the head of the group specifies the number of free datasets employed by the research group.
- **Description of the previous datasets [ONLY FOR GROUP LEADER]:** With respect to the previous point, the leader of the group lists the specific datasets.
- **Number of private datasets obtained by the research group in the last five years [ONLY FOR GROUP LEADER]:** Here, the leader of the group specifies how many datasets have been obtained by the research group which are considered private.
- **Description and freedom of exploitation (licenses) for the previous datasets [ONLY FOR GROUP LEADER]:** Here, the leader of the group specifies what kind of license the research group has for the private datasets of the previous bullet.
- **Number of datasets created by the research group with own data in the last five years [ONLY FOR GROUP LEADER]:** Here, the head of the group specifies the number of datasets that has been directly created by the research group by collecting data.
- **Description of the previous datasets [ONLY FOR GROUP LEADER]:** Here, the group leader describes the datasets the previous bullet refers to.

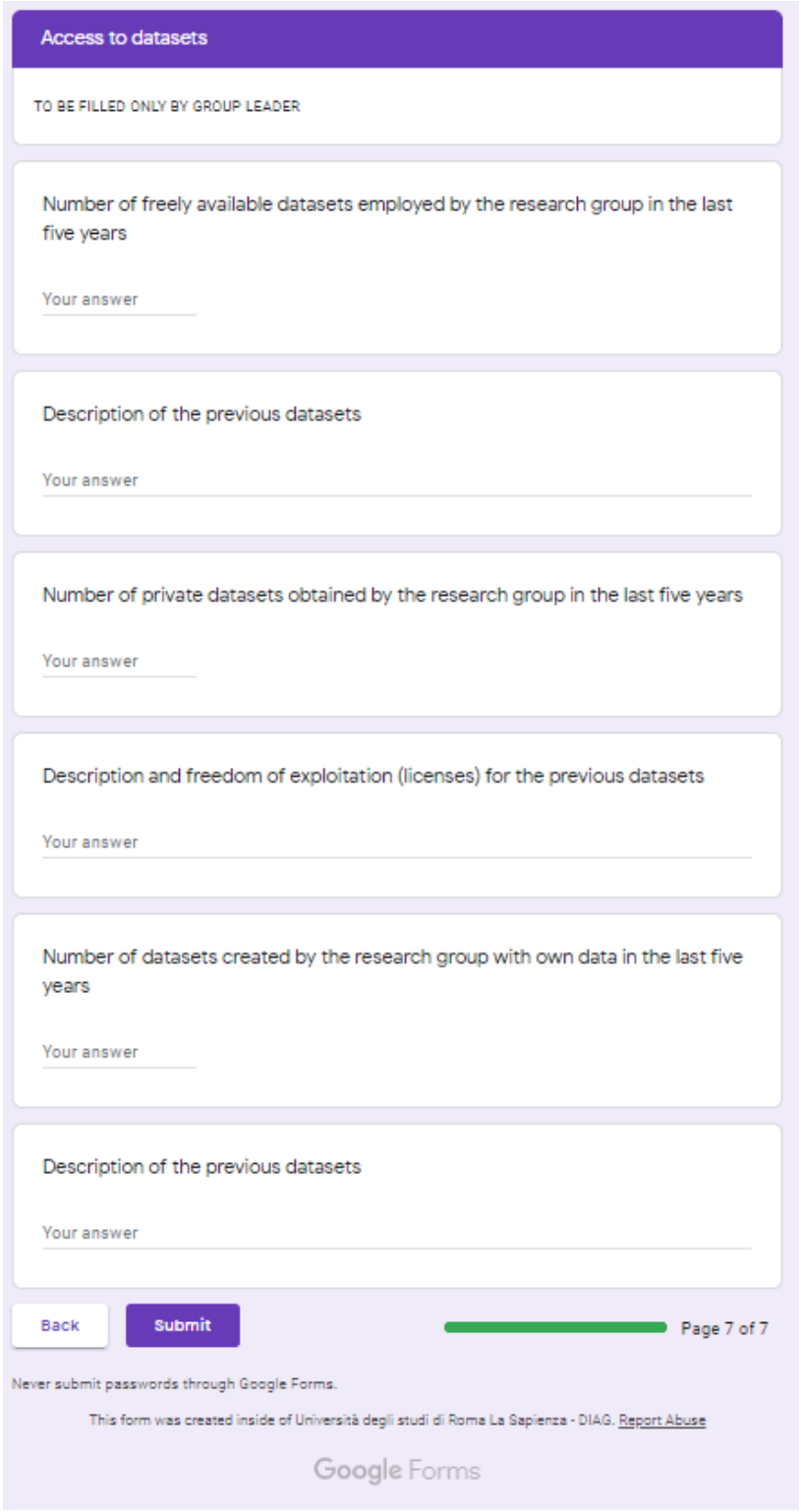
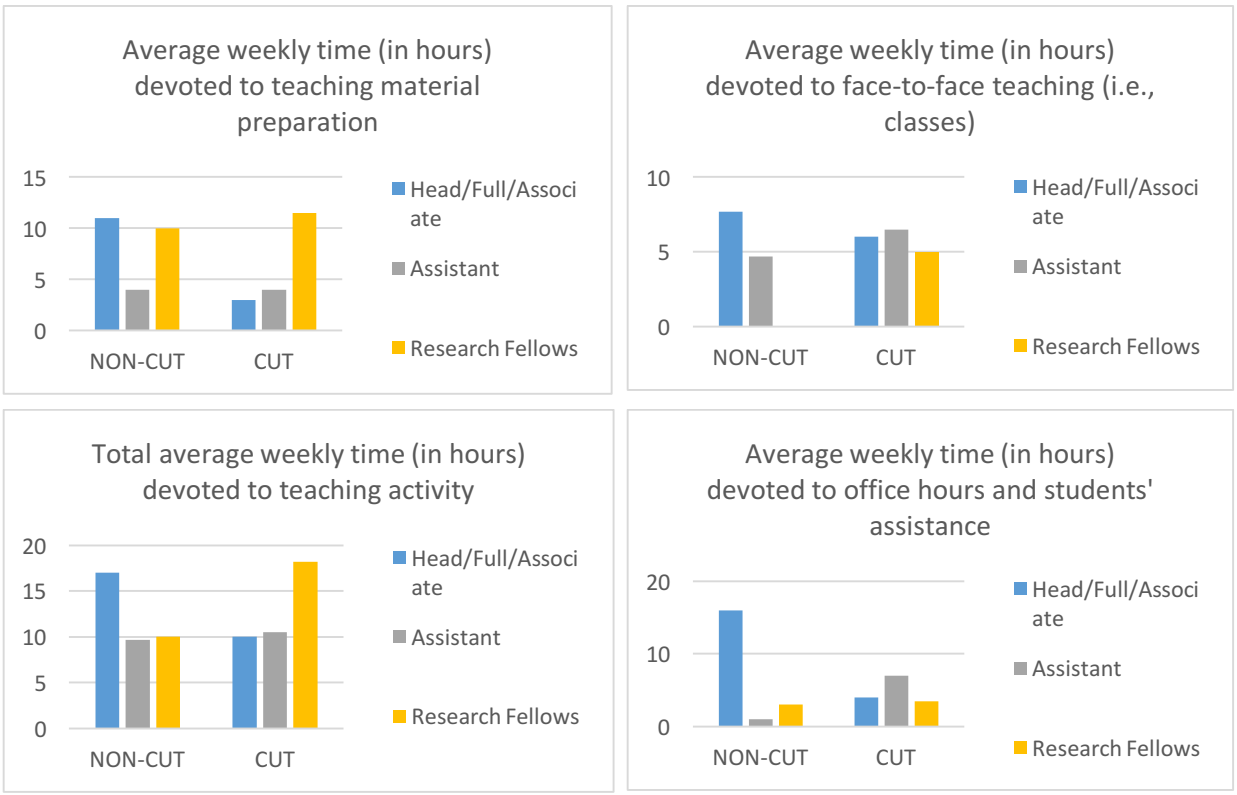


Figure 7. Part 7 of the questionnaire.

4. GAP ANALYSIS

In this section, we start by providing the histogram representations of numerical fields in the different parts of the questionnaire. This is done in order to facilitate the visual analytics task, as many considerations are immediately grasped and visible in this way.

Each histogram is divided into two parts; in the left part, average values are shown for each considered role in research institutions other than CUT, whereas on the right side, the averaged CUT values are shown. We considered three different roles: Head/Full/Associate professor as a whole, assistant professors, and research fellows. The latter include both post-doc and Ph.D. students.



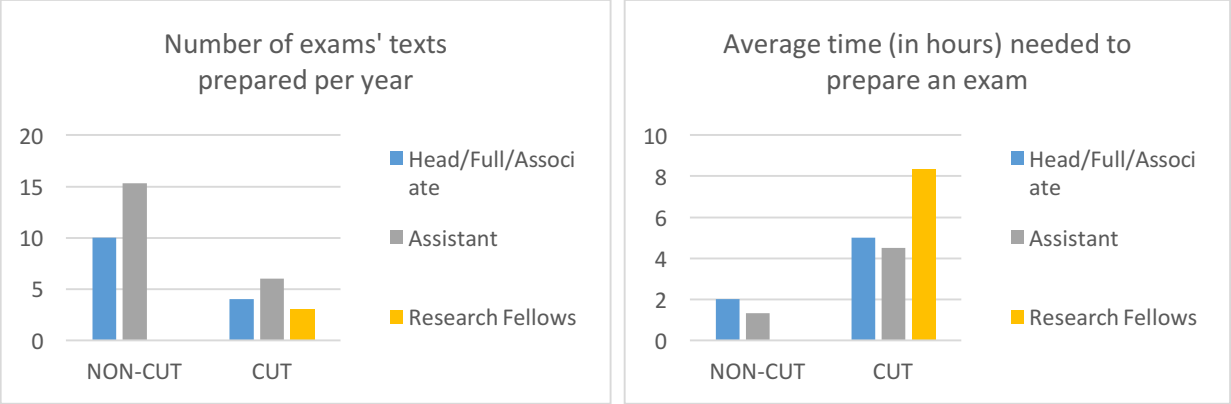


Figure 8. Part 2 histograms (section 1)

The first observation that can be made is that from the questionnaire we know that the CUT research group is composed by 1 full professor, 2 assistant professors, 3 postdocs and 4 PhD students. This means that the group misses associate professors, whose tasks must be shared between the full professor and the 2 assistant professors.

Figure 8 and Figure 9 contain the histograms for part 2 of the questionnaire. Data do not show significant difference between CUT and NON-CUT institutions with some exceptions. Specifically, **Error! Reference source not found.** shows that the time spent by NON-CUT professors wrt. CUT professor for preparing teaching material is higher, as well as the time devoted to office hours. On the contrary, the time spent from CUT professors for exams is higher. Whereas the sum of time spent is comparable, there is a difference among the two activities, as the time devoted to preparation of material and interactions with students is conceptually more innovation-oriented and qualifies institutions as more research-oriented, whereas the one for exams is more teaching-oriented. It does not attract new potential students (e.g., MSc are attracted via office hours to pursue a PhD) and does not lead to continuous improvements over the courses' content.

Conversely, CUT activities on committee chairing is sensibly higher. Concerning instead taught courses, which are not reported in the histograms, topics can significantly vary, but for both CUT and NON-CUT groups the courses of databases, data science, big data management, machine learning and software architectures courses are given.

GAP#1: Teaching at CUT is overall quantitatively similar to the NON-CUT institutions, but in details it is more devoted to examinations and committee chairing (more "administrative tasks") than to innovate course content (via preparing new materials, etc.). It is suggested that CUT personnel is put in the condition to increase the time

devoted to “good” teaching, by alleviating the too much administrative tasks which are currently allocated to them. The implementation of this suggestion clearly depends on organizational and political choices of the National Government and the University or Department Administration, so this can be outside the direct impacts of the project.

As far as course content in the JRAs is concerned, CUT is well aligned with current trends, and this should be reinforced and supported.

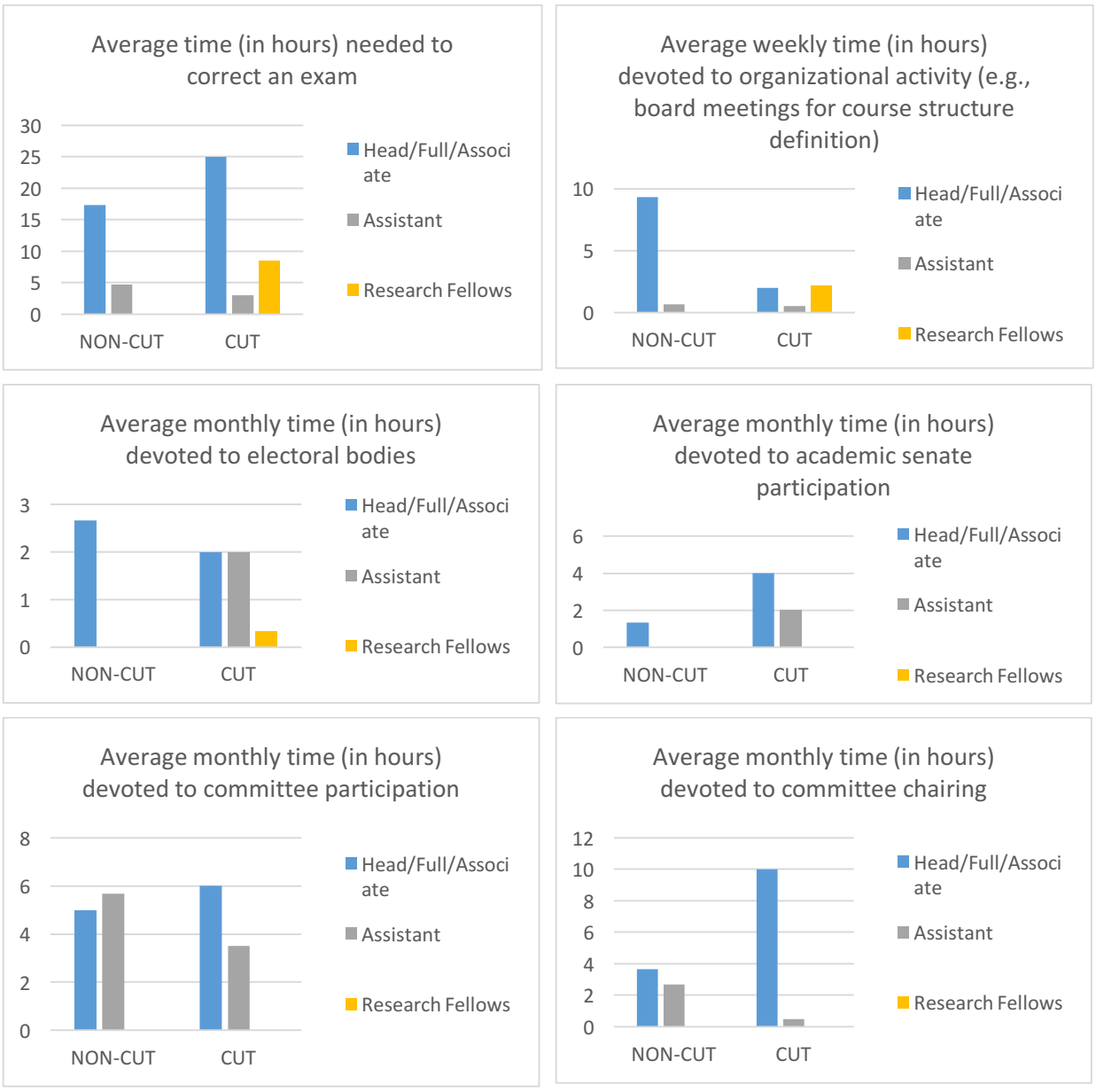


Figure 9. Part 2 histograms (Section 2)

Figure 10. Part 3 histograms (Section 1)

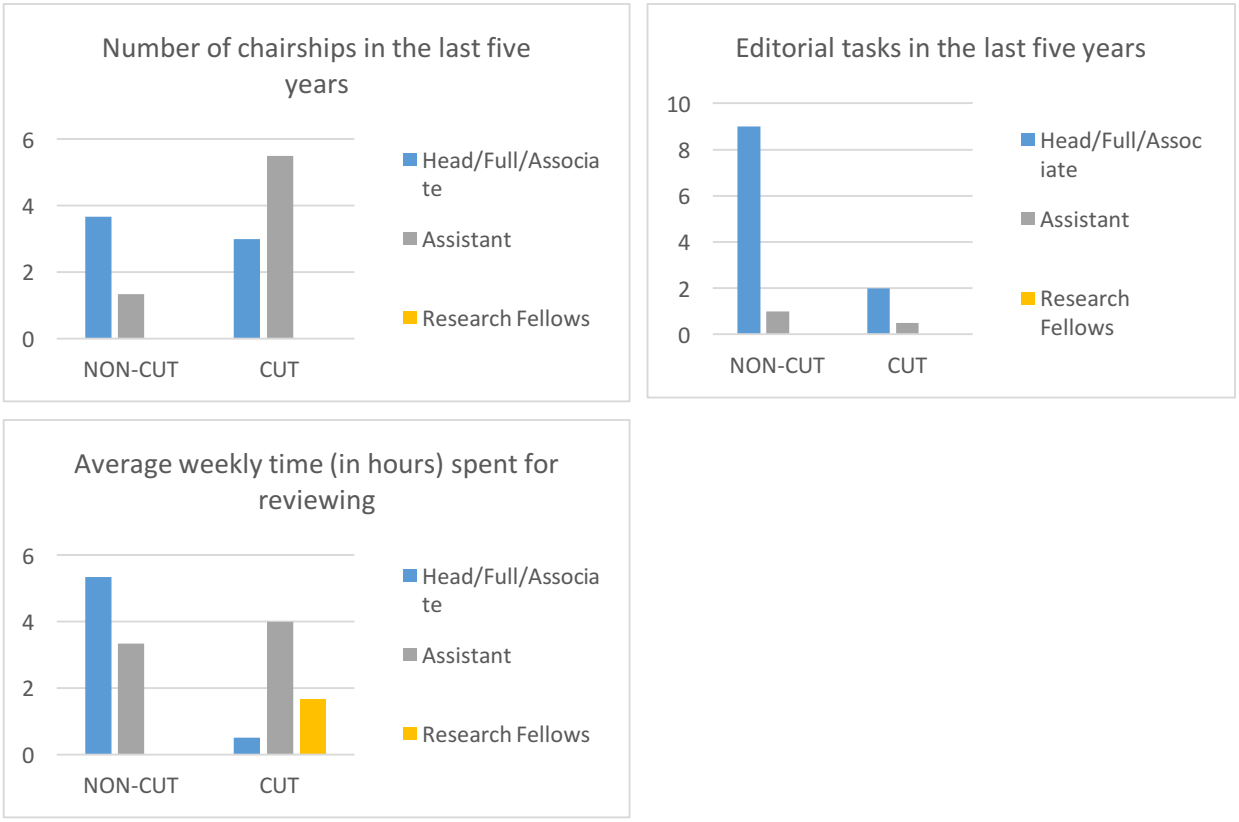


Figure 11. Part 3 histograms (section 2)

Figure 10 and Figure 11 show the histograms related to part 3 of the questionnaire, which is focused on research activities. Many of the diagrams here are similar, but one may notice that, despite a similar number of national and international collaborations, there is a difference in the number of both journal and conference papers published by NON-CUT institutions and CUT.

GAP#2: papers published by CUT are lower than NON-CUT institutions, and h-index of group leaders is lower. As an example:

In Sapienza, Maurizio Lenzerini's h-index is 81, and Massimo Mecella's one is 36. The average number of papers by Mecella is 10.6 (2015 – 2019).

In ERISS/JADS, Michael Papazoglou's h-index is 55, and Willem-Jan van den Heuvel's h-index is 35. The average number of papers by van den Heuvel is 4.4 (2015 – 2019).

In CUT, Andreas Andreou's h-index is 23, and Sotiris Chatzis' one is 23. The average number of papers by him is 5.2 (2015 – 2019).

This is due to a smaller dimension of the research group and younger composition (the University started in 2004). It is suggested that the research group becomes larger in terms of people (e.g. post-docs, Ph.D. and master students), something which is, of course, related directly to attracting funding for recruiting people.

In addition, from analyzing the diagrams some hypotheses can be made:

- CUT shows a lower participation to conferences, where it is easier to understand which are the hottest topics in the field from the research point of view. This is also due to the logistic situation of CUT, that is being located in Cyprus and therefore travelling is quite complex. As an example, whereas Rome (site of Sapienza) is basically directly connected to each major city in Europe and North America and China (also due to its touristic interest) and Tilburg (site of ERISS/JADS) is 2-hour fast train from Amsterdam Schiphol (one of the major airports in the world, it is ranked 3rd in Europe), Limassol (site of CUT), despite the fact that it has been ranked by TripAdvisor as the 3rd up-and-coming destination in the world, is quite difficult to reach outside of the summer period and does not have an airport. As a result, travelling is costlier for CUT and often the supporting university budget is hardly enough for one conference participation only.
- The previous point is also paired with a lower number of conferences organized; again, this may be due to the low reachability of Limassol and the high cost for travelling.
- The previous two points are also related to the participation to a lower number of program committees.
- Conferences and journals addressed by NON-CUT and CUT institutions are different: NON-CUT tend to address a wider set of conferences, in addition to classical conferences and journals in data management topics (e.g., VLDB, SIGMOD, ICDE, TKDE), also conferences from the services and systems community (e.g., ICWS, ICSOC, CAISE, a wide number of ACM and IEEE transactions) are targeted. The topics of the JRAs are addressed in many different conferences and journals, so the choice of venues for publications should be wide and not limited to a few conferences, that despite being "classical" in data management not necessarily cover the whole spectrum of possibilities. Moreover, not only A+/++ conferences should be addressed, but also A conferences and B ones (in specific cases) are interesting venues, as they provide interesting dissemination

possibilities for the research work, which may lead in increased visibility and ultimately increase the h-index.

- As witnessed by the histograms related to project activities, CUT focused more in the past on gathering a deep understanding and knowledge of cutting-edge technologies, thus devoting less time to cutting-edge research topics. This is where DESTINI will greatly assist, providing the tools to share the expertise of the leading institutions with CUT on cutting-edge research topics within the JRAs.

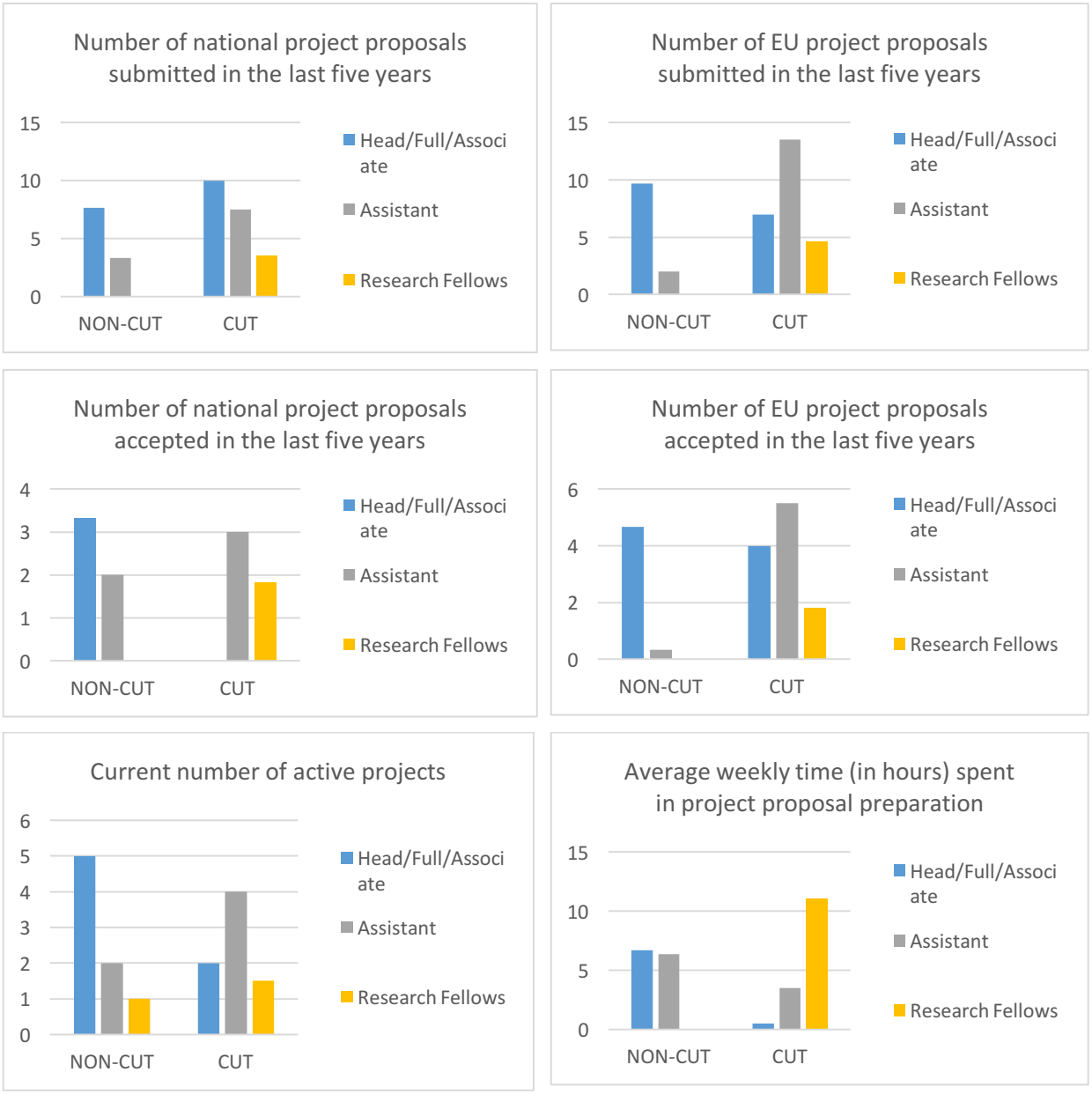


Figure 12. Part 4 histograms (Section 1)

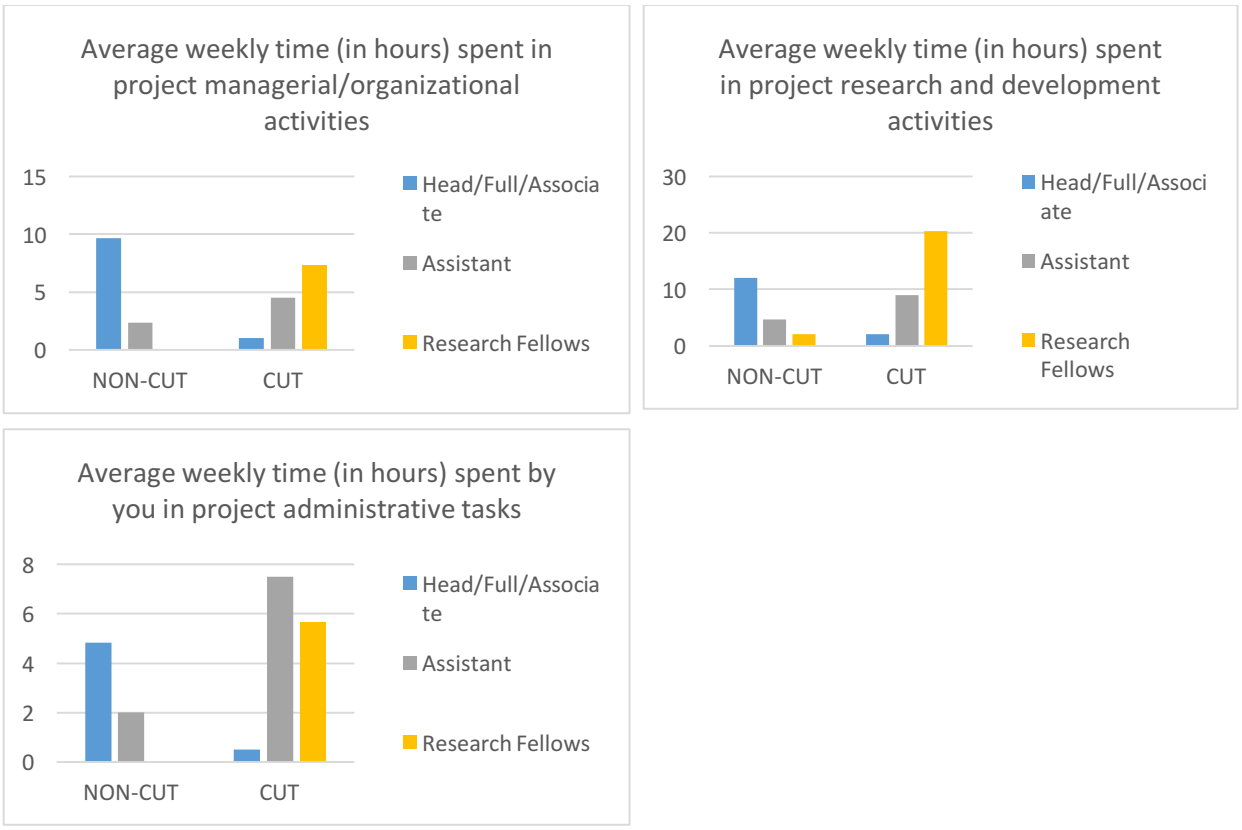


Figure 13. Part 4 histograms (Section 2)

In general, all previous aspects can be monitored and mitigated in the context of the DESTINI project.

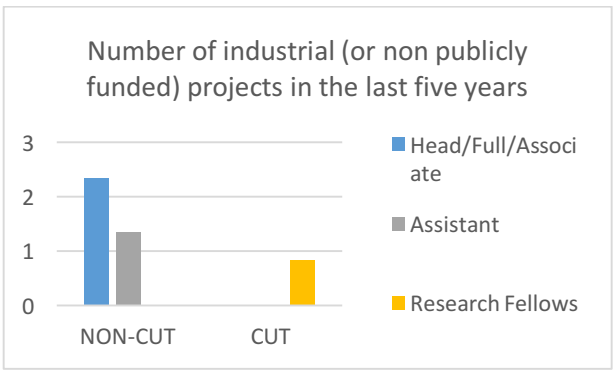
Figures 12 and 13 contain histograms for the part 4 of the questionnaire, which focuses on publicly funded projects. Here CUT shows great performance perfectly fitting with NON-CUT institutions both in terms of submitted and accepted proposals at both national and European level. An interesting observation can be made about the time spent by CUT research fellows in project research and development activities, which is very high with respect to NON-CUT research fellows, with the chart showing inverted involvements in this kind of activities. This may be due to the fact that usually researchers at CUT are financially supported only by means of project participation and work, something which of course raises their responsibility and time spent on project development tasks. This time gap could be for example moved to basic research tasks in the future in order to increase the number of published papers. A similar observation can be made about administrative tasks. Of course, this is something that also depends on the strategy of the

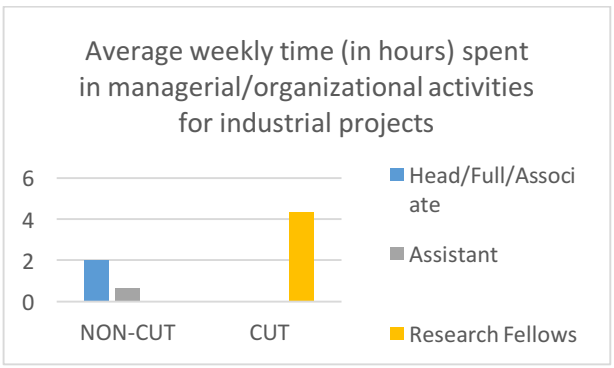
university/department and the available funding or grands that may permit for example awarding scholarships for post-docs, PhD or master students rather than working at the expense of research production.

GAP#3: Time spent in project activities is greater in CUT than in other institutions. As anticipated, this means less time can be devoted to research. The reasons for this might be (i) a smaller group composition and less students/collaborators joining the projects, and again this is due to a younger age of the group, (ii) Lack of financial support for post-docs, PhD or master students. It is suggested to increase the dimension of the research group and seek other means for supporting financially the group than working in projects, in order to be able to devote more time to research than to development.

The same conclusions cannot be drawn with respect to industrial (non-publicly funded) projects, as depicted in Figure 14, where CUT does not have the same performance of NON-CUT institutions, but *(i)* this result may be related to the company fabric of Cyprus, and *(ii)* collaborations with local companies is one of the goals of the DESTINI project.

Nonetheless, Figure 14 also shows that CUT has a number of collaborations with national and international (non-companies) stakeholders very similar to the one shown by NON-CUT institutions. This may be attributed to the active social contribution of CUT to local society which requires involvement with industrial and market players





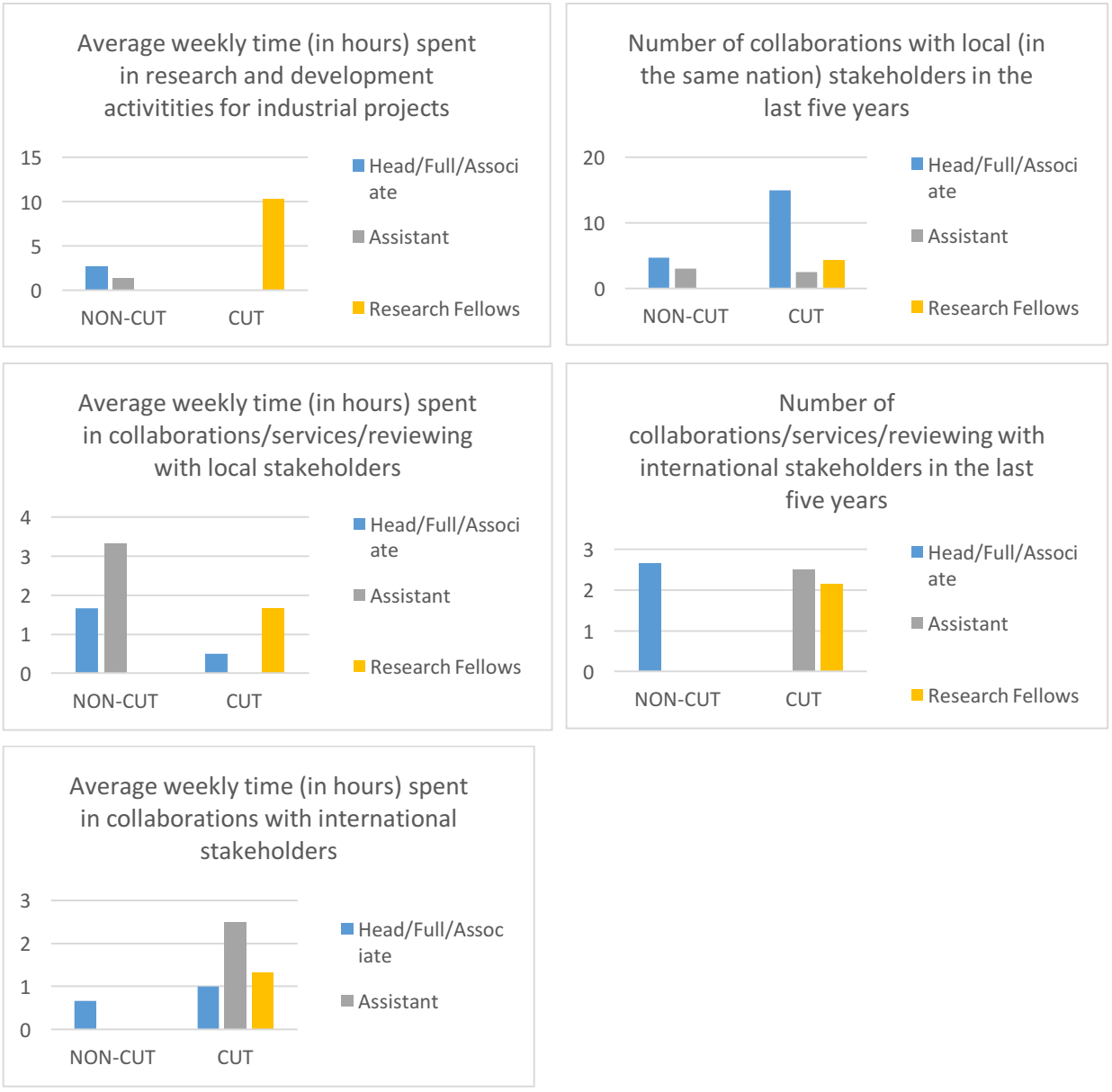


Figure 14. Part 5 histograms

GAP#4: Industrial projects of CUT are sensibly lower in number than those for other institutions. This is attributed to the different industrial and business ecosystem of Cyprus wrt. other EU countries.

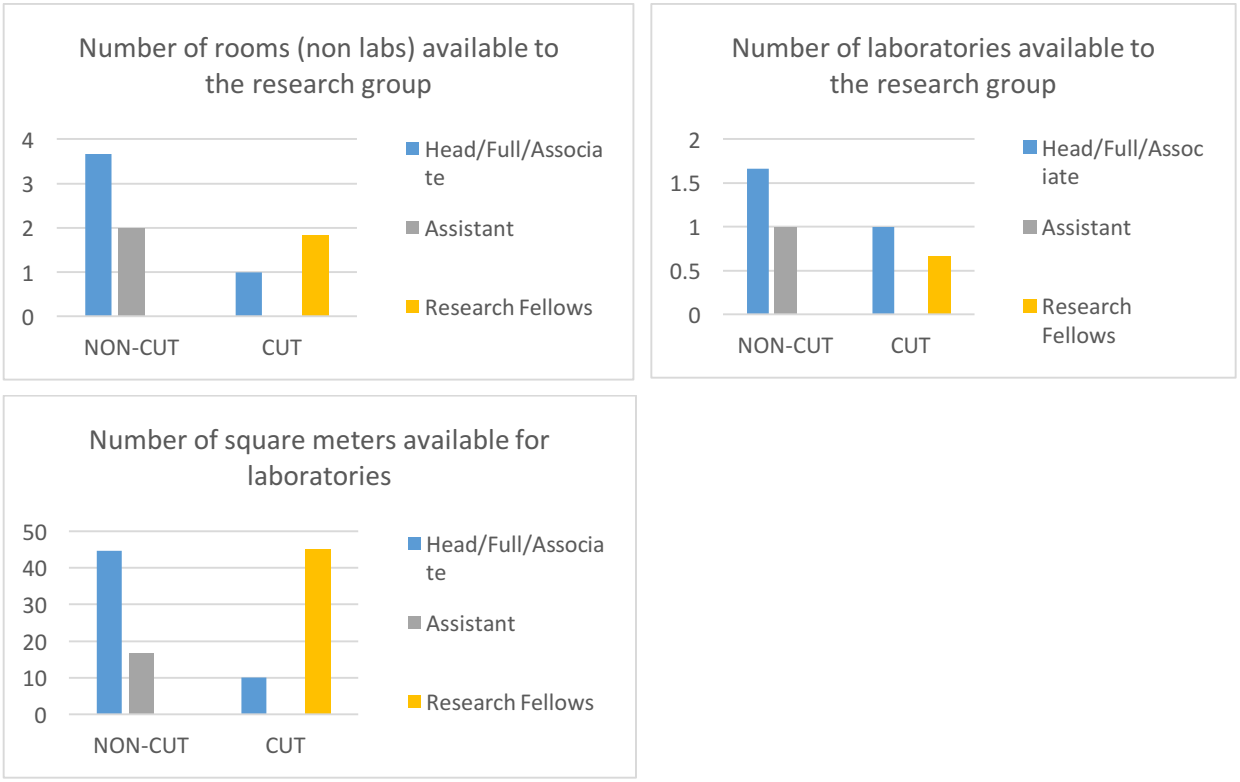


Figure 15. Part 6 histograms

Results shown in Figure 15 come from Part 6 of the questionnaire, which focused on infrastructure. Although CUT seems to follow NON-CUT institutions but in lower figures, NON-CUT institutions and particularly the leading partners will show through DESTINI how they can take advantage of a stronger infrastructure. Also, looking at the relevant data that cannot be shown through histograms, it can be noticed that NON-CUT institutions have easier access to hardware facilities (such as servers), but CUT can cope with this gap with the use of cloud services, which is already in place. CUT is a public university, and, as such, it relies solely on funding by the government of Cyprus. During the last seven years the economic crisis that affected the world had also a significant impact on CUT's governmental funding scheme which was significantly reduced, resulting in cut-downs in infrastructure investments as well.

GAP#5: Technical infrastructure for CUT is smaller and lighter than for other institutions. Again, this might be due to the different industrial and business ecosystem of Cyprus and the available budget of CUT invested to such infrastructure each year.

Finally, results shown in Figure 16 witness a higher interest of NON-CUT institutions in freely available datasets and “home-made” datasets, whereas the employment of private datasets is similar.

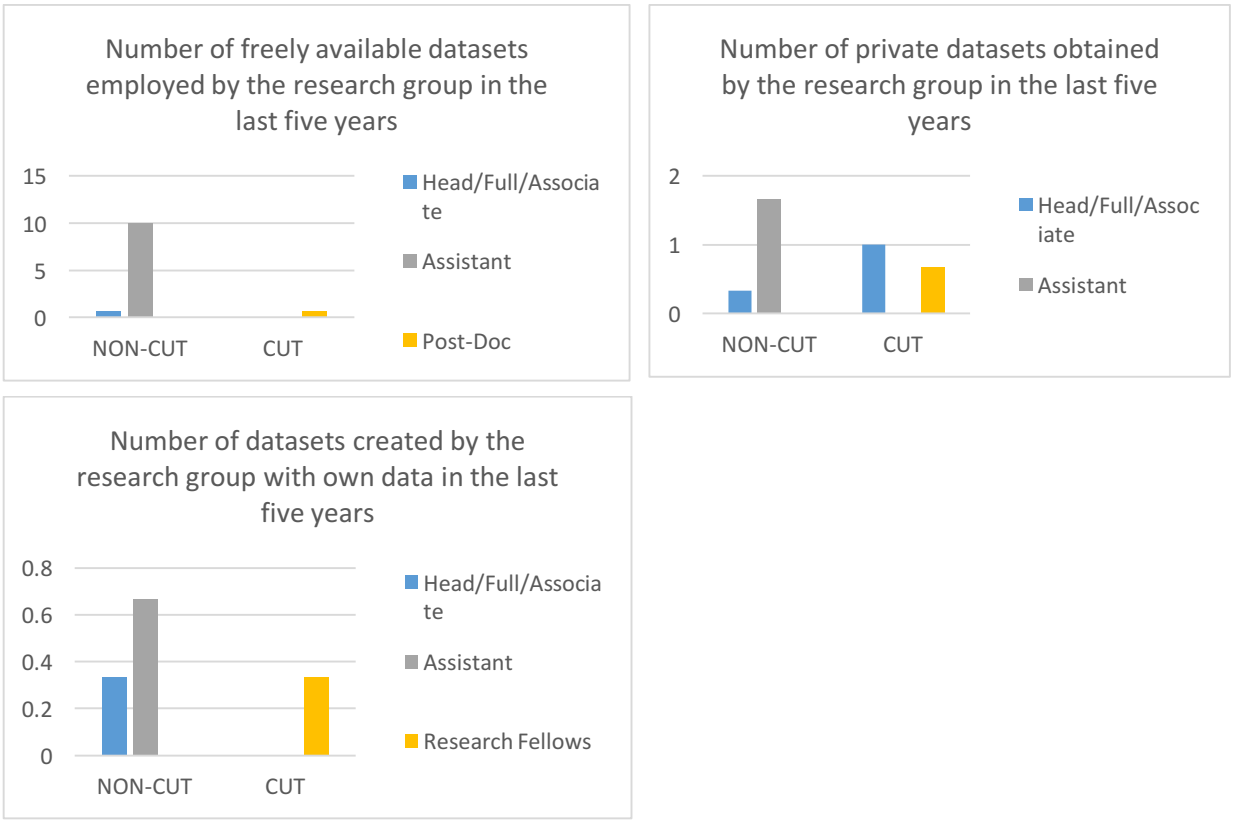


Figure 16. Part 7 histograms

GAP#6: CUT seems less aware of the importance of open datasets for modern research, especially in the topics of the JRAs. It is important that this consciousness is acquired, as it is crucial for production and acceptance of work in top venues, and repeatability of research results. In addition, the EC acknowledges the importance of open datasets, so this should be a primary concern for all modern researchers and of course of DESTINI.

5. SUMMARY - CONCLUSIONS

The present deliverable constitutes a report that describes in detail the gaps CUT exhibits in contrast to the international trends in the JRAs of interest. The deliverable essentially evaluates CUT's current research standing and potential, assessing also the capacity and manpower of the existing team, as well as the supporting technical infrastructure, and compares these with international standards in the area.

The deliverable was formed with the aid of a specially designed questionnaire that was distributed to different research groups in Europe. Through the different sections of the questionnaire it was made possible to collect data from both CUT and non-CUT respondents, form a baseline in different sections and aspects of research, teaching, administration and other activities, and then compare the findings.

The results suggested a number of different gaps and weaknesses in the widening institution which will be used as a strong guideline for performing transfer of knowledge and expertise from the leading institutions to CUT in accordance with the research and innovation agenda of DESTINI.