A4L_ACTIONS

Alliance for Life Sciences: From Strategies to Actions in Central and Eastern Europe

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D1.2 SELF-ASSESSMENT REPORT

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Alliance4Life

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1. EXECUTIVE SUMMARY

Alliance4Life is a bottom-up initiative of twelve leading life science institutions from eleven CEE countries that aims at closing the divide in European health research and innovation. Members of the Alliance are **progressive research institutions** that have the necessary strength to **stimulate institutional change**.

Large-scale ESIF investments into the life science infrastructure alone could not close the R&I gap in Europe so far, financial support needs to be complemented by **measures on research and innovation strategy at institutional and national levels**. Institutions gathered in this Alliance believe that improving governance and managerial practices as well as **transforming institutional culture** will enhance efficiency and increase return on investment.

Alliance members joined forces to share good practices in 2017 and successfully implemented their first Horizon2020 action during 2018-2019. Public outcomes of this project are available in the section Documents & Deliverables - "**Alliance4Life 2018-2019**". Currently the Alliance4Life implements its second project "**Alliance4Life_ACTIONS 2021-2024**". The current project focuses on raising the institutional profiles of Alliance4Life´s members to attract and retain international talents and to provide the right operational framework conditions including **improved research management**. Moreover, the goal is to help overcoming traditional national conditions inherited from the communist era that were neglected during the political transformation in the CEE region. Alliance4Life intends to become a **role model** for institutions in less performing regions and to serve as a **hub of excellence** through close collaboration with renowned European networks established in high performing countries. The alliance contributes also to **science policy and to shaping priorities at national and EU levels**, especially with insight suggestions on how to increase participation in the Framework Programme, by providing recommendations and feedback on **the new ERA and WIDENING** programme.

One of the key objectives of the A4L_ACTIONS project is to embed international scientific evaluation as a strategic management tool in CEE health research institutions. As the first step towards this objective, the **Alliance4Life elaborated a new comprehensive self-assessment study of the current research and innovation performance of its members**, as well as of **the progress in the implementation of their research management strategies**. The document presented in this Deliverable 1.2 offers, among others, a comparison between the baseline status (data from 2015-2017) reported during the first project of the Alliance4Life (No. 779303) and the new benchmark results of the current A4L_ACTIONS project (data for 2018-2020).

Traditionally, the assessment of research institutions as well as of individual researchers focuses on scientific achievements represented by the research outputs. This approach relies on **scientometric parameters**, such as number of publications, impact factor of the journals, in which they are published, number of citations to those publications, and H-index. However, it is now widely recognised that the metric oversimplification of the scientific achievements diverts researchers and institutions from deeper considerations of the **key qualities of their research work and culture**, such as academic rigor, data sharing, dissemination and transfer of knowledge and mentoring, i.e. supporting and motivating the next generation of scientists[1]. These approaches typically reward researchers and/or institutions

[1] https://pubmed.ncbi.nlm.nih.gov/34554086/, https://pubmed.ncbi.nlm.nih.gov/31797732/

having better access to resources and/or exploiting the evaluation system, and lead to prioritization of ranking over the goals for **societal impact of research, diversity, equity and inclusion**.

Understanding and tackling this complex problem at the institutional level is very challenging, especially in the need to comply with **national systems** of research evaluation that often emphasise metrics. Solution of this problem requires a **collaborative systems** approach that addresses the underlying **research culture, infrastructure, and conditions**, within which the assessment is conducted.

Partner institutions of the A4L_ACTIONS project are aware of these challenges and therefore, they decided to perform the assessment exercise taking into account all dimensions of the research activities. These include **SWOT analysis** of both internal and external conditions, **research culture, managerial practices, resources as well as responsible metrics** evaluated in the context of a quantitative **benchmarking study**.

The first step towards the complex assessment of the institutions participating in the A4L_ACTIONS project was their **self-evaluation using SWOT analysis**. This method shows an up-to-date picture about the situation and covers both internal analysis of perceived strengths and weaknesses, and external analysis of opportunities and threats that the institution considers as important for its further progress.

The most valued **strengths** articulated by the individual A4L_ACTIONS partners include the unique expertise of the key researchers, international collaboration, good management, access to grants, formulated strategy, access to education, good professional relationship with partners, and academic freedom.

The main internal **weaknesses** of the A4L_ACTIONS institutions include suboptimal internationalization, low competitiveness for prestigious grants, low synergy, weak cooperation with industrial sector, low attractiveness for incoming researchers, low ability to update infrastructure, weak support services. To some extent, weaknesses described here overlap with systemic threats and barriers that institutions are facing in their efforts towards progressive development and sustainability, as these two phenomena are mutually interconnected.

There are several commonly perceived **opportunities** for a progressive development of the A4L_ACTIONS institutions, such as new research funding schemes, national recovery plans, strategic partnerships, geographical position, presence of regional industry fitting life sciences, open labour market for the new generation talents, etc. In addition, Horizon Europe is clearly identified as an important window of new research opportunities to tackle the major societal challenges. The A4L_ACTIONS partners also consider the global COVID-19 pandemic as an opportunity for strengthening the quality and societal impact of their research.

In terms of main **threats**, all A4L_ACTIONS partners identified unpredictable and insufficient funding of research, high brain-drain, enormous bureaucracy in implementation of projects, as well as complicated and lengthy public procurement processes as major obstacles. These obstacles represent threats not only for the individual institutional progress, but also for closing the Research and Innovation gap in the European Union. The research institution and researchers do not have access to reasonable funds, new technologies, and rewards that would enable them to become competitive with their western counterparts. These barriers have specific roots and characteristics in each Central and Eastern European (CEE) country, but in general represent (at least partly) an undesired heritage of the previous political systems in this part of Europe. Unfortunately, also current decision makers focus mainly on immediate economic profits and only marginally consider recent and/or future benefits of research for quality of life and progressive development of the society. Expectation of high research

quality and excellent outputs are difficult to achieve in the absence of predictable and sustainable systemic support.

In order to get better insight into the functioning of the A4L_ACTIONS institutions and map the starting point of the future advances in research governance, the partners represented by the institutional managements responded to an online survey that contained set of questions related to **managerial practices.** The topics covered by the managerial survey included questions regarding implementation of processes and rules of **science evaluation and benchmarking**, **research integrity and ethics**, **internationalization of human resources and mobility**, **grant preparation and implementation**, **research infrastructure management** (core facilities), **technology transfer and IP management**, and **science communication**.

The survey has identified the A4L_ACTIONS partners whose managerial practices, rules and processes are on a high level, so that they can serve as best practice examples to the other partners who are on the way to build and/or improve in the above-mentioned fields. The A4L_ACTIONS project will further monitor how the closing of existing gaps proceeds and will further provide inspiration and help among partners especially via the concept of seven Focus Groups[2] of Alliance4Life.

As a next step of the self-assessment study, the **Surveys of perception of internal research culture** in A4L_ACTIONS partner institutions were accomplished with the aim to learn about the opinions of researchers, doctoral students, technical and administrative staff on working conditions, culture of relations and quality of research environment. The questions in the questionnaire were created on the basis of existing surveys carried out in the recent past by renowned foreign institutes in the field of science and research, in particular the **Wellcome survey on research culture** published in 2019 and 2020[3].

The survey performed by A4L_ACTIONS partners revealed **several key factors that need to be improved** to achieve a better quality institutional and research environment at Alliance4Life's partner institutions, which participated in the survey of the A4L_ACTIONS project: internal communication in solving problems and creating a research plan, performance evaluation with emphasis on quality, cooperation of leaders / superiors with doctoral students and team members, career plans for early career workers, trainings focused on management and skills development, administrative support for researchers, public procurement processes (through communication with the relevant state authorities and better setting up of internal processes).

Several findings of the respondents of the A4L_ACTIONS survey are **in line with the opinions presented by Wellcome** in their international survey. These are e.g. signs of a successful scientific career, pride in belonging to the scientific community, confidence in one's own abilities, importance of communication, presence of creativity in the work environment, dissatisfaction with performance evaluation, negative impact of metrics, importance of wellbeing in the workplace, insufficient funding as a research barrier.

On the other hand, there are also **clear differences in the perception of A4L_ACTIONS** respondents in comparison with the Wellcome survey participants, in the sense of higher job security, in higher confidence in management decisions, in the higher importance of obtaining projects, in the lower presence of unhealthy competition and in less fear to inform about cases of violation of standards and research ethics. Several circumstances negatively perceived in the environment of A4L_ACTIONS institutions are indeed a reflection of the governance and functioning of the **systems of research**

[2] https://alliance4life.ceitec.cz/focus-groups/

[3] https://wellcome.org/reports/what-researchers-think-about-research-culture , https://cms.wellcome.org/sites/default/files/what-researchers-think-about-the-culture-they-work-in-quantitative-research.pdf, https://www.shift-learning.co.uk

governance in the CEE countries, identified by Alliance4Life's partners as major barriers and threats of their sustainability and development in their SWOT analyses. These include **suboptimal funding, high administrative burden and a lack of time for creative activity**, which is the most highly valued attribute of research.

The fourth part of the self-assessment study is the **quantitative benchmarking study**, which was used to evaluate quantitative parameters of the outputs/achievements in five domains: **research excellence, knowledge transfer, funding and grants, human resources, and core facilities** and/or special infrastructures.

The benchmarking results presented here and understood also in the context of SWOT analysis, survey on managerial practices and survey on institutional culture clearly show that **the best performing partners in terms of research outputs work in the environment of relatively well functioning national systems, well implemented practices of institutional management and well-developed internal research culture.** This analysis also demonstrates that most of the A4L_ACTIONS partners are aware of the challenges of building institutional environment that enables excellent research. Despite objective barriers and threats, all A4L_ACTIONS partners can demonstrate very good research achievements that reflect their endeavours and deep interest for improvement. This is particularly visible when comparing the outputs of the period of 2018-2020 with the outputs of the preceding period of 2015-2017. However, it has to be taken into account that the year 2020 was affected by the COVID-19 pandemics, which interfered also with research activities.

To our knowledge, **this is the first Self-assessment Report** based on a complex evaluation **of the benchmarking indicators combined with the elements of research culture, which was elaborated by the research institutions in the CEE region** by the so-called EU-13 countries that have joined the European Union since 2004, are mostly are located in the CEE region and belong to the WIDENING countries. It is important to note that this report results from the inherent motivation of the A4L_ACTIONS partners to assess their own performance in the context of similar institutions of the CEE area using consolidated assessment structure and indicators as well as to share experiences and good practices. This approach offers **benefits to all stakeholders**, including Alliance4Life´s partner institutions themselves through **identification of strategic instruments and clear formulation of specific actions** towards further institutional development, national policymakers to understand correlations between science policy and level of research excellence achievable in particular national environment, and **the European Commission** representatives to get insight into **realistically available opportunities as well as barriers for closing the research and Innovation gap** in the EU and to consider whether and how to translate this information into the **strategic decisions affecting the future of ERA**.

2. SWOT ANALYSIS

2.1 INTRODUCTION

The first step towards the assessment of the institutions participating in the A4L_ACTIONS project was their self-evaluation using SWOT analysis. All partners were asked to identify attributes and factors that are expected to shape their sustainability and development.

It was very important to gain overview on the conditions, in which partner institutions exist and operate, to understand barriers that prevent or complicate their progress and on the other hand, to exhibit their best practices and their creative approaches to opportunities available in their country as well as in the European and/or global research area.

The following A4L_ACTION partners participated in the survey: MU CEITEC, BMC SAV, MUL, UZSM, VU, LIOS, UL, (Faculty of Medicine), MUS and UMFCD. The statements that were mentioned by the majority of participating partners are listed in this document. The main findings of the SWOT analyses conducted by the A4L_ACTIONS institutions were extracted into word-clouds, in order to define common typical characteristics with possible major impacts on performance of research institution in the whole CEE region.

2.2 RESULTS

2.2.1 STRENGTHS

(Analysis of internal advantages, which are under internal control of the institution and can be used for future strategies, e.g. uniqueness, competencies, skills, capacities, resources, reputation, management, partnerships, etc.)

The most valued strengths reported by the A4L_ACTIONS partners include the unique expertise of the key researchers, international collaboration, good management, access to grants, formulated strategy, access to education, good professional relationship with partners, and academic freedom. This is in line with the attributes identified in the survey on managerial practices as well as in the anonymous institutional surveys described in the next parts of the D1.2 deliverable.

- Good national reputation for scientific outputs and engagement in important societal activities
- Strong tradition in biomedical research balanced with new ideas-driven research
- Highly qualified research staff including top national scientists with international recognition
- Highly motivated young researchers
- Good success rate in funding from national grant agencies
- Long-lasting international collaborations and projects funded from EU
- National and international strategic partnerships including Alliance4Life
- Regular internal evaluation across various activities and levels of governance / evaluation system based on independent international peer review
- Quality of research continuously improving over the recent years
- Growing collaborative research culture in order to pursue interdisciplinary research
- Ethical principles, research freedom, accountability, non-discrimination embedded in institute's culture
- Institutional culture supporting lifelong learning and work-life balance with many educational and social events

- Professional services: PR and event management, PhD school support, postdoc platform, grant administration office, core facilities management, HR award, recruitment policy, Welcome services
- Well-functioning administration departments
- Working environment based on open communication, strong focus on internal communication
- Research environment supporting networking

2.2.2 WEAKNESSES

(Analysis of internal barriers and limitations, which are under control of the institutions to be improved, e.g., gaps in skills, knowledge and infrastructure, low staff motivation and involvement etc.)

The main internal weaknesses of the A4L_ACTIONS institutions include low competitiveness for prestigious grants, suboptimal internationalization, low synergy, weak cooperation with industrial sector, low attractiveness for incoming researchers, low ability to update infrastructure, weak support services. To some extent, weaknesses described here overlap with systemic threats and barriers that institutions are facing in their efforts towards progressive development and sustainability, as these two phenomena are mutually interconnected.

- Lack of willingness to step outside of the comfort zone of one's own discipline
- Relatively few researchers able to succeed in competition for prestigious international grants and low number of successful EU projects in the position of coordinator
- Suboptimal success in publishing research results in premium high-impact journals
- No structured approach to talent search
- The entrepreneurial skills of students needing further development, unexplored innovation potential within the research groups and Insufficient experience in establishing spin-off companies
- Slow implementation of the system of core facilities
- Limited long-term, high-risk high-gain research due to research funding structure
- Low international visibility of Research Programmes
- Suboptimal support of researchers at the stage of grant writing and implementation, insufficiently developed PR services, lack of professional Welcome office
- Low attractiveness of the institution for postdoc positions
- Existing educational curricula lacking emphasis on interdisciplinary research
- Insufficient support system for students' mental health
- Insufficiently harmonised alumni activities
- Underrepresented female staff in senior positions

2.2.3 OPPORTUNITIES

(Analysis of external environment, i.e. of positive external conditions that the institution shall take into consideration for its future development strategy. It may be trends in research policy, in the markets, opportunities of legislature and funding such as grant opportunities, opportunities based on collaborations and strategic alliances, etc.)

There are several commonly perceived opportunities for a progressive development of the A4L_ACTIONS institutions, such as new research funding opportunities, strategic partnerships, geographical position, presence of regional industry fitting life sciences, national recovery plans, open labour market for the new generation of talents, etc. In addition, Horizon Europe is clearly identified as an important window of new research opportunities to tackle major societal challenges. The

A4L_ACTIONS partners also consider the global COVID-19 pandemic as an opportunity for strengthening the quality and societal impact of their research in Life Sciences.

- National Plans of recovery and resilience, which include research as one of priorities
- Healthy society among the smart specialization domains
- Horizon Europe with new research opportunities to tackle major societal challenges
- Transformation of international recognition to the strong international collaborations and development of strategic partnerships with leading European partners including universities and companies
- Increase in innovation and commercialization of research results through cooperation with business
- Proactive communication with the government, policymakers and other stakeholders with impact on research policies / Participation in research and innovation policy making process
- Concentration and centralization of research facilities (if not already existing)
- Growing awareness of the regional government about the importance of research and innovation for the future development of the region, including RRF plans and RIS3 strategies
- Membership in Alliance4Life providing opportunities for improvement of managerial practices, in part using skills and good practice examples provided by the A4L_ACTIONS projects and gained through exchange of ideas with the partner institutions
- Global pandemic has shown strength and importance of research in Life Sciences and opened opportunities for their further development in order to achieve better preparedness for upcoming crises

2.2.4 THREATS

(Analysis of external environment, i.e. of negative external conditions, barriers and risks that the institution shall take into consideration for its future development strategy.)

All A4L_ACTIONS partners identified unpredictable and insufficient funding of research, high brain drain, enormous bureaucracy in implementation of projects, as well as complicated and lengthy public procurement processes as major obstacles in closing the research and innovation gap in the EU. The research institution and researchers do not have access to reasonable funds, new technologies, and rewards that would enable them to become competitive with their western counterparts. These barriers have specific roots and characteristics in each CEE country, but in general represent (at least in part) an undesired heritage of the previous political systems in Central and Eastern Europe. Unfortunately, also current decision makers focus mainly on immediate economic profits and only marginally consider recent and/or future benefits of research for quality of life and progressive development of the society. Expectation of high research quality and excellent outputs are difficult to achieve in the absence of predictable and sustainable systemic support. However, in this context it has to be mentioned that also scientists and research managers have their responsibility for current situation and need not only to raise their voices and consistently explain the importance of research to policymakers, but also keep guard on strengthening the rigor and quality of research and fostering the translation of the research-generated knowledge to the real-life applications.

- Research funding significantly lower in CEE countries compared to their Western EU counterparts (research and development expenditure in % GDP much lower that the EU average, in the range of 0.5-1.95[4], median 0.97)
- National funding of research projects fragmented and often unpredictable, and very strong dependency on that funding due to low ratio of institutional vs. competitive research funding
- Low resources for investments into update or sustainability of the research infrastructure, resulting in slow implementation of frontier technologies

[4] https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?locations=EU

- Low salaries in research sector leading to low attraction/stabilization of talents and brain drain – high competition in labour market and attractiveness of higher wages outside academia for skilled personnel including administrative and technical positions
- Further reduction of financial sources on national level for research and innovation due to the impact of pandemic on public budgets
- Complicated and lengthy public procurement and related control processes, not compatible with the needs of effective research (reflecting neither high diversity of research products, nor requirements of specific research products for particular experiments)
- Absence of national funding and/or reward system for excellent teams and researchers, or research excellence not recognised due to non-transparent policies
- Few national industrial partners for biomedical applications and/or reprioritization in major international corporations (e.g. moving away)
- Insufficient international recruitment and incoming mobility / Weak internalization due to complicated national admission system and lower life standards
- Lack of strong research policy on the state level – weak application of declared priority for knowledge-driven development
- Lack of national research & innovation strategies with prioritization and concertation of research capacities including sustainability of centres of excellence (re-investment in the long-term, extremely costly technologies)
- Excessive bureaucracy related to research management, reports, accounts, etc. on the state level and rigid rules of funds disposal
- Low to non-existent support for patenting research outputs – lack of skills for negotiation with companies, complicated processes of establishment of spin-offs etc.
- Lack of experienced Technology Transfer professionals
- Lack of locally available venture capital for high-risk research and innovation.

2.3 CONCLUSION

In summary, SWOT analyses conducted as a part of the self-assessment exercise uncovered important competencies and prospects as well as weak points and vulnerabilities of the A4L_ACTIONS partners. Despite certain general findings, each partner claimed specific external and internal factors and circumstances that affect its current functioning and strategic planning. It is apparent that the partners operate in distinct national environments ranging from more research-supportive to less research-friendly. These environments, together with internal culture, can be addressed by effective managerial practices that would improve the research governance and the scientific performance at the institutional level. This view is in line with the mission of the A4L_ACTIONS project.

Details of the managerial practices in the A4L_ACTIONS institutions are described in the following part of the D1.2 deliverable.

3. MANAGERIAL PRACTICES

3.1 INTRODUCTION

Scientific research has resulted in enormous technological advances and has contributed to an unprecedented understanding of the natural world. Speed of the new discoveries and depth of the new knowledge is steadily increasing, but much of this progress goes hand-in-hand with increasing competitiveness, investments, pressure to publish original findings and/or protect IP, and to fight for talents and top-level partnerships. Such development of research endeavour naturally requires not only well-structured and sufficiently nurturing resources, but also the governance practices that support excellence, creativity, and generate appropriate working conditions, motivating researchers to high performance. However, this constellation is difficult to achieve in the CEE countries, that still have not fully implemented their economic, political and cultural transformation after the introduction of a new societal establishment more than 30 years ago. It is apparent that in the majority of these countries, societal prestige, acceptance by policymakers and funding of research lack behind the more advanced European countries in many aspects. Despite these objective disadvantages, A4L_ACTIONS partner institutions decided to contribute to the development of a progressive research governance and to support excellent researchers by improving their internal culture and implementing good practices of the research management into their institutional environment.

In order to get better insight into the functioning of the A4L_ACTIONS institutions and map the starting point of the future advances in research governance, the partners represented by the institutional managements responded to an online survey that contained set of questions related to managerial practices, as it was specified in the deliverable D1.1 Self-assessment report template. These managerial practices concern seven fields of the institutional operation. They resulted from the previous Alliance4Life project, specifically from the deliverable D2.2 Inventory of Best Practice[5] issued in January 2019. This means that the below stated findings about the current situation give an overview if and how the recommended best practices have been implemented by the A4L_ACTIONS partners up to now.

The following A4L_ACTIONS partners participated in the survey: MU CEITEC, ICRC, BMC SAS, MUL, UZSM, UT, VU, LIOS, UL (Faculty of Medicine), MUS and UMFCD. The numbering of the partners was anonymised and consistently used throughout the entire document of the deliverable D1.2.

3.2 RESULTS

The topics covered by the survey included questions regarding implementation of processes and rules of:

1. Science evaluation and benchmarking
2. Research integrity and ethics
3. Internalization of human resources and mobility
4. Grant preparation and implementation
5. Research infrastructure management (core facilities)
6. Technology transfer and IP management
7. Science communication

[5] https://alliance4life.ceitec.cz/inventory-of-best-practice/

Each topic contained 6-9 questions (see the template in Appendix A on page 14 of the Deliverable D1.1). Responses to particular questions were provided in binary form (response yes = 1, response no = 0) in order to allow for calculation of % positive (and partially positive) responses for each group of questions and for rating an overall status of the respective topic as well as individual questions covered by that topic.

The questions asked whether certain managerial practice was fully in place before the implementation of the first Alliance4Life project – with positive response "Yes before", or whether it has been fully introduced based on a good practice identified during the previous project of the Alliance4Life – with positive response "Yes A4L", or whether it is in the process of implementation – "In progress", or not implemented at all – "No". It has to be noted here that two of the A4L_ACTIONS partners did not participate in the previous Alliance4Life´s project, so they did not have access to the recommendations of best practices before.

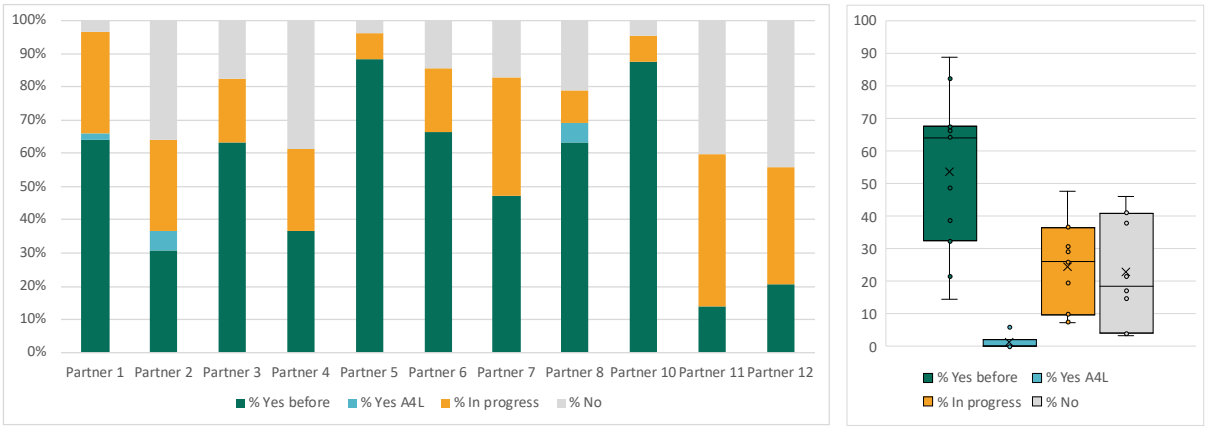


Figure 3.1
Overall percentage of responses (Yes before, Yes A4L, In progress, No) to all questions in the survey, given by each of A4L_ACTIONS partners (left, column graph), or together by all partners (right, box plot with interquartile range and indicated median —and average x).

The graph on the left side of the Figure 1 shows an average of responses, which A4L_ACTIONS partners provided to all questions in the survey. It is evident that proportion of "Yes, before A4L" responses was most frequently given by the partners 5 (89 %) and 10 (82.2 %), followed by the partners 6 (67.7 %), 3 (66.2 %), 8 (65.4%), and 1 (64.3%). The other partners still have quite a big space for improvements. Interestingly, the partners 1, 2 and 8 have already introduced several good practices based on the inspiration gained during the previous project of the A4L consortium. Median value of "Yes" responses corresponds to 57 % and average to 52.6 %, for "No" responses median value is of 20 % and average of 24.7 %.

Looking at the results of the survey from the viewpoint of particular topics, the best compliance is visible in the practice of the science evaluation and benchmarking, with the average of 76,2 % "Yes" responses, while the other topics are implemented to a lower degree and offer considerable opportunities for introducing good practices. However, some of them appear to be already in progress as indicated by the responding A4L_ACTIONS partners.

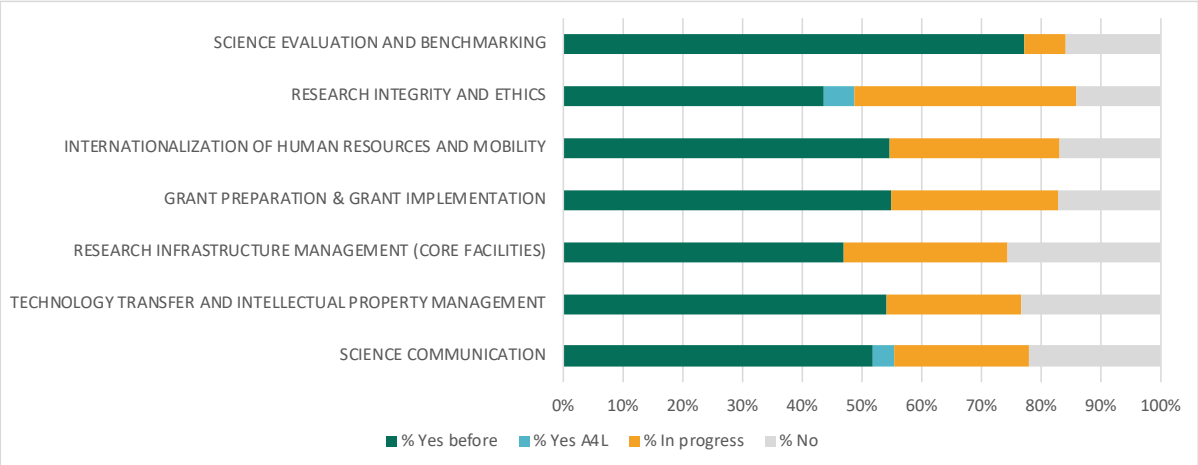


Figure 3.2
Average percentage of responses to questions included in the survey topics by all partners.

Graphical illustration of yes responses by the survey respondents (including both "Yes before" and "Yes A4L", Figure 3) confirms the differences in the degree of implementation of managerial practices among the A4L_ACTIONS partners.

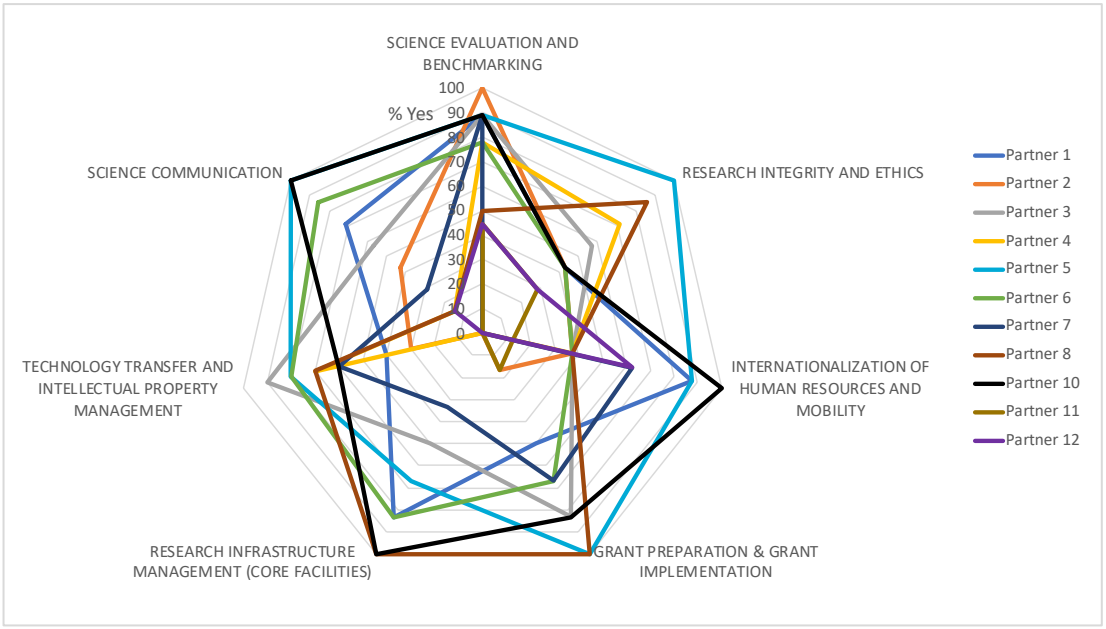


Figure 3.3
Radar graph illustrating an average percentage of "Yes" responses by each A4L_ACTIONS partner participating in the survey to the topics of managerial practices. Individual partners are discriminated by colors as depicted in the legend.

The differences are more apparent upon graphical illustration of "No" responses. The gaps that need to be closed are particularly in the topics of science communication, technology transfer and management of research infrastructure.

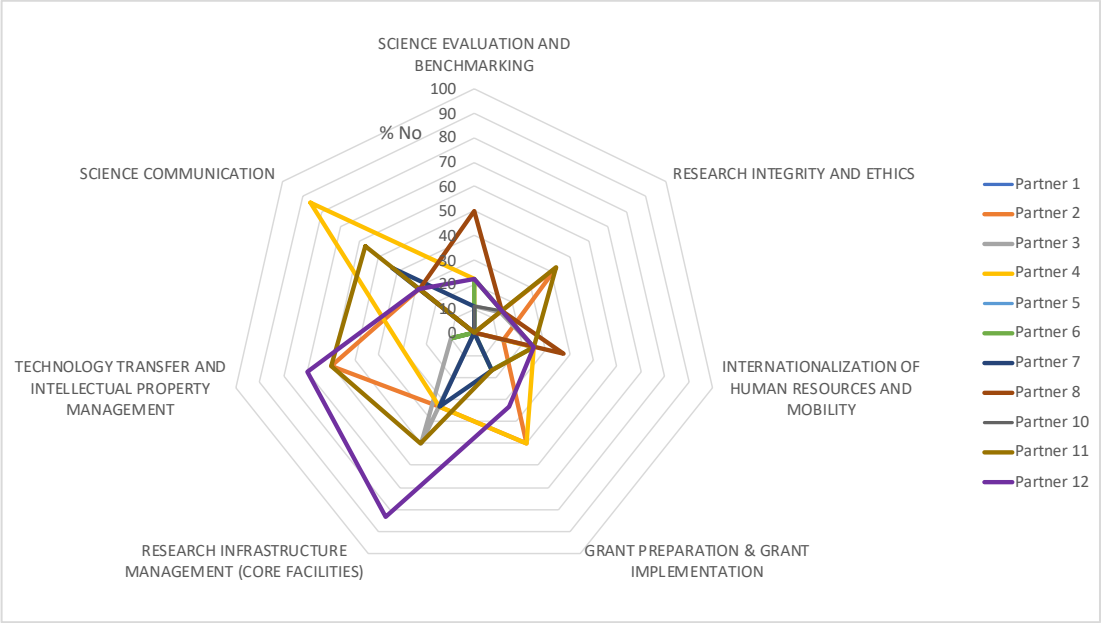


Figure 3.4
Radar graph illustrating an average percentage of "No" responses by each A4L_ACTIONS partner participating in the survey to the topics of managerial practices. Individual partners are discriminated by colours as depicted in the legend.

In order to understand the specific opportunities for advancements, each topic was analysed in detail, as described below.

3.2.1 SCIENCE EVALUATION AND BENCHMARKING

Science evaluation and benchmarking are key instruments for the assessment of the quality of research performed by the institutions, research teams and/or individual researchers. They are used to direct science policy, define promising research directions, identify excellent research groups, award funding, recruit researchers or promote them into leading and/or managing positions.

The evaluation and benchmarking approaches traditionally rely on scientometric proxies, such as journal impact factors and quartiles, citations, and H-index, which are often believed to represent research excellence. In fact, metrics, if not misused and if applied properly, can be a useful guide to various decisions. However, it needs to be supplemented by an independent peer review that is performed regularly, in a well-defined and transparent way.

The topic of science evaluation is now widely discussed in the research community and stakeholders, at different platforms (such as Science Europe[6]), and in scientific journals, including Nature[7], with general consensus that the scientific excellence is difficult to define, but the research evaluation based on certain basic principles going beyond metrics is inevitable for understanding the value and contribution of the research institutions to development of the society[8].

[6] https://www.scienceeurope.org/our-priorities/research-assessment/?fromprevious=1559
[7] https://www.nature.com/articles/d41586-018-02183-y, https://www.nature.com/articles/544411a, https://www.nature.com/articles/538453a
[8] https://academic.oup.com/spp/article/45/5/731/4858431

In this context, the A4L_ACTIONS partners were asked whether they undergo regular external or internal evaluation including independent peer-review process, whether evaluation includes benchmarking, whether bibliometric analysis takes into account the type of authorship and whether there are transparent rules/guidelines for the entire procedure (Table 3.1).

Table 3.1

Overview of the feedback of A4L_ACTIONS partners to the questions related to science evaluation and benchmarking at their institutions. Reponses "Yes before" are indicated by dark green colour and are assigned a value 1, responses "In progress" are indicated by orange and assigned by a value 0.5, and responses "No" are in light grey with 0 value. Final score of the feedback to individual questions corresponds to the sum of values of all related responses.

1. SCIENCE EVALUATION AND BENCHMARKING	1	2	3	4	5	6	7	10	11	12	SCORE
The evaluation is being organized regularly at least every 6 years (relates to internal and/or external evaluation)											10
The evaluation is being organized regularly with frequency more than every 6 years											4
The evaluation includes an independent peer review											10
The evaluation is performed by ISAB, i.e., the scientific advisory board has international members											5,5
The bibliometric analysis supports the quality of publication performance, i.e., the quality of publications is assessed by a position of the journal in Tier (T) or Quartile (Q)											9,5
For the bibliometric analysis, type of authorship is taken into account, i.e., first, corresponding, or co-authorship											8,5
The evaluation includes benchmarking with other institutions											7,5
Indicators and mechanisms of data collection and processing are well defined and described. i.e., guidelines exist											9
The possible consequences of the evaluation results are known to everybody in advance, i.e., transparent rules exist											9

From the majority of "Yes before" responses it is evident that science evaluation has been an important component of the management practices in the A4L_ACTIONS institutions already before entering the first A4L project. All partners but one perform it regularly at least once per 6 years either via an external assessment organized by their parent institutions or via an internally organized assessment. In all of these cases, the evaluation includes an independent peer review, but only five partners are regularly evaluated by the international scientific advisory board. In majority of partners, the bibliometric analysis takes into account the quality of publications by the assessment of the journal position (Tier or Quartile), author position (first or corresponding) and also benchmarking with the other institution of the similar type. Finally, the rules of assessment are claimed to be well defined and applied transparently. Some partners do not have regular periodic institutional evaluation of research groups. However, even in such cases the research groups are regularly assessed by the grant provider of basic funding (e.g. every 5-6 years). In addition, researchers are being evaluated by the external reviewers whenever they apply for grants from the national research agency. In both cases the evaluation includes quantitative and qualitative assessment. Moreover, the academic staff is evaluated regularly (~3-5 years depending on the position) for extension of an academic position or for promotion. This individual evaluation includes bibliometric analysis, as well as qualitative assessment by a group of experts, which include external members. Managerial practices of all the other A4L_ACTIONS partners also include these individual assessments as a part of the staffing policy.

A large number of the EU Member States have implemented a performance-based research funding system, with the allocation of institutional funding based on ex post assessment of the research performance. However, the characteristics of the funding schemes differ by the volumes (including diverse ratio of institutional to project funding), principles of allocation as well as adoption of metrics versus per-review approaches[9]. This results in substantial heterogeneity of national conditions for research execution that then clearly translate into the opportunities for research excellence and innovation as also witnessed in the SWOT analysis provided in the first part of this deliverable D1.2 Self-assessment report.

[9] https://academic.oup.com/spp/article/46/1/105/5037253

3.2.2 RESEARCH INTEGRITY AND ETHICS

In the debate about attitudes to science evaluation and attributes of research excellence, increasing emphasis is given on societal impact and relevance of research and its integrity[10]. The latter aspect is becoming more important with increasing pressure to publish and to enhance the production of research outputs in order to receive funding, get positions in high-profile institutions and promote to leading positions at own institution. This highly competitive research environment may lead to adoption of different strategies enabling to reach the goals by unethical practices both at the level of individuals and institutions, especially when the resources for research funding are scarce. One of the undesired effects of this behaviour is reproducibility crisis of the current research, which especially in Life Sciences can have devastating consequences for translation of knowledge to the pharmaceutical and clinical applications. Therefore, it is imperative to prevent and counteract these undesired phenomena by systematic approach at the institutional level. It is important to fully implement recommendations of the European Code of Conduct for Research Integrity and good practices into the daily life of the research institutions and regularly inform/educate researchers about this topic. In addition, institutional rules have to be well accessible to all employees and procedures of dealing with ethical problems need to be well defined and transparent.

Research integrity is important for researchers themselves to trust each other, for their institutions not to waste resources, but it is also mandate for maintaining public confidence in researchers and research evidence, which is crucial particularly in the situations such as current pandemics[11].

Therefore, this survey topic included questions concerning the availability of ethics committees, research integrity officers/consultants, procedures for handling research integrity cases, courses on research ethics/integrity available at the institutional level, quality raining materials, consultancy on ethical issues for grant writing, SOPs for avoiding conflicts of interest, and ethics review including social science research methods (Table 3.2).

Table 3.2

Overview of the feedback of A4L_ACTIONS partners to questions related to research integrity and ethics management at their institutions. Reponses "Yes before" are indicated by dark green colour and are assigned a value 1, responses "Yes A4L" are indicated by blue colour and also assigned by a value 1, responses "In progress" are indicated by orange with a value 0.5, and responses "No" are in light grey with 0 value. Final score of the feedback to individual questions corresponds to the sum of values of all related responses.

2. RESEARCH INTEGRITY AND ETHICS	1	2	3	4	5	6	7	8	10	11	12	SCORE
My institution has established a Research Ethic Committee (REC), or introduced research integrity officers/consultants for review of research integrity cases												10
My institution has implemented transparent and clear procedures for handling research integrity cases												9,5
Courses on research ethics/research integrity are available at institutional level												6,5
Quality training materials exist, i.e., EU guidelines/manual/e-books for REC members												6,5
REC provides consultancy on ethical issues also for grant writing												4,5
Standard operating procedures are defined that include a clear set of rules for avoiding institutional and personal conflict of interest												7,5
The scope of ethics review is broad and includes also social science research methods												7

Overall, the managerial practices addressed in this topic are incompletely implemented, but many of them are in progress as declared by the responses of A4L_ACTIONS partners. The best managerial practices were reported by the partner 5 (with positive responses to all questions), partner 8 (with positive responses to all but one question) and partner 4 (five "Yes" and two "In progress" responses).

[10] https://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf, http://path2integrity.eu: Promoting Excellence in Research - Path2Integrity

[11] https://www.scienceeurope.org/our-resources/seven-reasons-to-care-about-integrity-in-research

The other partners need to make further efforts to implement this important aspect of research more thoroughly. They will have the opportunity to learn from good practices and improved their skills through trainings available in the A4L_ACTIONS project. However, it should be noted that majority of the A4L_ACTIONS partners have reported existence of ethical committees at different levels (national, parental institution, own institution and its divisions), and of different types (regarding rules of authorship, rules of responsible experimental practice, rules of good pre-clinical and clinical research etc.). Evidently, this topic has received serious attention of the partners and will be further developed in the A4L_ACTIONS institutions.

3.2.3 INTERNATIONALIZATION OF HUMAN RESOURCES AND MOBILITY

Human resources (HR) management has become one of the most challenging issues in research governance particularly in CEE countries that suffer from brain drain and thus have to manage also stabilization and attraction of their own talents. Recruiting and retaining qualified and skilled academic staff becomes vital for high quality research. Internalization of the human resources and mobility of researchers represent an element of an institutional HR strategy that has a potential to bring new skills, ideas, knowledge and culture that is beneficial for the research institution, as evidenced by the experiences from the real life.

There are numerous means, by which HR management can support research staff development and make the research career more attractive for qualified personnel, including mechanisms of recognition and reward, promotion, funding, guidance, enabling work-life balance, stimulating mobility and facilitating internalization. The latter can be achieved through creating supportive environment such as welcome services, communication, availability of the documents and institutional rules in English, and accepting diversity along with promoting inclusiveness. This requires not only managerial interventions, resources, but also cultural changes at the institutional level accepted by the research teams as well as individual researchers.

This survey topic asked how these challenges are approached in A4L_ACTIONS partner institutions, in particular, whether English is the primary language of internal communication and of important documents, whether website is completely or partially available in English, whether recruitment of new staff proceeds in English, whether there is welcome and on-boarding support by dedicated personnel (Table 3.3).

Table 3.3

Overview of the feedback of A4L_ACTIONS partners to questions on HR management of internalization and mobility at their institutions. Reponses "Yes before" are indicated by dark green colour and are assigned a value 1, responses "In progress" are indicated by orange with a value 0.5, and responses "No" are in light grey with 0 value. Final score of the feedback to individual questions corresponds to the sum of values of all related responses.

3. INTERNATIONALIZATION OF HUMAN RESOURCES AND MOBILITY	1	2	3	4	5	6	7	8	10	11	12	SCORE
English is the primary language of internal communication at my institution												3,5
Important documents are being prepared or translated into English												8
Meetings with at least one foreign employee are held in English												9,5
Institutional website is completely available in English												8,5
Institutional website includes at least sections in English with the most relevant and important information												11
Recruitment of all positions, including administrative and technical positions, includes the requirement of a certain level of oral and written English												7,5
"Welcome Office" exists to assist researchers coming from abroad												7
"On boarding" for new employees exists, i.e. guidelines on how to navigate in the organization, information about employee rights and duties, about scientific career development and trainings etc.												5,5

The best practices in managing internalization and mobility were reported by the partner 10 (with positive responses to all questions), partner 1 (with seven "Yes" and one "In progress" responses) and partner 5 (seven "Yes" and one "No" responses). The other partners have some practices implemented and some in progress. From the point of view of individual questions, the lowest score was recorded for the question asking about English as the primary language of internal communication, which was responded positively by only three A4L_ACTIONS institutions. Several partners claimed that this is not fully practicable due to legal requirements for the use of national language in all relevant documents and procedures. However, this certainly does not preclude translation of main institutional documents and research presentation into English and thus facilitate participation of foreigners in the institutional activities. Therefore, there are still opportunities for improvements.

3.2.4 GRANT PREPARATION AND IMPLEMENTATION

Preparation and writing good research projects in a raising competition for funding is a sort of the art in science[12]. The project proposal has to be innovative, intelligible, with ambitious but achievable objectives, with balance of high risk–high gain and with the clear line composed into a story leading from existing knowledge and preliminary data to a new knowledge or innovative output. The originality aspects and expected impact need to be sufficiently emphasised to support the importance of the planned research. All these desired project proposal elements are not easy to put together and this process requires time, dedication as well as certain expertise and experience.

When the project proposal receives funding, its implementation is equally challenging, especially in the highly bureaucratic systems prevailing in CEE countries, where researchers face administrative barriers at different points of their research activities, such as complicated and lengthy procedures of public procurement and rigid rules of budget operations, as mentioned above in the SWOT analysis.

Thus, it is very important to develop and employ managerial practices providing professional support to researchers in the grant preparation and implementation. This topic of the survey asked to what extent this support is available at the A4L_ACTIONS institutions. The questions were related to grant offices or units dedicated to assistance with project proposals in pre-award and projects in post-award phases, or external services providing this support, existence of guidelines for researches, motivation schemes and/or support for submitting project proposals for prestigious national and international grants (Table 3.4).

Table 3.4

Overview of the feedback of A4L_ACTIONS partners to questions on grant preparation and implementation support at their institutions. Reponses "Yes before" are indicated by dark green colour and are assigned a value 1, responses "In progress" are indicated by orange with a value 0.5, and responses "No" are in light grey with 0 value. Final score of the feedback to individual questions corresponds to the sum of values of all related responses.

4. GRANT PREPARATION & GRANT IMPLEMENTATION	1	2	3	4	5	6	7	8	10	11	12	SCORE
For grant support, one or more centralized grant offices (GO) exist, i.e., departments or units dedicated to grant support												10
Specialized GO departments exist for pre-award and post-award phases												6,5
My institution uses services of external agencies or advisers for grant support												5
Grant preparation processes and guidelines for researchers have been defined and described												8,5
Some kind of motivation to submit international and prestigious national grants is in place, e.g. scheme for re-submission of promising proposals, benefits for successful applicants etc												7,5
Some kind of support for preparation of international and prestigious national grants is in place, e.g. financial support, availability of external advisers etc.												7

[12] https://www.nature.com/articles/d41586-019-03914-5

Two A4L_ACTIONS partners, namely the partner 5 and the partner 8 responded positively to all questions, suggesting that their researchers can benefit from professional support in both writing project proposals and implementing funded projects. Additionally, the partners 3, 6, 7 and 10 provide similarly complex support using mostly or entirely the expertise of the internal personnel (partner 6 uses the NCP services). The other partners have this support less established and its further development will require additional resources as well as additional expert personnel.

3.2.5 RESEARCH INFRASTRUCTURE MANAGEMENT (CORE FACILITIES)

Management of research infrastructure and concept of core facilities are gaining increasing importance with technological advances and with a higher use of expensive technical equipment that requires operation by highly skilled scientific personnel[13]. This is clearly evident in Life Sciences, where research depends on large investments into complex instruments to allow for acquisition of new knowledge. Especially in situations of scarce resources, effective management of existing research infrastructure, optimally in the form of core facilities, is a key factor in securing its sustainability.

The survey maps the situation in A4L_ACTIONS institutions asking whether the institutions possess model of specialized service-oriented core facilities, with rules of management and operation, guidelines for evaluation, cost model and booking system (Table 3.5).

Table 3.5
Overview of the feedback of A4L_ACTIONS partners to questions related to management of research infrastructure at their institutions. Reponses "Yes before" are indicated by dark green colour and are assigned a value 1, responses "In progress" are indicated by orange with a value 0.5, and responses "No" are in light grey with 0 value. Final score of the feedback to individual questions corresponds to the sum of values of all related responses.

5. RESEARCH INFRASTRUCTURE MANAGEMENT (CORE FACILITIES)	1	2	3	4	5	6	7	8	10	11	12	SCORE
The model of specialized service-oriented core facilities (shared laboratories) has been introduced in order to concentrate costly equipment and provide access and services to internal and external users												8,5
Rules of management and operation of core facilities exist												8
Evaluation process and quality management guidelines are in place												5,5
My institution is member in one or more European-wide infrastructures (ESFRI)												7,5
Cost model and method of price calculation have been established												8,5
Booking system or other e-tool for laboratory management have been implemented												6,5

The feedback to these questions shows that approximately half of the A4L_ACTION partners have the managerial practice of core facilities with its relevant aspects in place. These partners also declare membership in European-wide infrastructures, where they gain additional expertise. The best practice examples can be provided by the partners 10, 8, 12, 6 and 1. Indeed, the transfer of experience together with sharing rules and cost models is already ongoing (for example from the partners 10 and 1 to the partner 2).

3.2.6 TECHNOLOGY TRANSFER AND IP MANAGEMENT

Technology transfer is the process by which results of research are converted into innovations applicable in practice and able to reach the market. Most academic and research institutions support this process via "tech transfer offices" that provide services related to IP identification and protection

[13] https://pubmed.ncbi.nlm.nih.gov/26763487/

as well as to navigation in search for investments, product development and commercialization. This support can lead either to licensing or spin-off/start-up activities and can promote academia-industry partnerships.

The process of technology transfer is highly dependent on creative thinking of researchers, on their ability to recognize innovative potential of their research, on their motivation to give priority to IP protection rather than publishing and on the expertise, valuation capabilities and knowledge of innovation landscape of technology transfer experts.

Taken together, both effective technology transfer and IP management are highly complex topics that largely determine the ability of the research institutions to fully exploit their innovation potential. While in the advanced EU Member States, innovation strategies are enforced at national levels and technology transfer offices with skilful personnel linked to progressive innovation hubs are unavoidable parts of the research institutions, the less developed Members States generally do not have this area so well developed, as reflected also in the European Innovation Scoreboard 2021[14] ranking only EE among strong innovators, while SI, CZ, and LT belong to moderate innovators and HR, HU, SK, PL, LV, BG and RO among emerging innovators. On average, lower performing countries appear to grow faster than the higher performing ones. However, only Estonia and Lithuania witness an improvement in performance of 25 percentage points in 2021 compared to 2014, Croatia between 15-25 points, and Czechia and Poland between 10-15 points. The other countries of A4L_ACTIONS partners improved only up to 10 percentage points. This indicates existence of large systemic differences in innovation policies and practices also among the less developed countries of the CEE region.

The survey topic related to technology transfer and IP management contained questions on existence of technology transfer office and strategy, rules/policy for IP protection and commercialization, IP evaluation committee and commercialization board, international networking, external consultants, match-making sessions with industry and training of technology transfer and IP protection issues for research staff (Table 3.6).

Table 3.6

Overview of the feedback of A4L_ACTIONS partners to questions on technology transfer and IP management at their institutions. Reponses "Yes before" are indicated by dark green colour and are assigned a value 1, responses "In progress" are indicated by dark yellow with a value 0.5, and responses "No" are in light grey with 0 value. Final score of the feedback to individual questions corresponds to the sum of values of all related responses.

6. TECHNOLOGY TRANSFER AND INTELLECTUAL PROPERTY MANAGEMENT	1	2	3	4	5	6	7	8	10	11	12	SCORE
For spin-off support and commercialization of research results a Technology Transfer Office (TTO) exist												8,5
Technology transfer strategy has been formulated												9
Institutional policy on Intellectual Property (IP) protection has been formulated incl. rules of using the income from commercialization (incl. royalties to inventors)												10
Institutional Committee / Valorisation committee on IP evaluation has been established												7
Dedicated funds for IP protection exist												6,5
Institutional "Commercialization Board" including members from industry has been established												3
TTO is networked on national/ international level in order to receive nationwide/ international support												7,5
External consultants /agencies are being used in order to help the internal technology transfer team (with scouting, commercialization, etc.)												7
Science and business collaboration is being fostered by match-making sessions with industry												5,5
Trainings on technology transfer issues like IP management, entrepreneurship, patent law etc. are being organized for staff and/or PhD students												8,5

[14] https://euraxess.ec.europa.eu/worldwide/asean/european-innovation-scoreboard-2021-published

The best practices in technology transfer and IP management are implemented in the institutions of the A4L_ACTIONS partners 10, 5 and 3, followed by the partners 6, 8, 7, 4 and 1. The other partners have considerable delay in implementation of these practices into their management and need to develop efforts to minimize this delay at the institutional level, even if their national systems do not provide sufficient support to these activities as indicated in their comments on the threats listed in the SWOT analysis.

3.2.7 SCIENCE COMMUNICATION

Science communication is an integral part of the research program and serves for dissemination of research-generated knowledge to non-experts, including policymakers, different stakeholders as well as public[15]. This is particularly needed in case of research funded with public money. The communication of research results and their societal impact should be objective, understandable and well-structured to effectively deliver the message and target audience or readers with the aim to inform, educate, raise interest of young generation in science, attract funding or change human behaviour (e.g. to participate in introduction of ecological programs or in lifestyle / healthcare programs). Dissemination of research evidence-based knowledge is extremely important during the ongoing pandemics to counteract expanding conspiracy theories and motivate people to responsible behaviour.

Traditionally, science communication has been the role of teachers or trained science writers. Todays' scientists are voluntarily communicating their science, perceiving it as a moral obligation towards society, but it is also increasingly expected from them. Since most scientists are not trained in science communication, many academic and research institutions engage professional communicators and establish science communication offices that overtake the responsibility of informing about the institutional research activities and achievements, interacting with media and providing support to scientists in dissemination of their knowledge using different platforms and channels.

In order to get insight into the practices of the A4L_ACTIONS partner institutions in the science communication management, the survey investigated whether the institutions employ dedicated PR manager, have PR department, possess communication plan, list of priority media and network of contacts, whether they organize public events with journalists and trainings of communication skills, and whether they have institutional Twitter account (Table 3.7).

Table 3.7

Overview of the feedback of A4L_ACTIONS partners to questions on technology transfer and IP management at their institutions. Reponses "Yes before" are indicated by dark green colour and are assigned a value 1, responses "Yes A4L" are indicated by blue colour and also assigned by a value 1, responses "In progress" are indicated by orange with a value 0.5, and responses "No" are in light grey with 0 value. Final score of the feedback to individual questions corresponds to the sum of values of all related responses

7. SCIENCE COMMUNICATION	1	2	3	4	5	6	7	8	10	11	12	SCORE
My institution employs a dedicated Communication / PR manager												9
My institution has a dedicated Communication / PR department												5,5
An institutional PR / Communication Plan has been formulated												5
List of priority scientific media is in place and network of journalists/ media contacts has been created												8
My institution works actively with journalists – e.g. organizes roundtables, public discussions, joint meetings / training for (scientific) journalists and researchers etc.												8
Trainings for researchers in communication skills are being organized												6,5
My institution has a Twitter account												7

[15] https://www.livingknowledge.org/fileadmin/Dateien-Living-Knowledge/Dokumente_Dateien/Toolbox/LK_C_Communicating_Science_Kit.pdf

Again, the A4L_ACTIONS partners 10 and 5 exhibit best practices in management of science communication (providing “Yes” responses to all questions), followed by the partners 6, 1 and the partner 8 institution, which has implemented three practices based on inspiration from the first A4L project. The other partners have the part of the communication practices partly implemented and partly in progress.

3.3 CONCLUSION

Good managerial practices are crucial for setting the rules of operation and for shaping internal culture towards achievement of strategic goals and mission of the research institution. Their design and successful implementation require devoted and visionary management team, skilful personnel and also resources for functioning of dedicated units or offices. Despite this task is not easy to accomplish, it is an important prerequisite for providing professional support to researchers, thereby accelerating progressive development of the academic and/or research institution and enabling its sustainability. The present survey has identified the A4L_ACTIONS partners who showed very high level of managerial rules and processes that can serve as the best practice examples to the other partners that are on the way to build and/or improve their managerial practices. The A4L_ACTIONS project will monitor how the closing of existing gaps proceeds and will provide help in this process.

4. INSTITUTIONAL RESEARCH CULTURE

4.1 INTRODUCTION

This deliverable is a part of the tasks of the Alliance4Life_ACTIONS project aimed at improving the internal institutional culture through better research governance and more effective support of research excellence.

Surveys of perception of internal research culture in A4L_ACTIONS partner institutions were accomplished with the aim to learn about the opinions of researchers, doctoral students, technical and administrative staff on working conditions, culture of relations and quality of research environment. The survey respondents included altogether 904 employees of seven A4L_ACTION partners.

The survey was conducted in the form of an anonymous electronic questionnaire generated according to the template specified in the deliverable D1.1 Self-assessment report template of the A4L_ACTIONS project[16]. The questionnaire asked a total of 30 questions, of which 27 contained further sub-questions (a total of 204) and 3 questions could be answered freely. The questions in the questionnaire were created on the basis of existing surveys carried out in the recent past by renowned foreign institutes in the field of science and research, in particular the Wellcome survey on research culture from 2019[17].

The anonymity of the survey was guaranteed by the fact that the chosen format did not allow the identification of the respondent. Identification was not possible even for the designated questionnaire administrators performing the data processing. In addition, personal questions offered the choice of neutral answers.

Here we provide a summary of the obtained data without a deeper correlation analysis of the results according to the groups of respondents. Therefore, within this summary, it is not possible to draw any conclusions about the similarities or differences of opinions depending on the stage of career, position, or other general characteristics of the respondents. These connections will be analysed in more detail internally by each partner as a background for the strategic decisions on future improvements. Similarly, due to the complexity and diversity of the free responses, this component of the survey will be analysed and commented on separately and internally by each partner. A comparison of some of the outputs of the A4L_ACTIONS survey with the outputs of the Wellcome survey illustrates the specific aspects of the perception of research culture in CEE countries. This summary also suggests that some negatively perceived internal aspects of the research culture in A4L_ACTIONS are the result of systemic shortcomings and barriers of the research governance at the national levels.

Following A4L_ACTIONS project partners performed the survey among their employees and provided data for this deliverable: MU CEITEC, BMC SAV, MUL, UZSM, UT, VU, LIOS, UL (Faculty of Medicine) and UMFCD. Their numbering in this deliverable is anonymised.

[16] https://alliance4life.ceitec.cz/self-assessment-report-template/
[17] https://wellcome.org/reports/what-researchers-think-about-research-culture

4.2 RESULTS

The anonymous survey brought the following key findings:

- 90.6 % of respondents are proud to belong to the scientific community; 76.2 % would recommend their institution and 73.3 % would recommend their team/department to other scientists/ professionals. 71.1 % would recommend a scientific career to others, and 51.7 % are satisfied with the perspective of their career at A4L_ACTIONS partner institutions.
- 58.7 % of respondents think that creativity is welcome in the workplace and 50.4 % perceive a culture of cooperation. 88 % feel safe in their workplace.
- According to the respondents, the greatest degree of responsibility for stimulating positive changes in research culture is on research institutions, politicians and funding bodies (71.6 %, 62.2 % and 61.2 %), while only 38.3 % of survey participants admit individual responsibility.
- 43 % of respondents think that the institution's management makes sensible decisions, and 42 % are satisfied with how the institution's management communicates its expectations regarding workplace behaviour and culture. Only 34 % are satisfied with how it evaluates performance.
- Supervisors or leaders discuss performance (44.9 %) and note the results achieved (46.4 %). However, 18.8 % of respondents stated that the supervisor did not show any interest in them.
- 79.5 % of respondents declare their ability to work independently and 46 % believe that they can lead a team, but only 17.2 % completed training on managing people.
- 73 % of respondents feel freedom in research and interpretation of results, while 17 % are afraid to contact the leader/supervisor in case of problematic results.
- Majority of respondents (81 %) declared that they are able to manage their work tasks, and 66.8 % think that their work has adequate recognition.
- According to the respondents, the most valuable features of a scientific career are acceptance by the scientific community (77.9 %), funding of projects (53.1 %), and publications in renowned journals (56.6 %). The positions of mentor (14.5 %) and positions in the management (5.3 %) are considered the least valuable.
- Insufficient research funding (64.7 %), excessive administration and bureaucracy (61.8 %) and complicated public procurement (47.5 %) are considered to be the main obstacles to a successful career. 47.1 % of respondents consider administrative capacities and better administrative support to be a priority for improvement of research culture.

4.2.1 PROFILE OF RESPONDENTS

Most respondents are in the early or middle stages of their careers, with median values calculated from the results reported by each partner corresponding to 33.0 % and 33.3 %, respectively. Women represent 62.0 % and men represent 35.4 % of respondents. The vast majority of respondents belong to the scientific academic community (median of 95.3 %) and have the same country of origin as their current working place (median 97.3 %). Almost two thirds of respondents are members of scientific teams (median 62,3%). 68.3 % of respondents work more than 40 hours a week and a 24.8 % work even more than 50 hours a week. With all these characteristics, the profile of A4L_ACTIONS respondents is similar to the profile of the Wellcome respondents (indicated by black arrows), except higher participation of early career respondents in A4L_ACTIONS cohort. This allows for comparison of responses to analogous questions in these two surveys.

CAREER STAGE

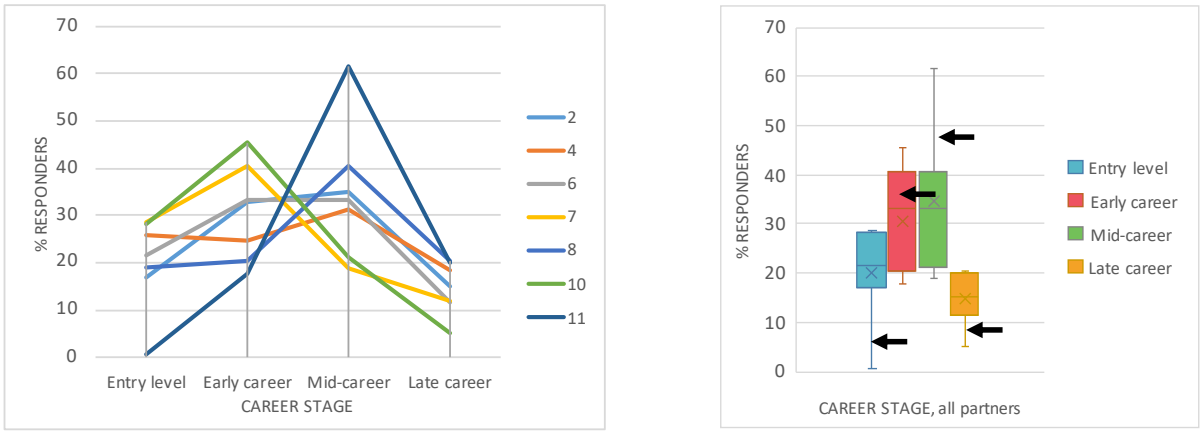


Figure 4.1
Career stage of survey respondents. *Left: The line graph shows the differences in the career profiles of the respondents from individual A4L_ACTIONS partners. Right: The boxplot graph shows median and interquartile range of each career stage for all partners together. Black arrows indicate the values obtained in the Wellcome survey.*

GENDER PROFILE

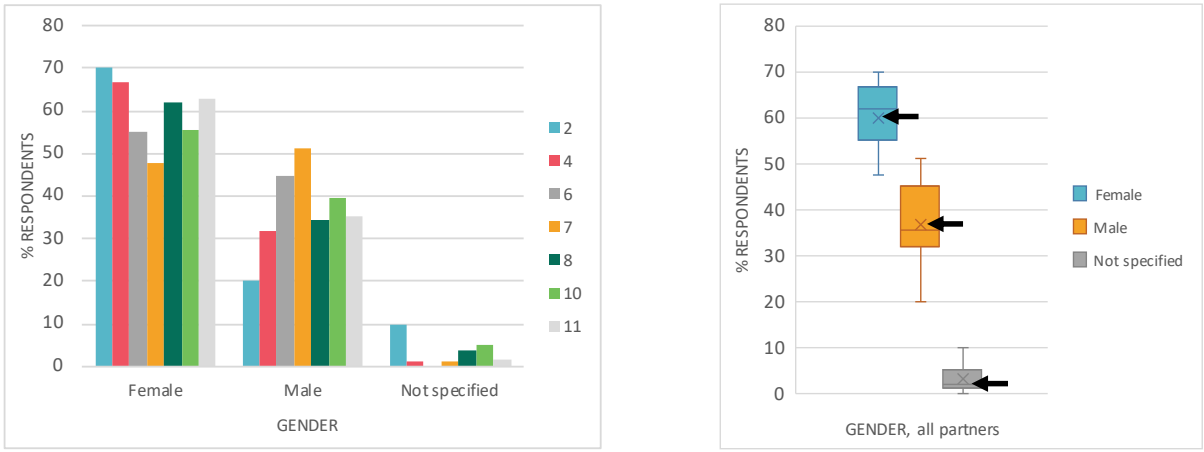


Figure 4.2
Gender profile of the survey respondents. *Left: The column graph shows gender profiles of the respondents from individual A4L_ACTIONS partners. Right: The boxplot graph shows median and interquartile range of genders for all partners together. Black arrows indicate the values obtained in the Wellcome survey.*

JOB POSITION PROFILE

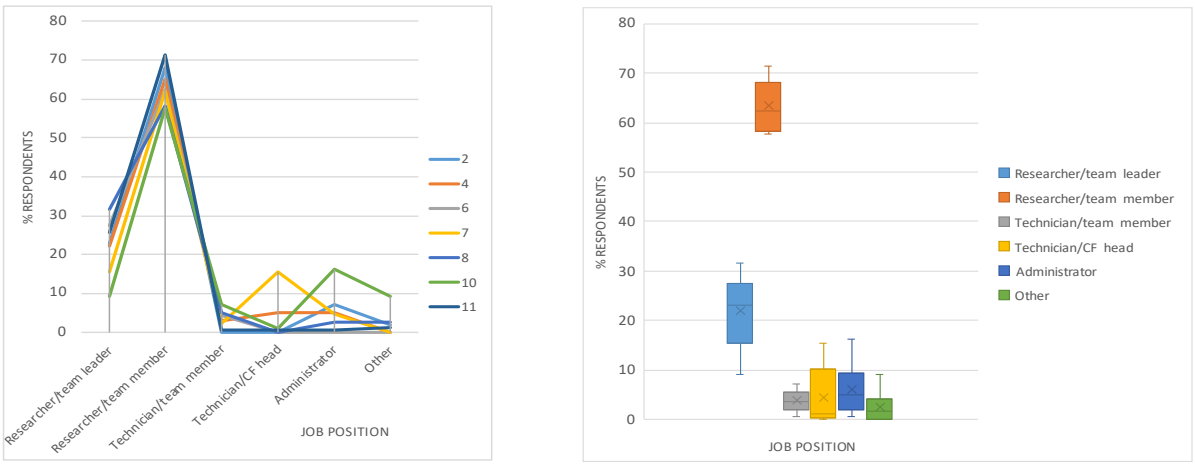


Figure 4.3
Job position profile of the survey respondents. *Left: The line graph shows job position profiles of the respondents from individual A4L_ACTIONS partners. Right: The boxplot graph shows median and interquartile range of the job position (see the legend) for all partners together.*

COUNTRY OF ORIGIN

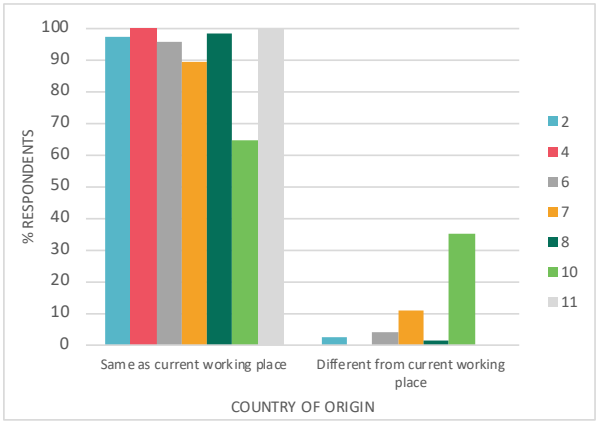


Figure 4.4
Country of origin of the survey respondents. *The graph shows country of origin of the respondents from individual A4L_ACTIONS partners.*

CARING RESPONSIBILITIES

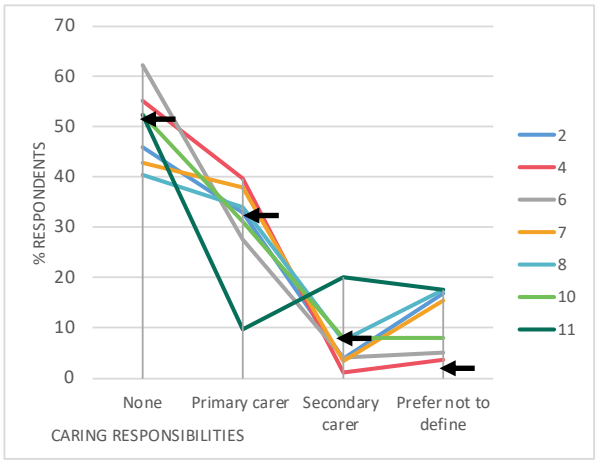


Figure 4.5
Caring responsibilities of the survey respondents. *The graph shows caring responsibilities of the respondents from individual A4L_ACTIONS partners. Black arrows indicate the values obtained in the Wellcome survey.*

CURRENT EMPLOYMENT STATUS

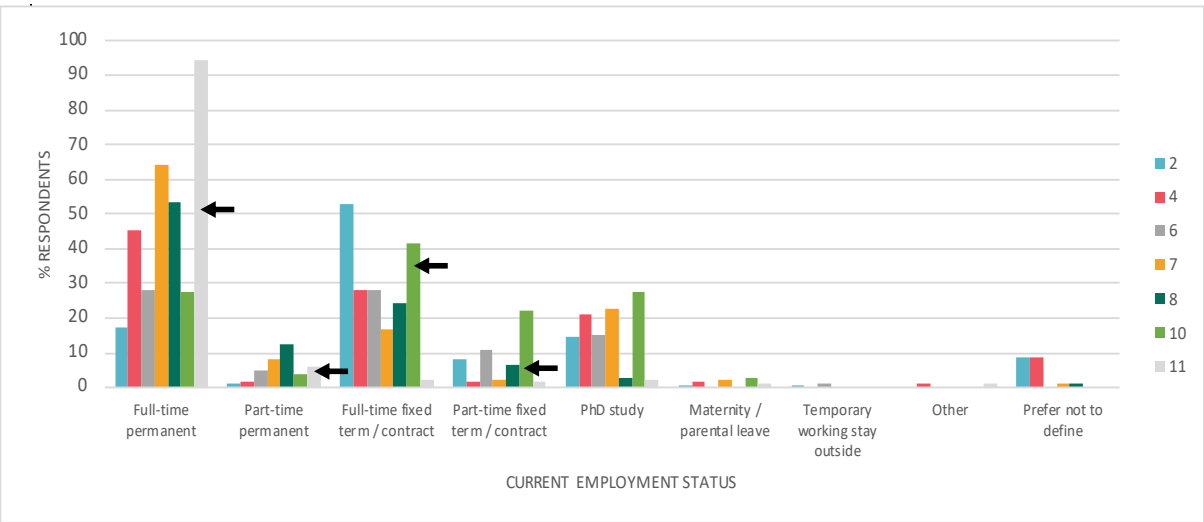


Figure 4.6
Current employment status of the survey respondents. *The graph shows current employment status of the respondents from individual A4L_ACTIONS partners with median values of 45.4 % for full-time permanent positions, 5 % for part-time permanent positions, 27.8 % for full-time fixed term positions and 6.3 % for part-time fixed term positions. Black arrows indicate the values obtained in the Wellcome survey, which correspond to 51 % for full-time permanent positions, 5 % for part-time permanent positions, 37 % for full-time fixed term positions and 6 % for part-time fixed term positions.*

WORKING HOURS

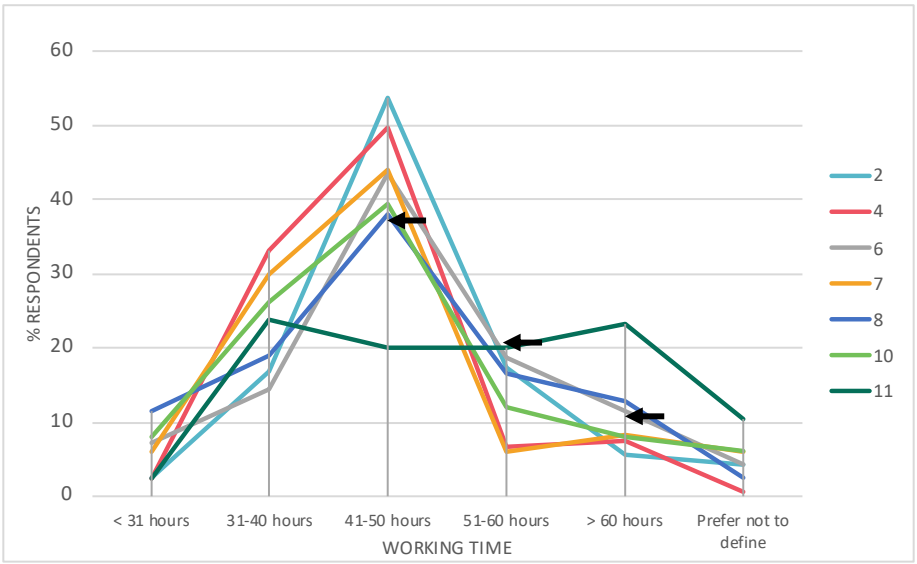


Figure 4.7
Average number of hours dedicated to work for the institution. *The graph shows working time of the respondents from individual A4L_ACTIONS partners with medians of 23.8 % for 31-40 hours, 43.5 % for 41-50 hours, 16.5 % for 51-60 hours, 8.3 % for > 60 hours. Black arrows indicate the values obtained in the Wellcome survey: 27 % for 31-40 hours, 40 % for 41-50 hours, 21 % for 51-60 hours, and 11 % for > 60 hours.*

4.2.2 MANAGEMENT AND LEADERSHIP

The summary of views on management and leadership indicates high level of self-confidence of respondents in relation to their ability to work independently (79.5 %) and at the same time their critical attitude towards supervisors and leaders due to relatively low interest in appraisal of performance (22.2 %), support of wellbeing (27.5 %) and training of skills (22 %). A relatively high proportion of respondents (70.6 %) feel sufficient research freedom, whereas (40.1 %) express concerns about communicating problematic results to the leader or supervisor.

Less than a half of the respondents (42.7 %) think that the institution's management makes sensible decisions, 44.1 % are satisfied with how the institution's management communicates its expectations regarding workplace behaviour and culture, but only 33.7 % are satisfied with how the management of the institution evaluates performance. 77.5 % respondents consider problem-solving communication and setting the research plan to be the most important characteristics of research management.

These views suggest that staff management and skills development trainings could contribute to the wellbeing of employees or doctoral students, as well as to improvement of their relations with leaders and supervisors. At the same time, it is necessary to improve the communication of the management towards employees and doctoral students, both in solving current issues and in strategic goals. There is also a need to consider and improve the way of performance evaluation.

ACTIVITIES CARRIED OUT BY THE LEADER OR SUPERVISOR DURING THE PREVIOUS YEAR

QUESTION: Has your supervisor, PI or manager done any of the following within the last 12 months? *(Multiple choice)*

According to the survey respondents, leaders or supervisors at the A4L_ACTIONS project institutions were most active in discussing the performance (median of 44.9 %) and in following the results achieved (46.4 %). However, only a few leaders or supervisors provided a personal example of ethical behaviour (11.6 %), offered training to support the skills development, mediated communication with experts and even fewer asked for feedback on leadership and management (8.3 %).

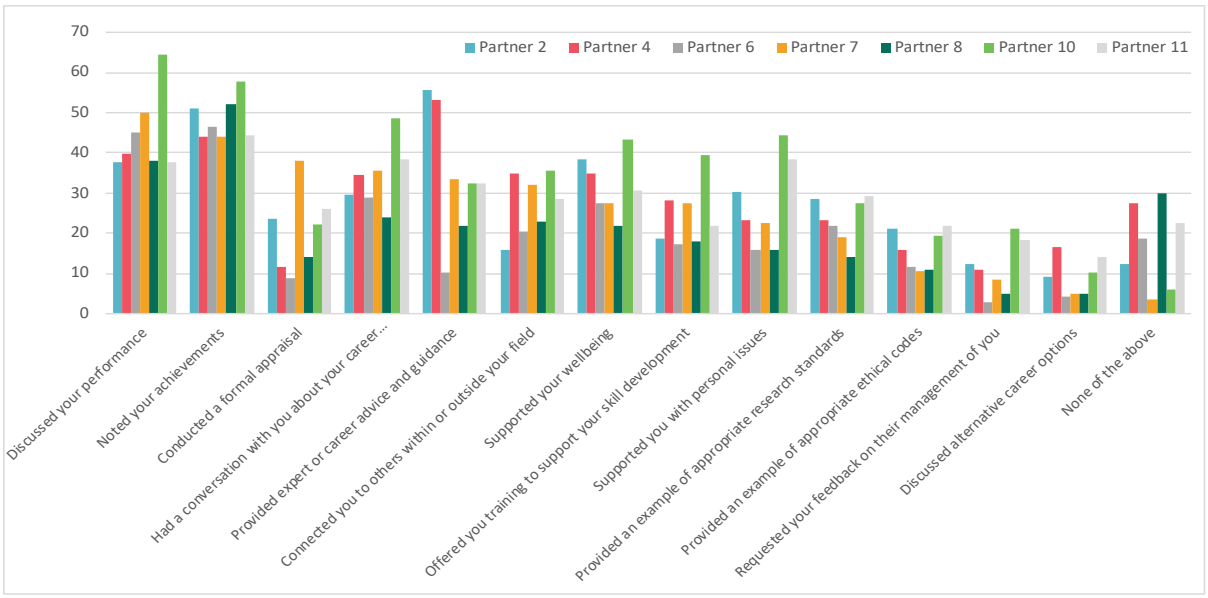


Figure 4.8
Percentage of survey participants that agreed with the responses to the question on the activities carried out by the leader / supervisor, illustrated separately for each participating A4L_ACTIONS partner.

As many as 18.8 % of respondents declared that the leader or supervisor did not show any interest in them. However, it is important to note that there are marked differences among the individual A4L partners in the respondents' opinions / experiences as illustrated on Figure 4.8. According to the view of the Wellcome survey respondents, the leaders / supervisors appear to be considerably more interested in performance, results, formal appraisal and in providing support/guidance compared to the leaders in the A4L survey (Figure 4.9).

Figure 4.9
Percentage of survey participants that agreed with the responses to the question on the activities carried out by the leader / supervisor during the previous year. Comparison of A4L with Wellcome survey.

OPINION ON OWN ABILITIES / SKILLS

QUESTION: How far do you agree or disagree with the following statements?

As many as 79.5 % of A4L respondents declare their ability to work independently and 46 % believe that they can lead a team. Because about one third of researchers' respondents are managers, it can be assumed that the remaining respondents are members of teams who have the potential or ambition to advance to a leading position in the future (Figure 4.9). Only 17.2 % of respondents completed training on managing people, while the Wellcome survey showed up to 48 % (see the black arrow). A4L_ACTION partners have clear unmet needs for improvements in this area (Figure 4.10).

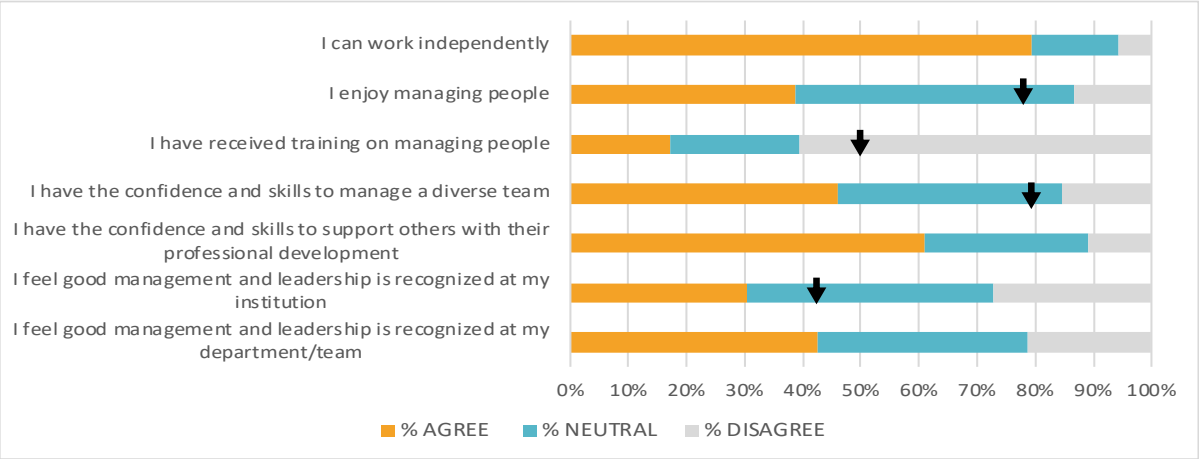


Figure 4.10
Percentage of positive, neutral and negative responses to the question on the abilities / skills of the survey participants. *Black arrows indicate the values obtained in the Wellcome survey.*

RELATIONSHIP WITH THE LEADER AND / OR SUPERVISOR

QUESTION: To what extent do you agree or disagree with the following statements?

According to the respondents, 73 % have the freedom to investigate and process the results, while 14 % declare its absence, and up to 17 % are afraid to contact the leader in case of problematic results. The results in this section are generally comparable to the Wellcome survey, except for differences in the agreement that management makes reasonable decisions (35 % in Wellcome versus 43 % in A4L), and that the leader / supervisor also values negative results (60 % in Wellcome versus 49 % in A4L).

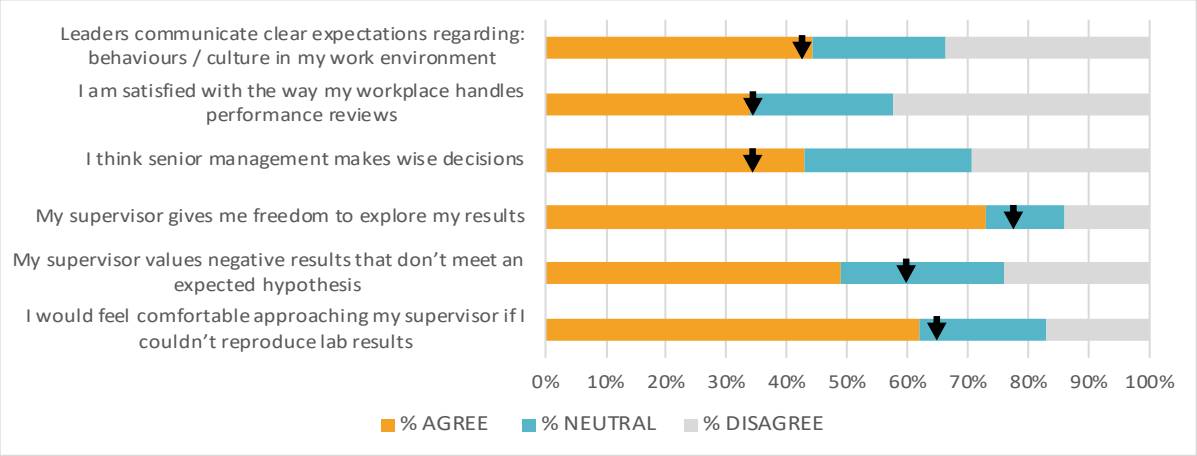


Figure 4.11
Percentage of positive, neutral and negative responses to the question regarding relationship of the survey participants with their leader / supervisor. *Black arrows indicate the values obtained in the Wellcome survey.*

OPINION ON THE IMPORTANCE OF THE CHARACTERISTICS OF MANAGEMENT AT THE LEVEL OF TEAM / INSTITUTION

QUESTION: How important do you think the following research leadership characteristics are? How successful is your workplace team and your institution / workplace as a whole in demonstrating each leadership characteristic?

Respondents think that communication in problem-solving is the most important aspect of management, albeit all other characteristics were considered for very important. At the same time, all characteristics are assessed as better demonstrated at the team level compared to the institution. The respondents of the Wellcome survey had similar opinions.

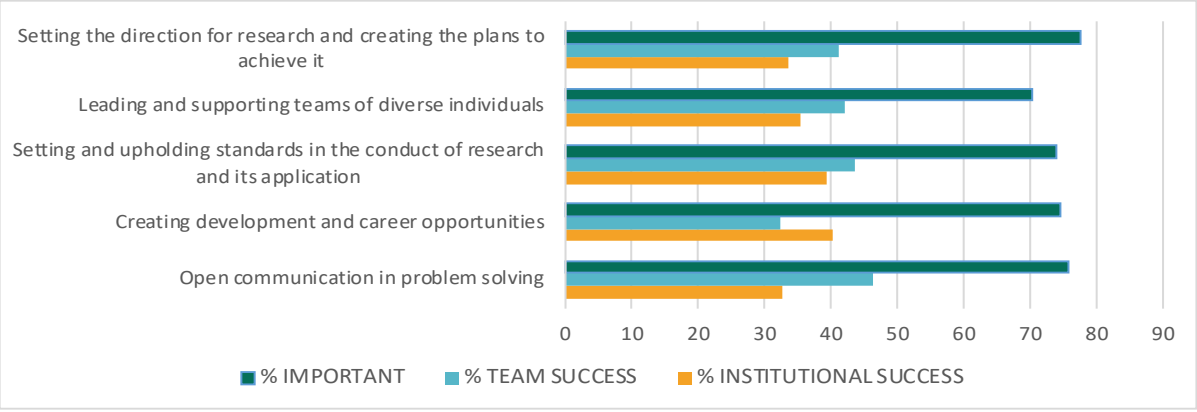


Figure 4.12
Percentage of responses to the question on importance of management characteristics for team success and/or institutional success.

4.2.3 CAREER

SIGNS OF A SUCCESSFUL SCIENTIFIC CAREER

QUESTION: What would you consider to be the markers of a successful career in the research community? *(multiple choice, max 5)*

According to the respondents, the most valuable features of a scientific career are acceptance by the scientific community (77.9 %), access to high-profile projects (53.1 %), and publications in renowned journals (56.6 %). The positions of mentor and leader, and position in the management with influence over strategic decisions are considered to be the least valuable (14.5 % and 5.3 %, respectively). It turns out that supervision, team leadership and management are, despite their complexity and responsibility, significantly underestimated, even though, in addition to organizational skills, they require considerable scientific erudition. Moreover, leaders and managers of the institutions are considered as driving forces of positive changes in the field of research culture.

It is interesting that the first and last position is the same in both A4L and Wellcome surveys. Job security is on the 4th position in Wellcome survey (46 %), while in A4L it is on the 9th position (26.9 %). High salary is on the 10th place in the Wellcome survey (22 %), while it is on the 7th place (32 %) in the A4L. The importance of obtaining valuable projects is perceived very differently - in Wellcome on the penultimate position (20 %), while in the A4L it is on the third position (53.1 %). These differences reflect the systemic features of the research funding in CEE countries, which is in general characterized by a low proportion of institutional funding.

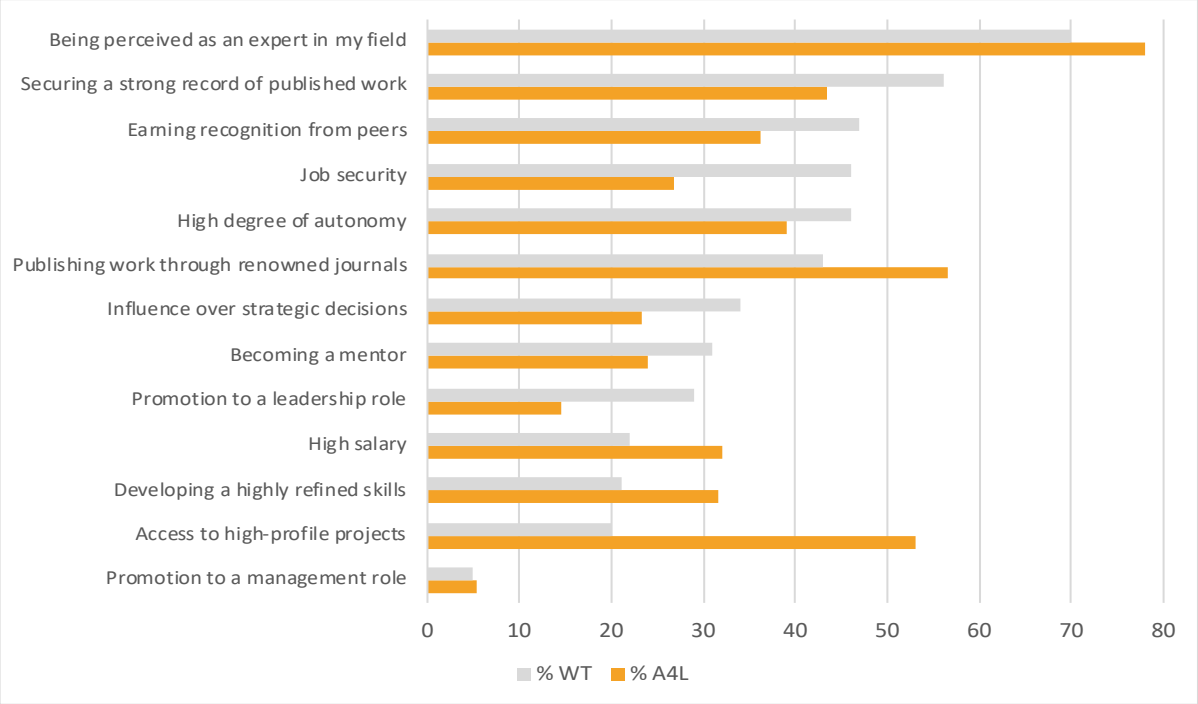


Figure 4.13
Percentage of "Agree" responses to the question regarding signs of a successful scientific career. *Comparison of A4L_ACTIONS respondents (A4L) with Wellcome respondents (WT).*

BARRIERS TO ACHIEVING A SUCCESSFUL / MORE SUCCESSFUL CAREER

QUESTION: Do you face any barriers in achieving a successful career in the research community? *(multiple choice)*

Insufficient research funding (64.7 %), excessive administration and bureaucracy (61.8 %) and complicated public procurement (47.5 %) are considered by the A4L survey participants to be the main barriers. A smaller proportion of respondents see the barrier in a lack of advice and guidance (31.5 %), an unmanageable workload (30.6 %), a lack of opportunities (26.2 %) and a lack of training in skills (21.6 %). Interestingly, job insecurity was identified as a barrier by 24.2 % of A4L respondents, compared to 51 % in the Wellcome survey.

Figure 4.14
Percentage of "Agree" responses to the question regarding barriers to achieving a successful career. *Comparison of A4L_ACTIONS respondents (A4L) with Wellcome respondents (WT).*

WORKPLACE ATTRIBUTES

QUESTION: How far do you agree or disagree with the following statements relating to your current working environment?

As many as 58.7 % of A4L_ACTIONS respondents believe that creativity is Wellcome in their work environment, similarly to 60 % of Wellcome respondents. Unhealthy competition at the level of the institution and the team / department is perceived by 25.2 % and 12 % of A4L_ACTIONS respondents, which is much less than 42 % claimed by the Wellcome respondents (indicated by black arrows), suggesting that the internal research environment in A4L partner institutions is less affected by strong rivalry. Moreover, 59.1 % A4L_ACTIONS respondents state that the accuracy and reliability of results is considered an important aspect of outputs in the institution (compared to 69 % in Wellcome survey), and 50.4 % that the institution supports the culture of cooperation (61 % in Wellcome). 32.3 % of respondents agree that the institution's management listens to the complaints and tries to resolve them (compared to 47 % in Wellcome survey).

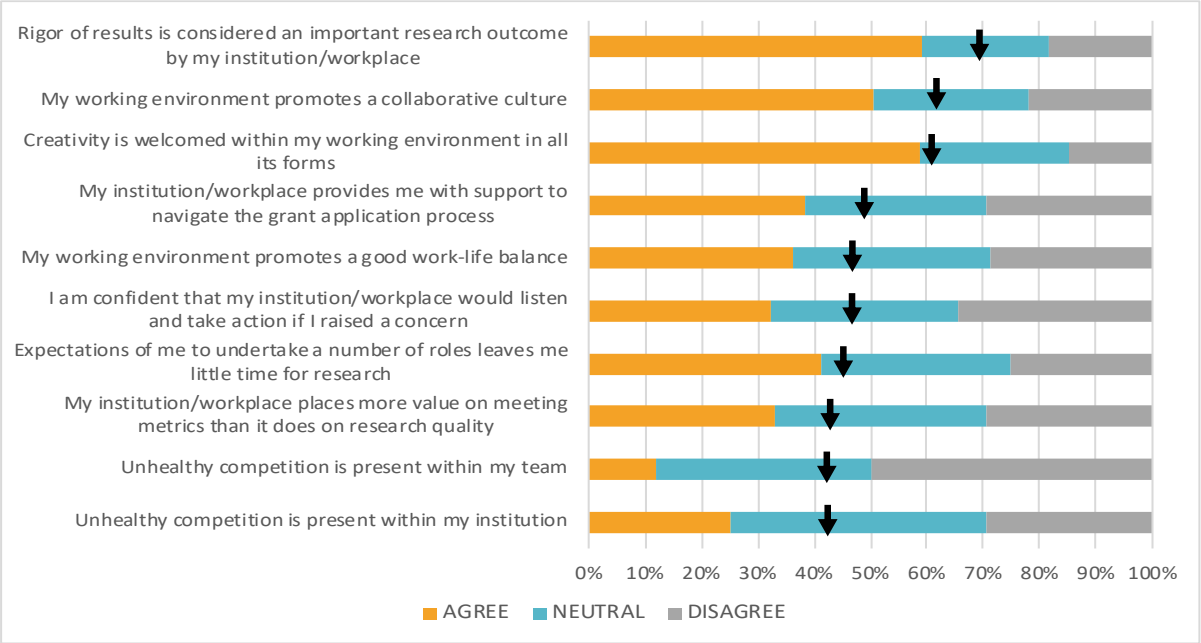


Figure 4.15
Percentage of positive, neutral and negative responses to the question regarding workplace attributes. *Black arrows indicate the values obtained in the Wellcome survey.*

PERFORMANCE, RECOGNITION AND ETHICS

QUESTION: How far you do agree or disagree with the following statements relating to your career over the last 1-5 years?

Almost all respondents (81 %) declared that they are able to manage their work tasks (compared to 45 % Wellcome), and 66.8 % think that their work has adequate recognition. 40.4 % have experienced that someone has taken credit for their work (similar as 40 % in the Wellcome survey) and 29.1 % feel pressured by a leader to achieve key performance indicators (54 % in the Wellcome survey). 61 % of respondents are not afraid to inform their supervisor about breaches of research ethics (compared to 47 % in the Wellcome survey).

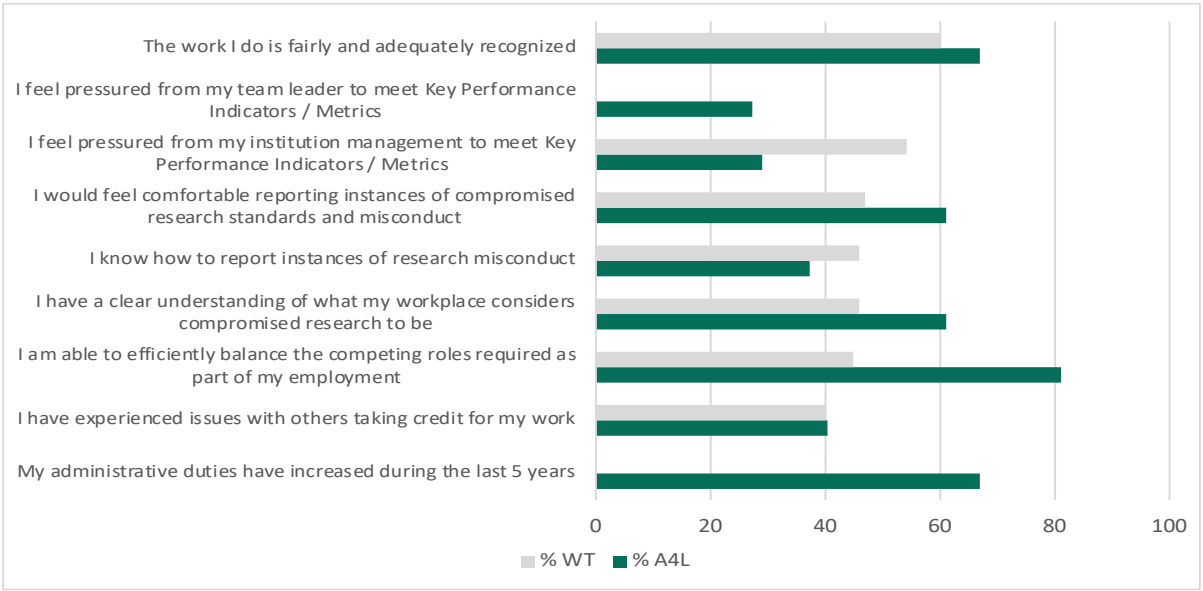


Figure 4.16
Percentage of "Agree" responses to the question regarding performance, recognition and ethics. *WT=Wellcome*

SATISFACTION WITH RESEARCH CAREER

QUESTION: How far do you agree or disagree with the following statements relating to your career?

90.6 % of A4L respondents are proud to belong to the scientific community; 76.2 % would recommend their institution and 73.3 % would recommend their team / department to other scientists / professionals. 71.1 % would recommend a scientific career to others, and 57.1 % are satisfied with the prospects of their career. 29.4 % are considering a career outside of research and 20.8 % outside of their country in the next 3 years. Respondents to the Wellcome survey are less proud (84 %), less likely to recommend their team (62 %), scientific career (50 %), and less satisfied with the prospect of a scientific career (38 %).

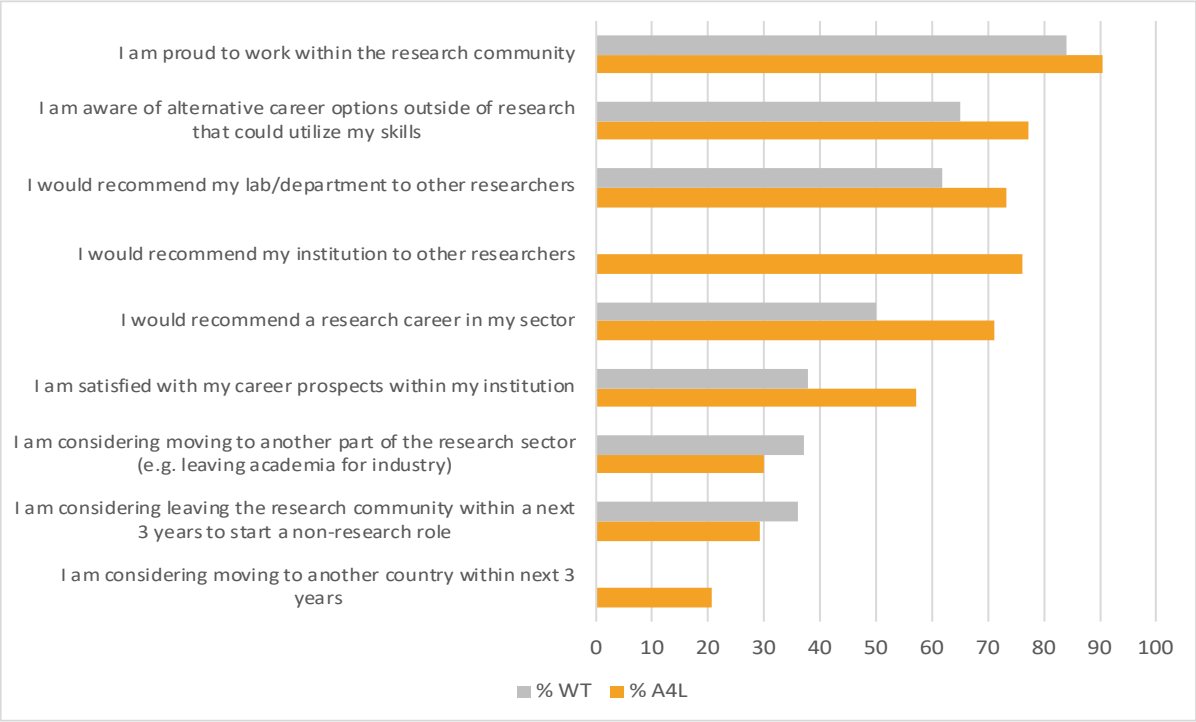


Figure 4.17
Percentage of "Agree" responses to the question regarding satisfaction with research career. *Comparison of A4L_ACTIONS respondents (A4L) with Wellcome respondents (WT).*

4.2.4 PERCEPTION OF RESEARCH CULTURE

ATTRIBUTES OF RESEARCH CULTURE

QUESTION: How far do you agree or disagree with the following statements relating to research culture?

Majority of respondents agreed that administration and bureaucracy block quality research (79.6 %), that high competitiveness is an unfavourable factor (57.1 %), that metrics are preferred over quality in the current research culture (70.4 %) and that metrics negatively affects research culture (60.4 %). In the Wellcome survey, 78 % of respondents recognize the negative role of high competitiveness, 71 % the preference of quantity over quality and 86 % the negative impact of metrics on research culture (Figure 4.18).

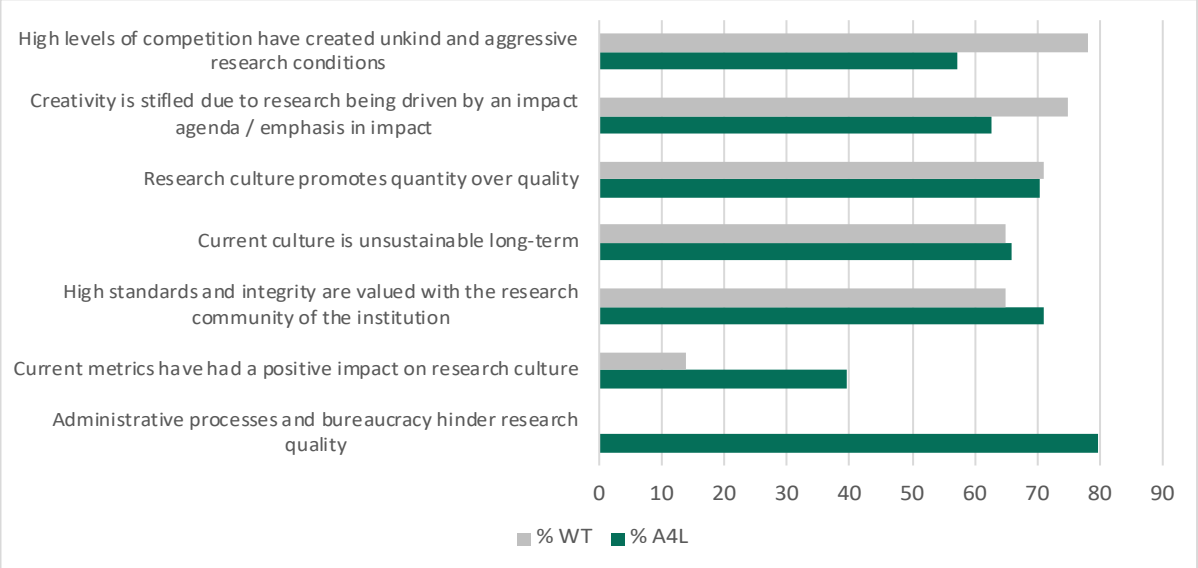


Figure 4.18
Percentage of "Agree" responses to the question regarding research culture. *Comparison of A4L_ACTIONS respondents (A4L) with Wellcome respondents (WT).*

WELLBEING IN THE WORKPLACE

QUESTION: How far do you agree or disagree with the following statements relating to wellbeing in your work place?

According to 98.9 % of A4L_ACTIONS respondents, the feeling of well-being is the basis of a good working environment and 48 % declare that their workplace provides them with a sufficient feeling of wellbeing (compared to 96 % and 44% in the Wellcome survey, respectively). As many as 59.8 % say that an interest in the work leads to an increase in their workload, and 54.7 % think that a career in research can lead to loneliness (compared to 69% in a Wellcome survey). 45.4 % of A4L respondents declare excessive working hours as part of the workplace culture, while in the Wellcome survey it is up to 57 %.

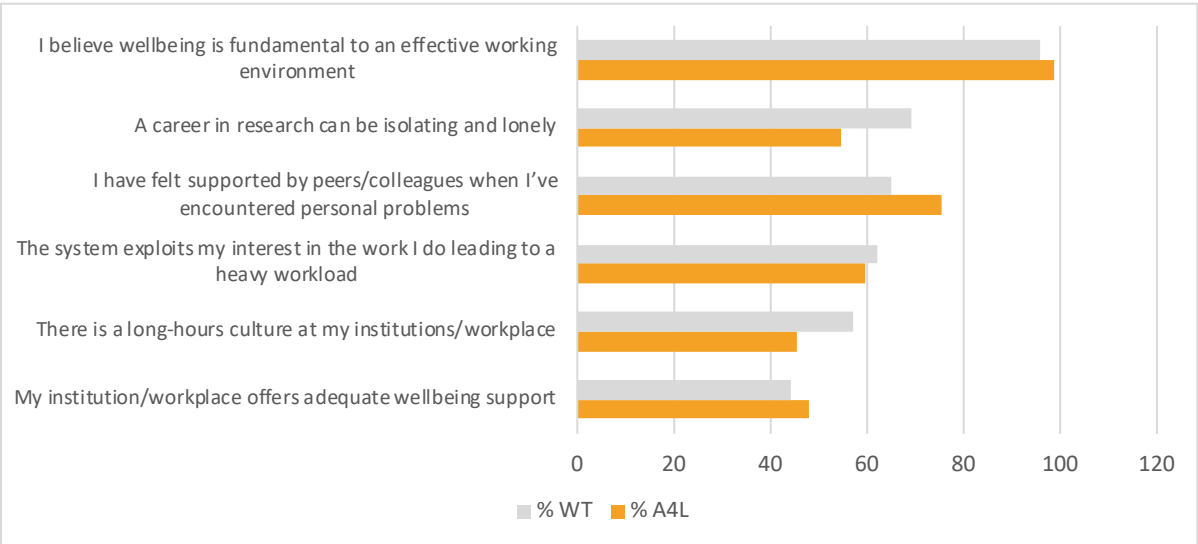


Figure 4.19
Percentage of "Agree" responses to the question regarding wellbeing in the workplace. *Comparison of A4L_ACTIONS respondents (A4L) with Wellcome respondents (WT).*

WORKING ENVIRONMENT

QUESTION: How far do you agree or disagree with the following statements relating to your working environment and personal resilience?

88% of respondents feel safe in their work environment and similar percentage are considered resilient (81% and 82% in the Wellcome survey). 77-78% state that the institution and department respect personality diversity and equal opportunities (compared to 37% in the Wellcome survey). 58% of survey participants are able to detach themselves from the work problems, 38% find it difficult to manage work during personal problems and 27% experience a difficult period due to stress at work (41%, 59% and 49% in the Wellcome survey).

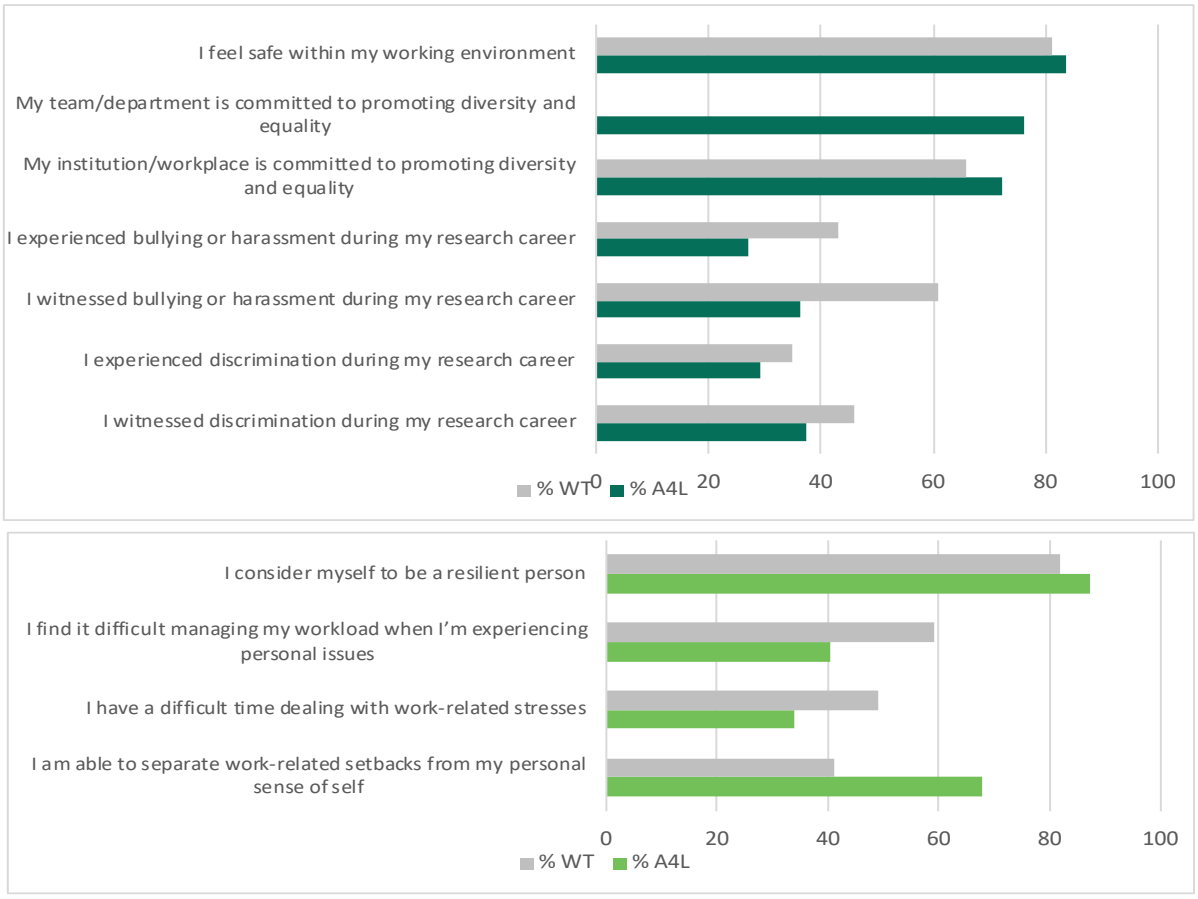


Figure 4.20
Percentage of "Agree" responses to the question regarding the working environment and personal resilience.
Comparison of A4L_ACTIONS respondents (A4L) with Wellcome respondents (WT).

4.2.5 VISIONS

ELEMENTS OF RESEARCH CULTURE NEEDED FOR POSITIVE CHANGE

QUESTION: What do you think is needed to create significant positive change to research culture in your country?

The A4L_ACTIONS respondents consider all listed elements as approximately equally important (from 78.3 % to 92.1 %) as shown in their multiple-choice responses (see below). In contrast, Wellcome survey allowed for selection of a single response and its respondents considered the change in funding

conditions as most important (25%), followed by greater focus on quality (11 %) and reduction in administration (10%). Wellbeing / support, and rewards were viewed as least important (4% and 1%, respectively)

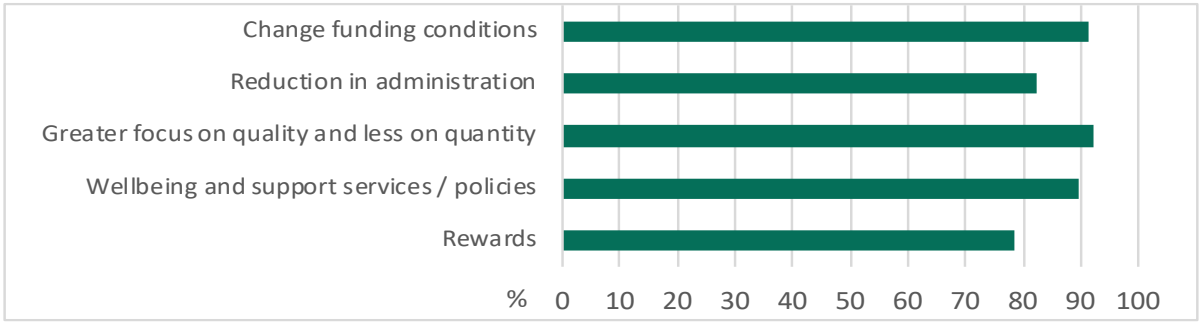


Figure 4.21
Percentage of "Agree" responses to the question regarding elements necessary to create positive change to research culture in the national context.

ENTITIES RESPONSIBLE FOR STIMULATING POSITIVE CHANGE IN RESEARCH CULTURE

QUESTION: Which groups / entities do you think should be responsible for driving change in research culture?

According to the A4L_ACTIONS respondents, the highest degree of responsibility for stimulating positive change lies with research institutions and universities 71.6 %, with respondents' institutions 67.2 %, with the government / politicians (62.2 %) and funding bodies (61.2 %). Only 38.3 % of respondents perceive the responsibility of individual members of the scientific community, mainly senior researchers (43.7 %) and only 18.9 % see the high responsibility of young scientists.

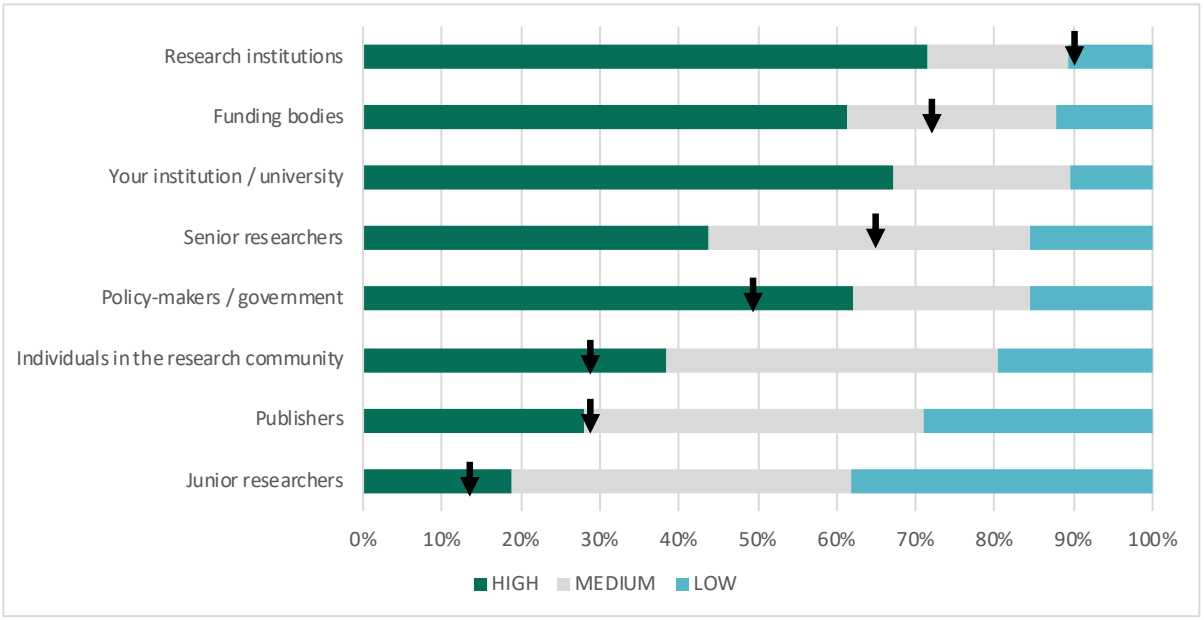


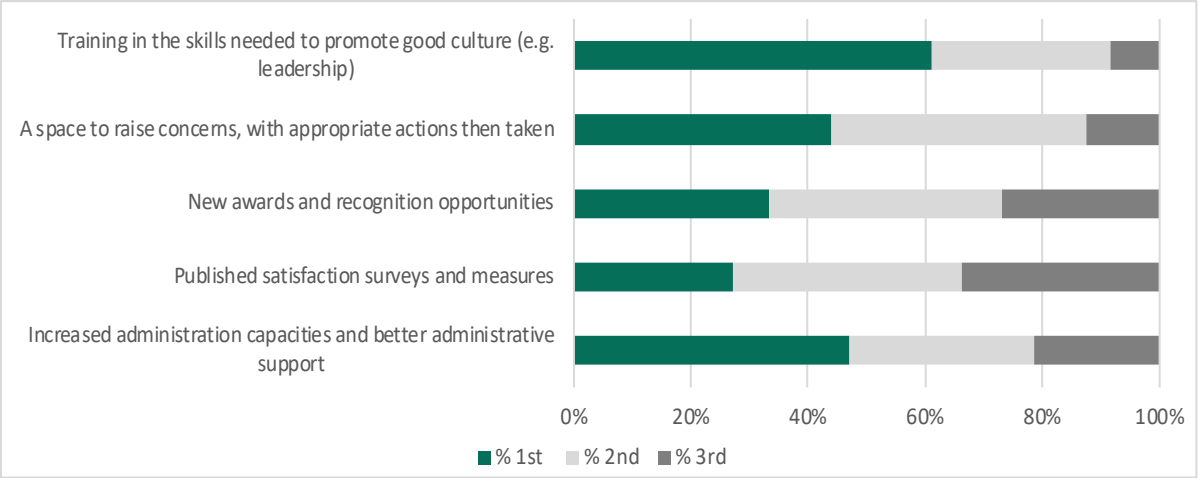
Figure 4.22
Percentage of positive, neutral and negative responses to the question regarding entities responsible for positive change to research culture. *Black arrows indicate the values obtained in the Wellcome survey.*

REQUIREMENTS FOR IMPROVEMENT OF RESEARCH CULTURE

QUESTION: Where do you think your institution should focus first to improve research culture?

The need to recognize and educate how to promote activities supporting a good leadership (61 %) and space for comments and their subsequent solution (44,1 %) are perceived as needed to improve institutional culture. Despite the perception of high administrative burdens and bureaucracy as the main barriers to quality research expressed by 61.8 % of respondents (see above on page 11), only 47.1 % of respondents consider for important to strengthen administrative staff and improve the administrative support of researchers. However, this opinion markedly differs among the A4L_ACTIONS partners, with partner 11 expressing the need for administrative support more strongly (70.1 % of respondents), whereas the partners 10 and 7 do not consider this as the major need.

Figure 4.23



Percentage of positive, neutral and negative responses to the question regarding focus needed to improve research culture.

CONTRIBUTION OF INDIVIDUALS TO THE IMPROVEMENT OF RESEARCH CULTURE

QUESTION: As an individual, what actions do you think you could take to help drive positive change in research culture?

Most respondents (84.6%) want to support colleagues, be accommodating and stimulate positive changes within the team (75.9%). To a lesser extent, however, there is a willingness to develop an initiative or activity in some areas related to building institutional culture (39.5%) or to have an open discussion in the community (44.4%). While up to 53% of respondents consider good practice and research management training to be a priority activity to improve research culture (see above), only 32.7% expressed a willingness to participate in such training. The Wellcome survey did not give the possibility of multiple choice, but the most common answers were in order: a positive example, support to colleagues, shifts within the team and a warning of misconduct.

Figure 4.24
Percentage of "Agree" responses to the question regarding individual contribution to create positive change to research.

4.2.6 SCIENCE COMMUNICATION

This section was included into the questionnaire in order to get insight into the opinions of the researchers and other employees working in the A4L_ACTIONS partner institutions on communicating science to stakeholders and lay public in order to increase the awareness of importance for acquisition of new knowledge, technological innovations, development of society as well as for daily life of each individual.

ATTRIBUTES OF SCIENCE COMMUNICATION

QUESTION: How far do you agree or disagree with the following statements relating to science communication of your research?

96.2 % of A4L_ACTIONS respondents think that science communication increases the visibility and reputation of the institutions and 91.3 % agree that society has the right to be informed about the research performed at public institutions, and 94.2% agree that science communication increases public's interest in science. Most of survey participants responded that science communication is a duty of every modern scientist (83.9 %) and that scientists from publicly funded institutes and universities should communicate science because they are using taxpayer's money (71.7 %). 93.5 % respondents disagree with the opinion that science communication is not important.

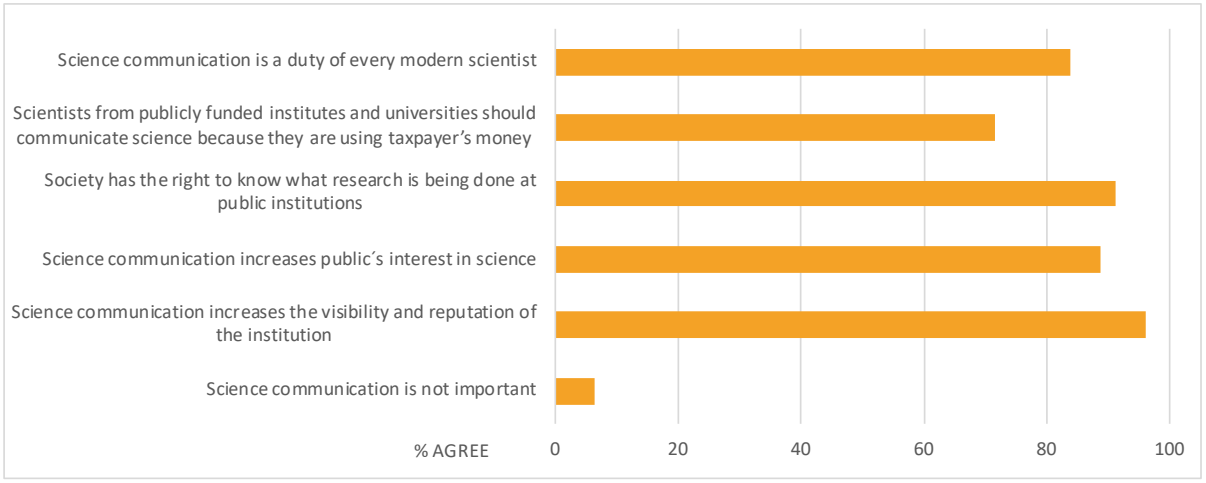


Figure 4.25
Percentage of "Agree" responses to the question regarding attributes of science communication.

ENTITIES RESPONSIBLE FOR DRIVING CHANGE IN SCIENCE COMMUNICATION

QUESTION: Which groups / entities do you think should be responsible for driving change in science communication?

A4L_ACTIONS respondents point out that highest responsibility for driving change in science communication lies on their institution (52.9 %), and PR and communication officer/department (42.1 %), then senior researchers (39.1 %); medium responsibility lies on individuals in the research community (51.7 %), funding bodies (42.1 %), and junior researchers (41.5 %).

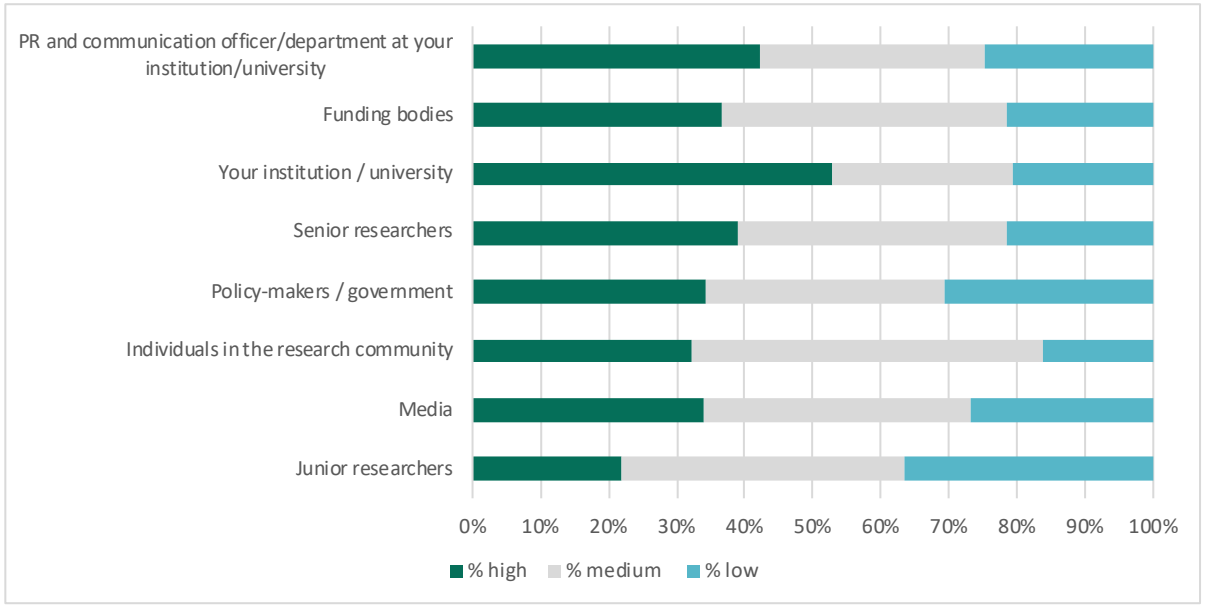


Figure 4.26
Percentage of responses indicating high, medium, or low responsibility for driving change in science communication.

REQUIREMENTS FOR IMPROVEMENT OF SCIENCE COMMUNICATION

QUESTION: Where do you think your institution should focus first to improve science communication?

44.7 % of A4L_ACTIONS respondents pointed out that increased administration capacities and better administrative support by experienced PR and communication officer or department are the priority for improvement of science communication, 56.2 % think that science communication should be regarded as strategically important agenda, 64 % that training for researchers in the skills needed for effective science communication would also improve this field. To learn from partner institutes /universities with successful communication departments is also considered for important (46.4 %).

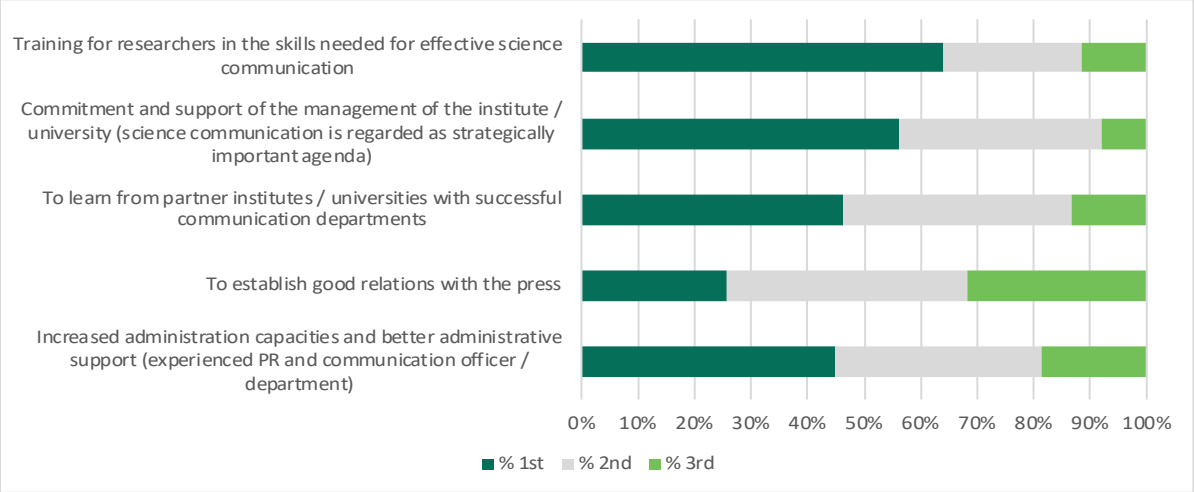


Figure 4.27
Percentage of responses indicating activities important for improvement of science communication.

INDIVIDUAL CONTRIBUTIONS TO POSITIVE CHANGES IN SCIENCE COMMUNICATION

QUESTION: As an individual, what actions do you think you could take to help drive positive change in science communication?

60.8 % of A4L_ACTION respondents claim to contribute by setting an example, 55.8 % by sharing research results with the PR and communication officer, 53.9 % by participating in organizing societal activities, and 70.1 % by supporting peers and colleagues.

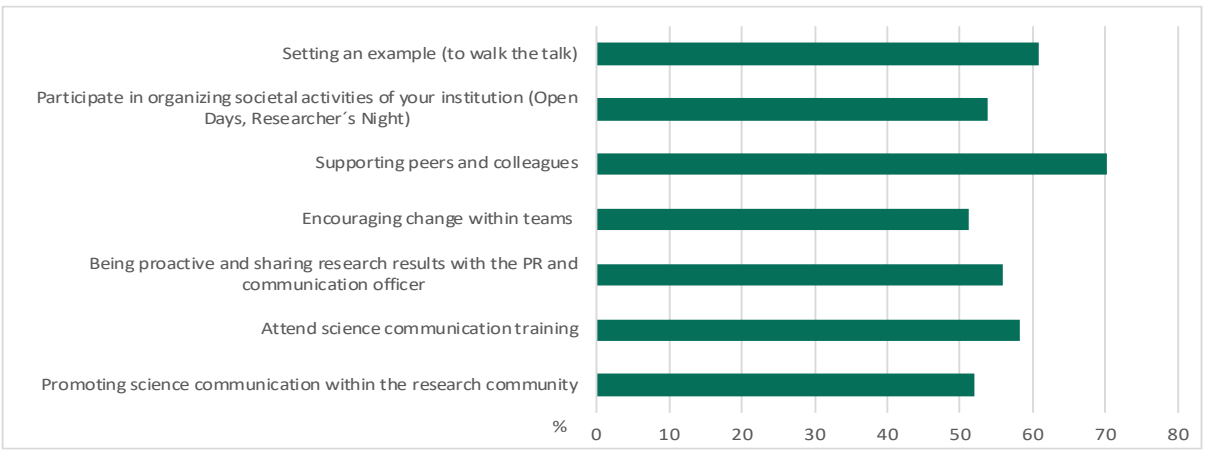


Figure 4.28
Percentage of "Agree" responses regarding individua contribution to improvement of science communication.

4.2.7 INTERNATIONALIZATION OF HUMAN RESOURCES AND MOBILITY

QUESTION: How far do you agree or disagree with the following statements?

Out of A4L_ACTIONS survey participants, 27.1 % agree and 26.4 % partially agree that English is the primary language of internal communication at their institutions. On the other hand, 73.1 % respondents agree that meetings with at least one foreign employee are held in English. 67.8 % of respondents agree that institutional website includes at least sections in English with the most relevant and important information, and slightly less (52.4 %) that institutional website is completely available in English. Only 30.5 % agree that a "welcome office" exists to assist researchers coming from abroad and 25.7 % that there are guidelines for the foreigners navigating them in the institution and providing them information on the rights and duties of the employee, trainings, career development etc.

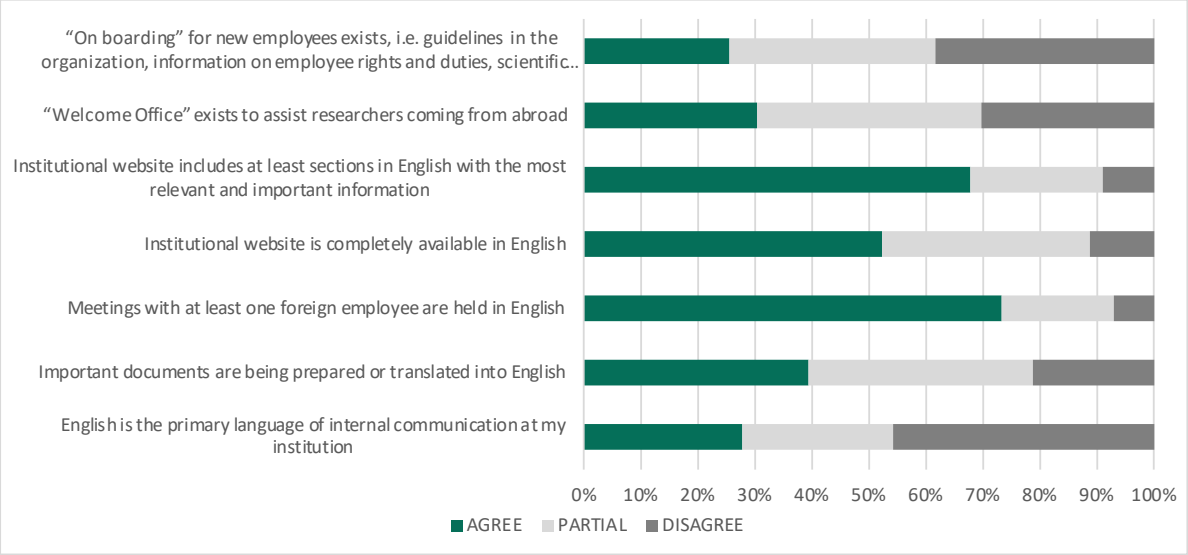


Figure 4.28
Percentage of positive, neutral and negative responses regarding individual contribution to improvement of science communication.

4.3 CONLUSIONS

The survey revealed several key factors that need to be improved to achieve a better quality institutional and research environment at Alliance4Life's partner institutions, which participated in the survey of the A4L_ACTIONS project:

- internal communication in solving problems and creating a research plan,
- performance evaluation with emphasis on quality,
- cooperation of leaders / superiors with doctoral students and team members,
- career plans for early career workers,
- trainings focused on management and skills development,
- administrative support for researchers,
- public procurement processes (through communication with the relevant state authorities and better setting up of internal processes).

Further steps and procedures for achieving improvements will be the subject of discussion with the academic communities and the managements of the Alliance4Life's institutions.

Several findings of the respondents of the A4L_ACTIONS survey are in line with the opinions presented in the international survey of the Wellcome. These are e.g. signs of a successful scientific career, pride in belonging to the scientific community, confidence in one's own abilities, importance of communication, presence of creativity in the work environment, dissatisfaction with performance evaluation, negative impact of metrics, importance of wellbeing in the workplace, insufficient funding as a research barrier.

On the other hand, there are also clear differences in the perception of A4L_ACTIONS respondents in comparison with the Wellcome survey participants, in the sense of higher job security, in higher confidence in management decisions, in the higher importance of obtaining projects, in the lower presence of unhealthy competition and in less fear to inform about cases of violation of standards and research ethics. These specific features of the A4L_ACTIONS survey will be shared with the Wellcome representatives. They can extend the findings of the Wellcome survey, which primarily included respondents from UK (76%) and other countries manly outside of the CEE region.

It is important to note that several circumstances negatively perceived in the environment of A4L_ACTIONS institutions are indeed a reflection of the governance and functioning of the systems of research governance in the CEE countries, identified by Alliance4Life's partners as major barriers and threats of their sustainability and development in their SWOT analyses. These include suboptimal funding, high administrative burden and a lack of time for creative activity, which is the most highly valued attribute of research.

In the light of these findings, it will be necessary to develop strategies and initiate changes both at the professional and societal levels in order to improve the working environment and research culture in Alliance4Life's institutions. Practical application of the improvements will be monitored and evaluated throughout the A4L_ACTIONS project with the support of best practice examples and targeted trainings, and will surely continue beyond the project implementation period.

5. BENCHMARKING

5.1 INTRODUCTION

The first three parts of the deliverable D1.2 Self-assessment report provide insight into reflections of the A4L_ACTIONS partners on the external and internal factors that affect their performance (SWOT analysis), on their managerial practices (survey completed by the management) and on their internal institutional culture (anonymous survey completed by the employees).

In this part of the D1.2, quantitative parameters of the outputs/achievements in the following five domains have been evaluated:

1. Research excellence
2. Knowledge transfer
3. Funding and grants
4. Human resources
5. Core facilities and/or special infrastructures

The purpose of this evaluation is (1) to understand whether and how the conditions and practices shape the research excellence, (2) get an overview of the progress of the A4L_ACTIONS partner institutions compared to the baseline values reported in the deliverable D2.1 Assessment report[18] which was submitted in February 2019 during the previous Alliance4Life´s project No. 779303, and perform inter-partner benchmarking.

All A4L_ACTIONS partners provided the quantitative data for the benchmarking analysis: MU CEITEC, ICRC, BMC SAV, MUL, UZSM, UT, VU, LIOS, UL (Faculty of Medicine), SU, MUS and UMFCD. The collected data were anonymized and numbering of the partners was randomized, but then consistently used throughout the deliverable.

The research activities of the A4L_ACTIONS project partners cover relatively broad scale of research areas, from chemistry, through pharmacology and pharmacy, ecology, biology, experimental medicine to clinical medicine. This fact can in part influence the publication and/or technology transfer and IP strategies and also scientometric parameters. It is now well documented that certain research areas are characterized by higher numbers of papers and their citations rates[19], while the other are characterized by more intense cooperation with industry and higher technology transfer outputs, and still other are more active in translation of knowledge to clinical practice.

Although the present analysis does not directly accommodate these factors in the calculations of the scientometric indicators, they were kept in mind when considering assumptions from the results of the assessments.

[18] https://alliance4life.ceitec.cz/assessment-report-2019
[19] https://pubmed.ncbi.nlm.nih.gov/28560354/

5.2 RESULTS

5.2.1 RESEARCH EXCELLENCE

Evaluation of research excellence was based mainly on bibliometric analysis of the set of publications generated by the individual A4L_ACTIONS partners and recorded in the Web of Science Core Collection in the period of 2018-2020. The eligible publication types were research articles, letters to editor and reviews. In this analysis, regular papers (having less than 100 authors) were evaluated separately from multi-author (MA) papers (with more than 100 authors) due to inherently different citation rates[20].

NUMBER OF PAPERS

The total numbers of paper published by the A4L_ACTIONS partners during the period of 2018-2020 range from 218 to 3783, to a large extent reflecting the differences in the volume of both total and research staff. To eliminate this disproportion, number of publications per FTE of the total staff as well as the research staff were calculated and displayed on Figure 5.1. It is still apparent that the A4L_ACTIONS partners differ in the rate of publications, particularly in relationship to the research staff FTE. The reasons might include different motivations due to divergent national schemes of evaluation (with emphasis on quantitative versus qualitative parameters) and funding (such as ESIF or sustainability programs), specific administrative barriers that delay the funding flows, and different ratios of institutional to competitive funding.[21] Internal institutional culture can also play a role.

Figure 5.1
Relative numbers of papers published in 2018-2020 *were calculated as a ratio of the total numbers of papers divided by the numbers of total staff FTE and research staff FTE, respectively. The dotted lines show the overall average value of the number of publications per total staff (light blue) or per research staff (dark green) for the A4L_ACTIONS partners. Orange diamonds refer to relative numbers of papers reported by the same partners in the preceding project for the period 2015-2017.*

The Figure 5.1 indicates that several A4L_ACTIONS institutions (2, 3, 5, 6 and 7) increased the relative numbers of papers published in 2018-2020 when compared to preceding assessment period 2015-2017. The other partners showed slightly reduced relative numbers of outputs (4 and 10) or even substantially decreased publication activity in quantitative terms (1 and 8, previously 12 publications

[20] https://clarivate.com/webofsciencegroup/campaigns/global-research-report-multi-authorship-and-research-analysis/
[21] https://euraxess.ec.europa.eu/worldwide/asean/european-innovation-scoreboard-2021-published,

per research FTE). However, it is important to note that certain differences between the current and the previous period may have resulted from methodological differences in calculating FTEs at some partners. In spite of this decrease, the Partners 1 and 8, together with 3, 4, 5 and 10 display the relative publication activity that is above the overall average of the A4L_ACTIONS institutions.

IMPACT FACTORS

However, the numbers of papers are generally not considered as a parameter defining the research excellence (albeit it still prevails in some national systems of research evaluation). Therefore, in the next step we evaluated qualitative parameters, namely the impact factor (IF) of the journals, where the papers were published, the ranking of the journals according to their citations in particular research fields, and numbers of citations to those papers.

Impact factor (IF) is calculated by dividing the total number of citations that a journal receives over a period of two years by the number of articles it published in that same period, thus representing the frequency with which an average article gets cited. From this reason, it is a very limited indicator of the true impact of an individual publication in that journal[22]. There are known examples of poorly cited papers in high-ranking journals and in opposite, well cited papers in journals with modest IF. This is why this scientific parameter should be used with caution, optimally supplemented with other parameters, and followed by the peer review process. This complex approach was adopted in the A4L_ACTIONS project, where benchmarking based on quantitative parameters is conducted as a prerequisite for the next phase of the peer review assessment.

In the first step, we used the publications datasets to calculate the average IF of the regular papers (with less than 100 authors) published during 2018-2020 by the A4L_ACTIONS institutes. The data are illustrated on Figure 5.2.

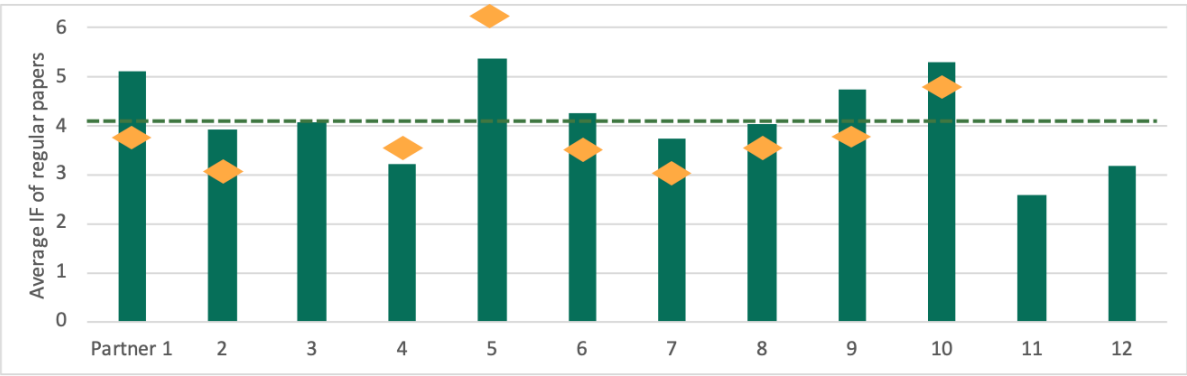


Figure 5.2
Average impact factors of the journals, where the regular research papers were published in 2018-2020 by the A4L_ACTIONS partners. *The average IF values were calculated as a ratio of a cumulative IF of all regular papers published by the individual partners and their number. For each paper, we used the journal IF related to the year, in which the respective paper was published. The dotted line shows the overall average value of the IF for all partners together. Orange diamonds refer to the average IF of journals of all papers (both regular and MA) reported by the same partners in the preceding project for the period 2015-2017.*

The average IF values ranged from 2.60 to 5.38, with an overall average of 4.07. Three institutions achieved the IF above the overall average, namely the institutions 5 (5.38), 10 (5.30) and 1 (5.10). In the preceding A4L project, these partners reported introduction of bonus system and an internal culture motivating researchers to publish their papers in journals with the highest possible impact

[22] https://academic.oup.com/spp/article/45/5/731/4858431, https://www.nature.com/articles/465864a.pdf, https://link.springer.com/content/pdf/10.1007/s40009-015-0419-8.pdf

factors[23]. This approach, when applied in longer term, can affect the behaviour of researchers with respect to the submission practice and stimulate their efforts to generate high quality data.

Figure 5.2 shows that the average IF values for the period 2018-2020 were slightly higher in case of seven institutions (1,2,6,7,8,10) when compared to IF values reported by the same institutions in the first A4L project (2015-2017). This might be in part due to improved research quality and in part due to the continuous increase of IFs for majority of scientific journals. Moreover, in the fall of 2020, Clarivate analytics announced transition towards calculating JIF (Journal impact factor) based on the date of electronic publication and not the date of print publication, which had an inflationary effect on the 2020 JIF scores[24].

The partners 4 and 5 display seemingly lower IFs than before, however, the Figure 3 does not include the IFs for the multi-author papers, in contrast to the average IFs calculated previously from all published papers. The multiauthor papers have distinct citation characteristics compared to regular papers[25] as also demonstrated below on Figure 5.

Figure 5.3
Numbers of multi-author papers and average impact factors of the journals, in which multi-author papers were published in 2018-2020 by the A4L_ACTIONS partners*. For each paper, we used the IF of the corresponding journal of the year, in which the respective paper was published. The dotted line shows the overall average value of the IF for all partners together.*

Most of the A4L_ACTIONS partner institutions (except partners 2 and 7) participated in the multi-author studies. Figure 5.3 clearly shows that these studies were published in the journals with considerably higher IF compared to regular papers, in accord with the conclusions of the Clarivate expert analysis (see the footnote 20). Average journals' IF for individual institutions ranges from 9.35 to 51.63 and overall IF average for all partners together corresponds to 23.97, which is 5.9-times higher value than that for average IF of regular papers displayed on Figure 5.2.

[23] https://alliance4life.ceitec.cz/assessment-report-2019/
[24] https://clarivate.com/blog/whats-next-for-jcr-defining-early-access/
[25] https://clarivate.com/webofsciencegroup/campaigns/global-research-report-multi-authorship-and-research-analysis/

RANKING OF PAPERS ACCORDING TO THE JOURNALS

Next, we evaluated the ranking of the journals, in which A4L_ACTIONS partner institutions published their research papers in the period of 2018-2020. The evaluation focused on the journals ranking in the first quartile (Q1) and in the first 10 and 5 percentile (Tier10 and Tier5). The journal's ranking is determined by comparing the journal to others in its JCR category (representing certain research area) based on the journal impact factor. If a journal falls in Q1, it means that the journal has IF higher than at least 75 % of journals in that category, if it falls in Tier10, its IF higher than that of 90 % of journals in the same JCR category etc.

Figure 5.4 shows the proportion of regular papers published by the A4L_ACTIONS partners in the 5 %, 10 % and 25 % of the most highly ranked journals. The best performing partners with respect to this parameter are the institution 5 (42 % in Tier5, 43.9 % in Tier10 and 49,4 % in Q1), the institution 10 (11.3 % in Tier5, 24.2 % in Tier10 and 53,9 % in Q1), and the institution 1 (8.3 % in Tier5, 19.7 % in Tier10 and 47.6 % in Q1). Comparison of journals ranking with the data from the previous project reveals that seven partners (1,3,5,6,7,8) perform better than before, even when MA papers were excluded from the present calculation and were analysed separately.

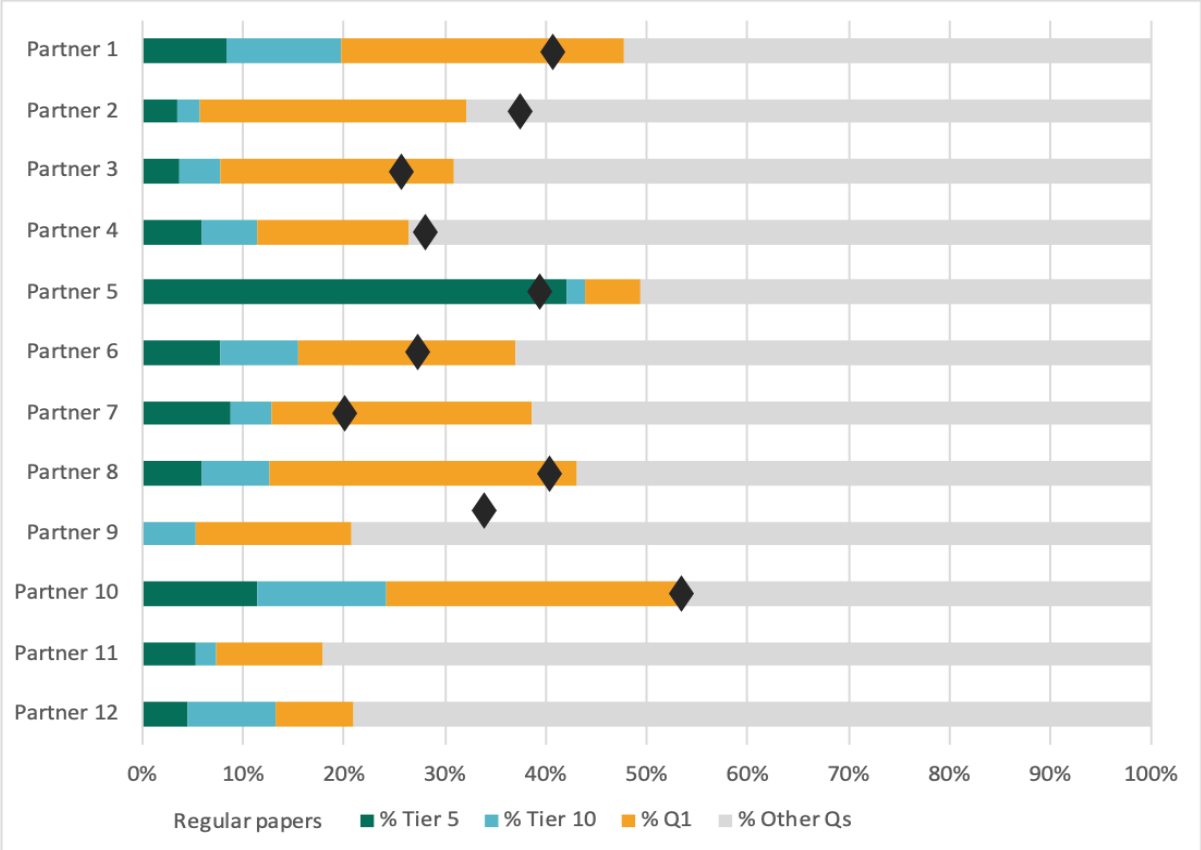


Figure 5.4
Proportion of journals ranking in Tier5, Tier10 and Quartile 1 (Q1), in which regular papers of the A4L_ACTIONS institutions were published in 2018-2020. *Black diamonds refer to the proportion of Q1 journals (with both regular and MA papers) that were reported by the same partners in the preceding project for the period 2015-2017.*

The ranking of MA papers is considerably higher compared to the regular papers (Figure 5.5). This is especially evident in case of the institution 1 (100% in Tier 5, representing 4 MA papers), the institution 10 (50% in Tier5 and 100% in Tier10, out of 2 papers), the institution 5 (84.3 % in Tier5 and 89.2 % in Q1, out of 83 papers), the institution 4 (64.3% in Tier5, 85.7% in Tier10 and 100% in Q1, out of 28 papers), and the institution 11 (77.6 % in Tier5, 79.3% in Tier10 and 84.5 % in Q1, out of 58 papers). In

fact, all institutions clearly benefit from the MA papers, as it will be evident also from their citation score shown further below.

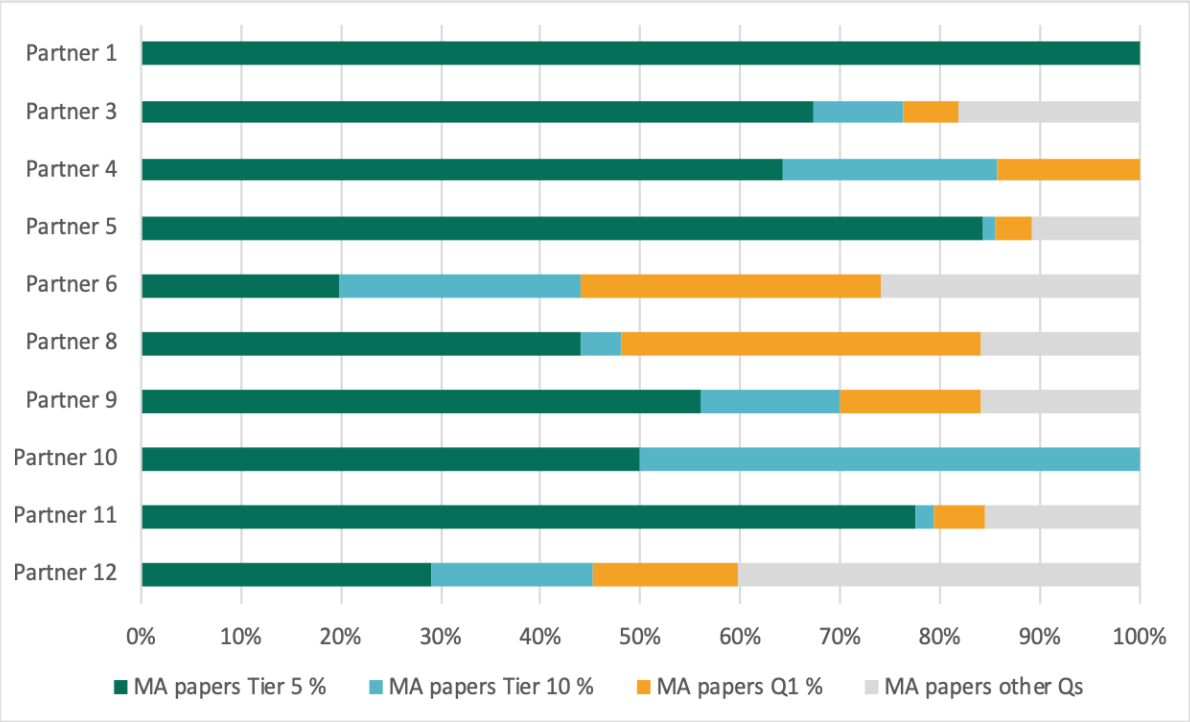


Figure 5.5
Proportion of journals ranking in Tier5, Tier10 and Quartile 1 (Q1), in which multi-author papers of the A4L_ACTIONS institutions were published in 2018-2020. *The partners that have not been involved in this graph did not refer any MA paper during the period of 2018-2020.*

NUMBER OF CITATIONS

Number of citations was the third scientometric parameter assessed in this benchmarking of research excellence. It is a relatively simple way to denote research influence, albeit it is quite difficult to compare between research fields without normalization. Here we assessed the citation rate (i.e. average citations per publication) calculated as a ratio of the cumulative number of citations to the number papers published in 2018-2020 by the individual A4L_ACTIONS partner institutions. As above, we separately analysed the citation rates for regular papers (Figure 5.6) and MA papers (Figure 5.7).

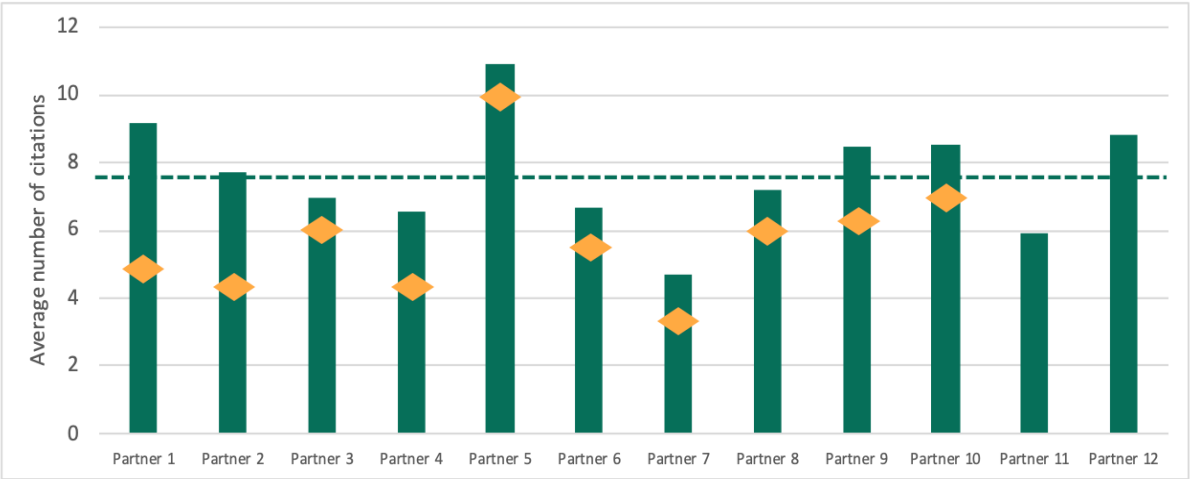


Figure 5.6
Average number of citations to regular papers published in 2018-2020 by the A4L_ACTIONS partners. *The dotted line shows the overall average citation rate for all partners together. Orange diamonds refer to average citations to the papers reported by the same partners in the preceding project for the period 2015-2017.*

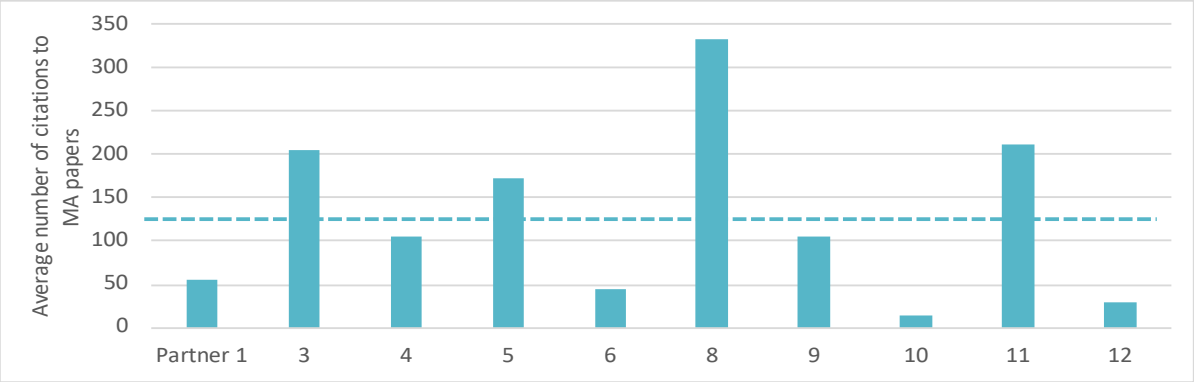


Figure 5.7

Average number of citations to multi-author papers published in 2018-2020 by the A4L_ACTIONS partners*. Citation numbers correspond to period from 2018 to the middle of 2021. The dotted line shows the overall average citation rate for all partners together. The partners that have not been involved in this graph did not refer any MA paper during the period of 2018-2020.*

The average citation rate for the 2018-2020 period corresponds to 7.64 citations per regular paper, ranging between 4.72 and 10.93 for individual institutions. It is markedly higher compared to the citation rate of 5.4 reported previously for the period 2015-2017. This mirrors the fact that all partners showed an improved performance in terms of the average citation numbers.

Expectedly, the citation rate is significantly elevated for MA papers, ranging from 14.5 to 332.7 and reaching an average value of 129.95, which is 17-times higher compared to the citation rate of regular papers. This is well corresponding to the conclusion of the Clarivate analysis related to the characteristics of the MA papers (see the footnote 19 above).

EXTERNAL COLLABORATIONS

In the following step, we assessed the proportion of papers generated in international and/or national collaborations (Figure 5.8).

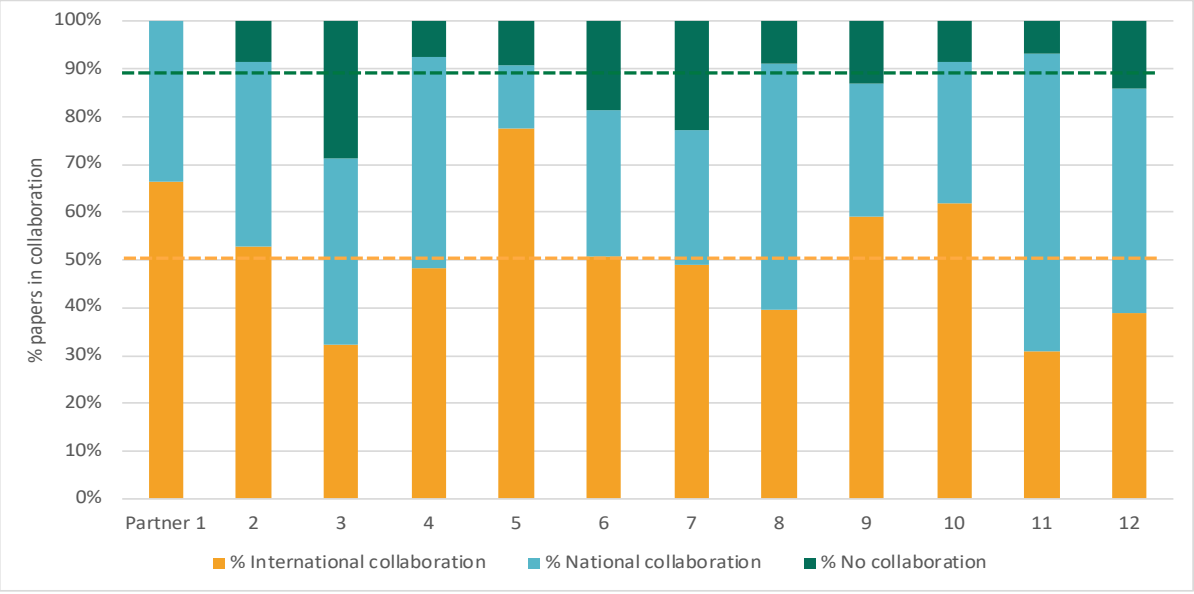


Figure 5.8

Percentage of 2018-2020 publication resulting from the cooperation of the A4L_ACTIONS partners with the international and/or national collaborators*. The orange dotted line shows the overall percentage of the international collaborations, the green dotted line represents the overall percentage of the external (international + national) collaborations.*

The Figure 5.8 shows that all A4L_ACTIONS institutions are highly collaborative, with an average of only 12.5 % papers without any collaboration, 38 % of papers with national collaborations and 51.3 % of papers with international collaborations.

Since the majority of papers published by the A4L_ACTIONS partners in the period of 2018-2020 resulted from the international and/or national collaborations, we wanted to assess what was the contribution of the internal staff to these research outputs. Therefore, we performed the scientometric analysis of the publications with the corresponding authors from the A4L institutions. The proportion of such regular papers ranges from 38 % to 58.4 % (Figure 5.9).

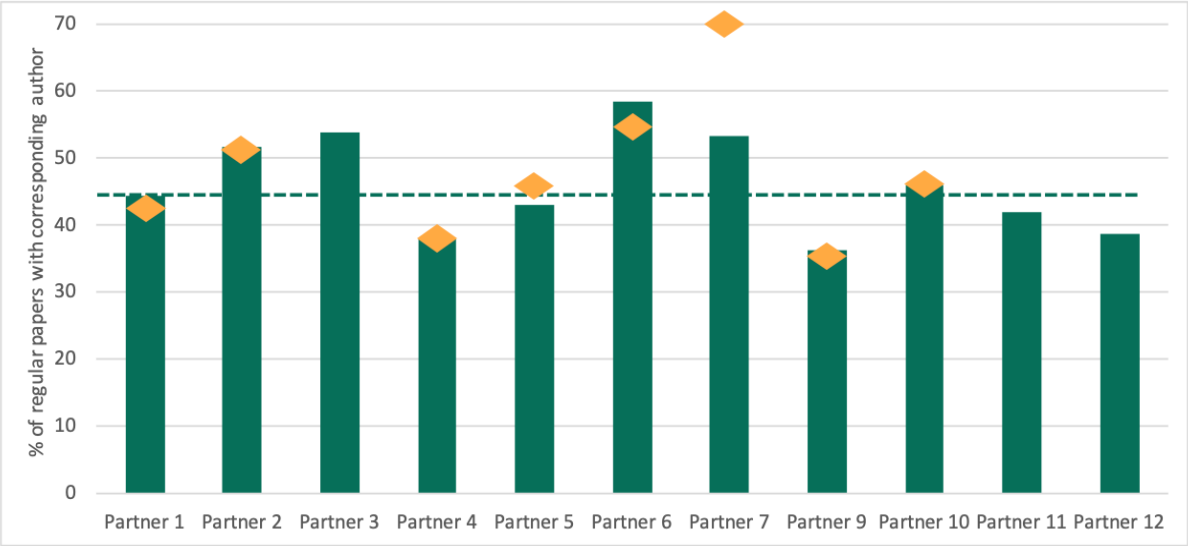


Figure 5.9
Percentage of 2018-2020 publication with the corresponding author from the A4L_ACTIONS institutions*. The dotted line shows the average percentage for all partners. The orange diamonds indicate the proportion of papers with internal corresponding authors published in the period of 2015-2017.*

An overall average of 45.95 % of regular papers published in 2018-2020 with corresponding authors from the A4L_ACTIONS institutions is only slightly lower than 50.1 % reported for all papers published in 2015-2017. In case of all A4L_ACTIONS partner institutions, these publications display lower citation rates when compared to the overall citation rates of their total publications (Figure 5.10). Namely, the rate of the average citations of total publications to those with internal corresponding author ranges from 2.8 to 1.2. This suggests that the external collaborations are beneficial in terms of this scientometric parameter[26], which is, however, just a surrogate of the real added value of sharing knowledge, skills and experiences.

The situation is quite different for MA papers. Out of 433 MA papers registered in the datasets of the A4L_ACTIONS partner institutions, only 8 (i.e. 1.36 %) have the corresponding authors from these institutions. Six MA papers (9.7 %) with the internal corresponding authors were published by the institution 12.

[26] https://www.europarl.europa.eu/RegData/etudes/STUD/2019/634444/EPRS_STU(2019)634444_EN.pdf

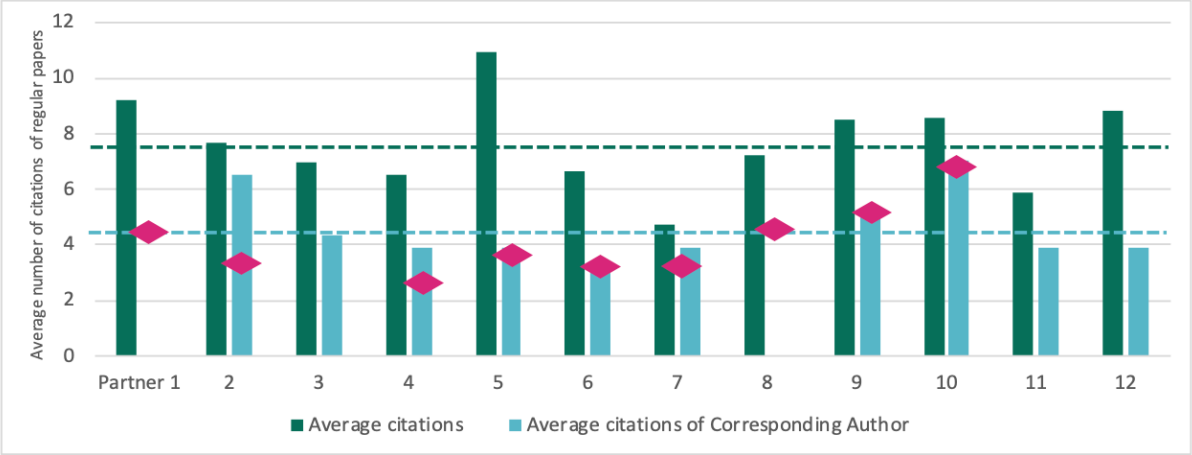


Figure 5.10
Average number of citations to 2018-2020 publications with corresponding author from the A4L_ACTIONS institutions*. Citations were collected from 2018 to mid 2021. The dotted line shows the average percentage for all partners. The red diamonds indicate the average citation rates of papers with internal corresponding authors reported in the period of 2015-2017.*

PRESTIGIOUS GRANTS HOLDERS

We then looked at a possible relationship between the scientometric parameters, extent of the collaborations, and the number of holders of prestigious grants, such as ERC and MSCA-IF grants implemented during the period of 2018-2020.

Only four institutions have the holders of these prestigious grants in their internal research staff, namely the institution 5 (3 ERC grants and 1 MSCA-IF grant), the institution 6 (1 ERC grant and 2 MSCA-IF grants), 9 (2 ERC grants) and the institution 10 (3 ERC grants and 3 MSCA-IF grants). Noteworthy, the partners 5 and 10 were among the best performing in several scientometric surrogates, including average impact factors of journals, where the regular papers were published in 2018-2020 (see Figure 5.2), Tier5, Tier10 and Q1 ranking of those journals (Figure 5.4), average number of citations to regular papers (Figure 5.6), and percentage of publications resulting from the external international collaborations (Figure 5.8). The partner 6 has the highest proportion of collaborative publications with the internal corresponding author.

Moreover, three partners (5, 6 and 10) declared the best or very good managerial practices in the survey analysed in the Chapter 4 of this deliverable. Specifically, the partner 5 is among the best in managing science evaluation (89 % of "Yes" responses to the questions in this topic), research integrity and ethics (100 %), internationalization of HR and mobility (87.5 %), grant preparation and implementation (100 %), and science communication (100 %). The partner 10 is among the best in managing science evaluation 89 %), internationalization of HR and mobility (100 %), grant preparation and implementation (83.3 %), core facilities (100 %), and science communication (100 %). The partner 6 is very good in managing science evaluation (77.8 %), grant preparation and implementation (66.7 %), research infrastructure (83.3 %), technology transfer and IP, and science communication (85.7 %). These partners also declared notable strengths resulting from systematically developed and implemented rules of functioning, research support services and working conditions for their research staff in the SWOT analysis presented in the A part of the D1.2 deliverable. In addition, their national environment seems relatively supportive to research activities and their countries rank best among the innovators from the less developed parts of the CEE region.

Taken all these facts together, it is conceivable that both internal and external conditions with the transparent, predictable and sustainable rules are the main factors contributing to the success and potential impact of the research activities in the A4L_ACTIONS partner institutions.

5.2.2 KNOWLEDGE TRANSFER

The analysis of the knowledge transfer was performed in order to see, whether and how it is affected by the managerial practices as well as the research outputs of the A4L_ACTIONS partners. We collected the data related to cumulative numbers of PCT applications, licenses and IP assignments, and spin-offs/start-ups exploiting the know-how of the institutions. The results are presented on Figure 5.11.

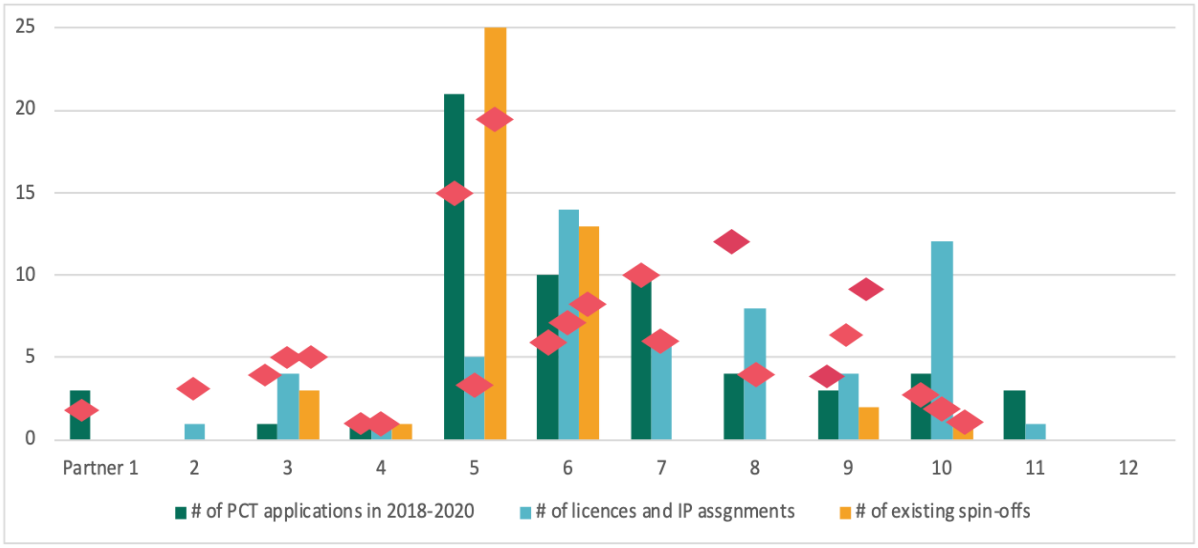


Figure 5.11
Numbers of PCT applications, licenses and IP assignments submitted and spin-offs established in the period of 2018-2020 in the A4L_ACTIONS institutions*. The red diamonds indicate the situation in the period of 2015-2017.*

The knowledge transfer activities reported by the A4L_ACTIONS project partners for the period of 2018-2020 were mostly related to diagnostic and prognostic methods (particularly in oncology, neurology, obstetrics), drugs and vaccines, medical devices, innovative micro/nanotechnologies, and innovative materials and biotechnologies.

Comparison of the status of the knowledge transfer in the period of 2018-2020 with the status in 2015-2017 revealed an improved activity of the partner institutions 5, 6, 8 and 10 at least in one out of three indicators. However, when calculated to the research staff FTE, the partner 7 shows the best knowledge transfer activity, followed by the partners 5 and 10. All the partners mentioned here declared the managerial practices that include technology transfer strategy, institutional IP policy, dedicated funds for IP protection, technology transfer offices networked on national/international level, and trainings on the knowledge transfer issues. This supports the view that systematic targeted management and support of the knowledge transfer can stimulate the activities in this domain.

5.2.3 FUNDING AND GRANTS

Research funding is a strategic instrument that is aimed at stimulation of scientific excellence and innovation activities. Over the past few decades, national research systems face an increasingly competitive environment for ideas, talents and funds. In reaction to this development, many governments have turned to more competitive forms of funding based on performance-based schemes[27]. Important attributes that determine the successful application of these schemes include the composition of key performance indicators, volume of support, predictability, stability and structure of the funding (mainly investments into research infrastructure and human resources).

[27] https://www.sciencedirect.com/science/article/abs/pii/S0048733318300726, https://www.oecd.org/sti/Draft_Report_public_funding_instrument_final.pdf https://academic.oup.com/spp/article/48/2/265/6184850

However, not all countries that have joined the European Union since 2004 and that are mostly located in the Central and Eastern Europe (CEE), have already adopted this strategy in its full complexity and therefore fail to sufficiently nurture excellent research with societal relevance[28]. Moreover, the volume of funding, irrespective of the type (institutional vs performance-based, or basic research vs applications) in the less developed CEE countries is ranging from suboptimal to profoundly low when compared to the advanced EU countries. This reduces their competitiveness in the European Research Area as well as in the global dimension, which translates into an overall lower participation in the prestigious EU projects and a lower attractiveness for excellent researchers[29].

VOLUME OF FUNDING

Here we mapped the situation in the funding and grants of the A4L_ACTIONS partner institutions. Total volume of the funding (both institutional and competitive) spent and awarded during the period of 2018-2020 is shown on Figure 5.12. No major differences could be seen, when compared to the situation in 2015-2017 (except the institutions 3 and 4 that declared approximately twice higher awarded funding). Some disproportions can be assigned to the specific features of the individual A4L_ACTIONS institutions related to their engagement in teaching or clinical work, variable involvement of supporting staff and diverse funding structures as demonstrated further below.

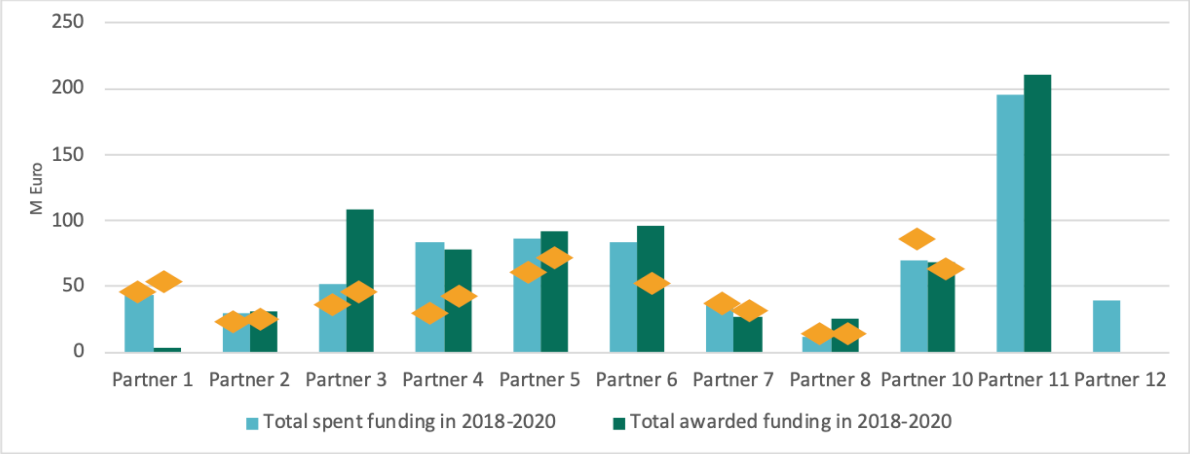


Figure 5.12
Total funding in Millions of Euro spent and awarded to the A4L_ACTIONS institutions in the period of 2018-2020. *The orange diamonds indicate the situation in the period of 2015-2017.*

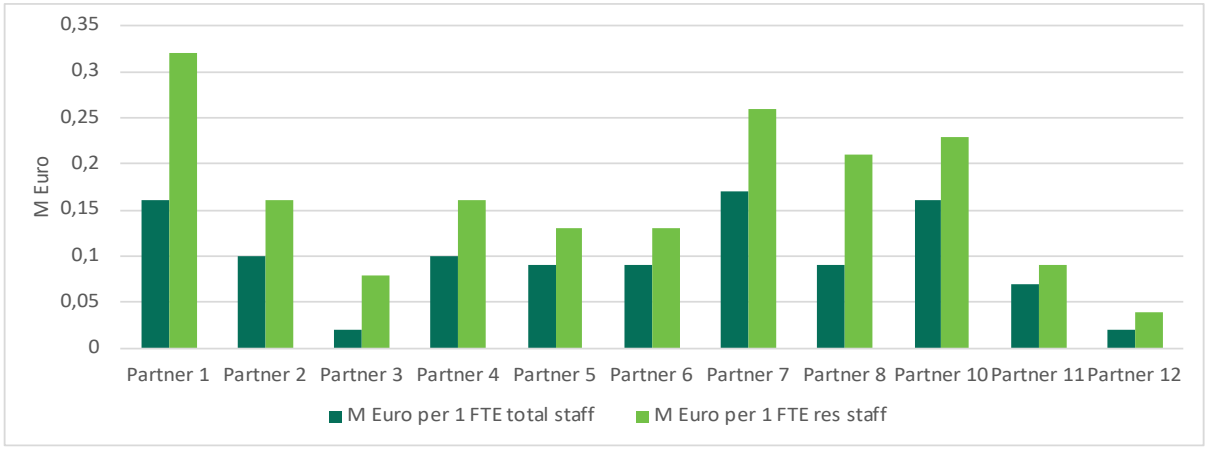


Figure 5.13
Funding in Millions of Euro spent in the A4L_ACTIONS institutions in the period of 2018-2020 calculated per FTE od total staff and research staff, respectively.

[28] https://academic.oup.com/spp/article/46/1/105/5037253
[29] https://www.europarl.europa.eu/RegData/etudes/STUD/2018/614537/EPRS_STU(2018)614537_EN.pdf

We then calculated the funding spent per total and research FTE to get an information of the relative funding volume. The results are exhibited on Figure 5.13. Interestingly, those partner institutions that were best performing in the scientometric parameters and technology transfer do not specially stand out in the volume of their spent funding. This fact further underlines the role of national environment, managerial practices and internal institutional culture in building and sustaining research excellence.

The institutions 3 and 12 declared the lowest relative funding per FTE and this translated into the highest numbers of publications per 1 Million or Euro spent in the period of 2018-2020, which might be due to contribution of non-research staff (teachers and clinicians) to the publication output. However, this is just an assumption that would need more detailed situation analysis.

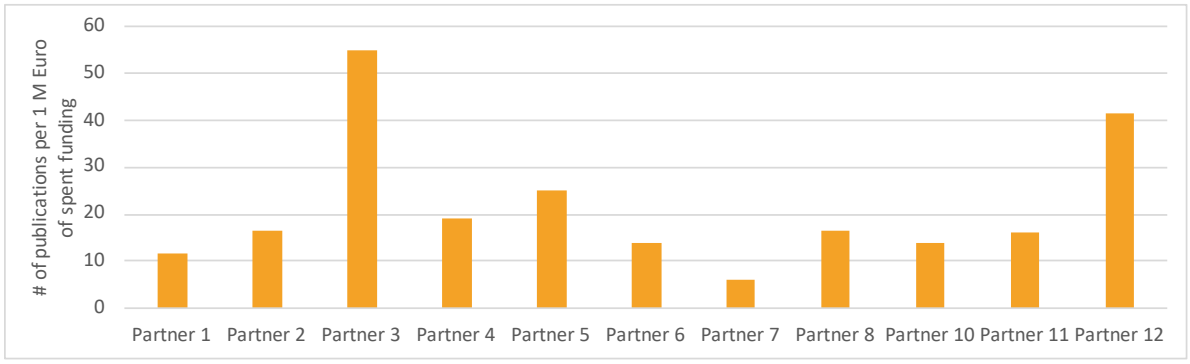


Figure 5.14
Relative number of papers per Millions of Euro spent in the A4L_ACTIONS institutions in the period of 2018-2020.

STRUCTURE OF FUNDING

The structure of funding awarded in 2018-2020 is illustrated on Figure 5.15 (absolute values in M Euro) and Figure 5.16 (proportion of diverse funding sources).

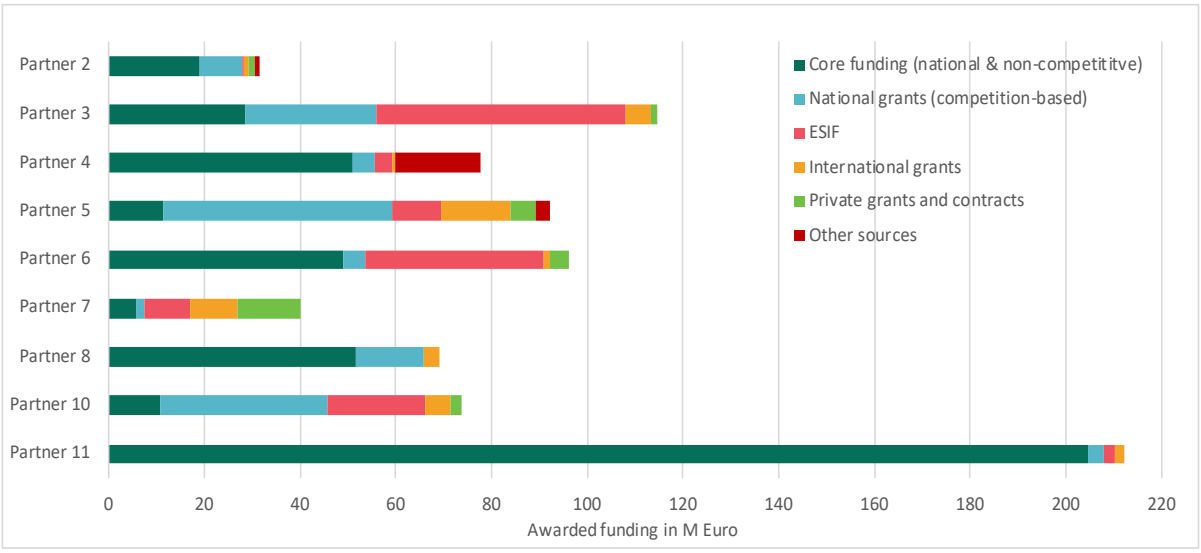


Figure 5.15
Total funding in Millions of Euro awarded to the A4L_ACTIONS institutions in the period of 2018-2020. *The partner 1 reported no data on core funding, national funding and ESIF.*

The A4L_ACTIONS partner institutions display relatively big differences in the proportion of the funding sources, to a large extent reflecting the national research funding systems and the type of the concrete institution, being it public universities, hospitals or research institutes. Thus, the partners 2, 4, 6, 8, and 11 received institutional funding that represented more than a half of the total funding, while the partners 3, 5, 7 and 10 are more dependent on competitive funding. Specifically, the institutions 3, 5

and 10 are funded primarily via competitive national projects, whereas the partner 7 showed the biggest proportion of the funding from international grants and private sources, in accord with its prominent position in the knowledge transfer activities. In absolute values, the institution 5 received the biggest funding from the international grants (see Figure 18), namely the EU grants as shown in the Table 5.1.

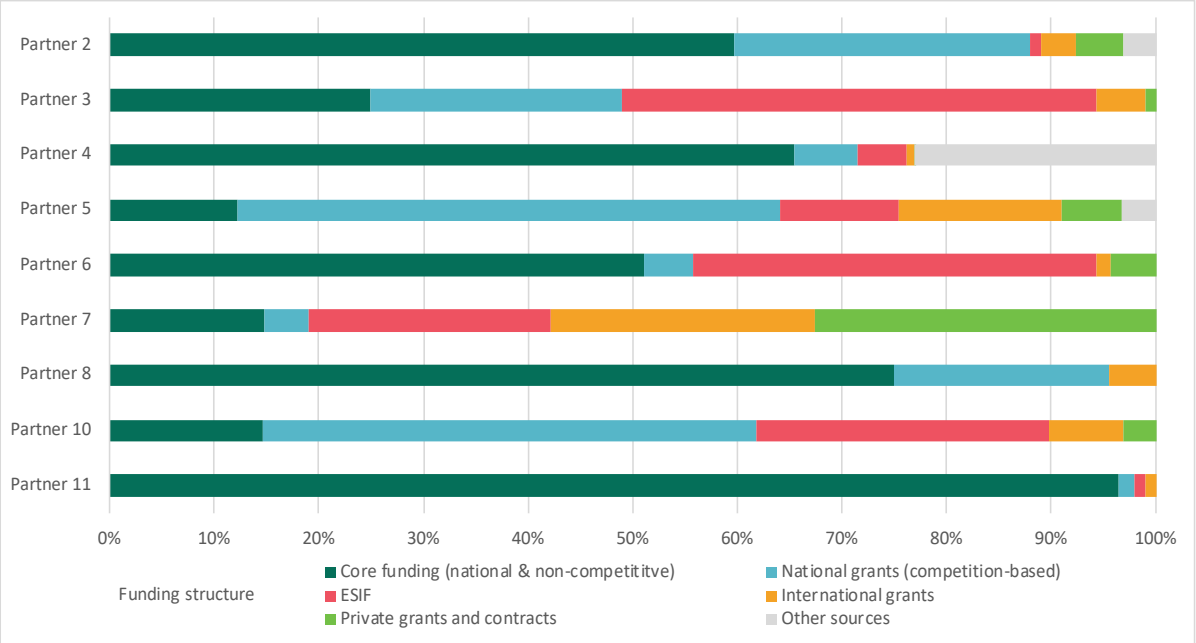


Figure 5.16
Structure of the funding (%) awarded to the A4L_ACTIONS institutions in the period of 2018-2020.

However, it needs to be emphasized that for some of the institutions, high proportion of the non-competitive funding stems from national education budget and not research budget, whereas the competitive funding is the sole source of funding for materials, reagents, and research equipment, meaning that research output is highly, if not entirely, dependent on competition-based resource allocation. Importantly, at these institutions, which are typically highly involved in higher education, a more detailed and extensive analysis of the budget allocation would therefore be required to establish how and to what extent non-competitive (education) budget contributes to the research output.

Table 5.1
Numbers of EU projects implemented by the A4L_ACTIONS institutions in the period of 2018-2020.

	Total EC-funded	H2020 ERC	H2020 HEALTH	H2020 MSCA IF	H2020 MSCA ITN	H2020 MSCA RISE	H2020 Teaming	H2020 Twinning	H2020 ERA-Chairs	H2020 LEIT	H2020 FET	H2020 SC	ERA-NETS	IMI	EURO-STARS	Other*
Partner 1	9		3	1	2	1	1					1				4
Partner 2	11		1					1				1	8			15
Partner 3	6		4									1		1		59
Partner 4	4		3									1				1
Partner 5	49	3	12	1	3	3	1	7	4	1		1	11	2		37
Partner 6	5		2	1	1							1				13
Partner 7	27		2		3	2	1	2				1	12	2	2	16
Partner 8	9				2				2			1	2	2		29
Partner 9	16	2	10		2	2										3
Partner 10	12	1	2	3	1	2	0	1				1		1		8
Partner 11	4				1							2	1			2
TOTAL	152	6	39	6	15	10	3	11	6	1	0	11	34	8	2	187

**other international, non-EC funded projects*

The numbers of the EU projects implemented by the A4L_ACTIONS partner institutions divided according to the different funding schemes are shown in the Table 1. Correspondingly with the data from the amount of funding displayed above on Figure 5.15, the institutions 5 and 7 are the most successful in competing for EU grants (it should be noted that the institution 7 has about 4.5-times smaller research staff capacity than the institution 5). When considering the most prestigious EU grants

(ERC, MSCA, Teaming and Twinning), excellent performance is exhibited by the institutions 5 and 10. As already mentioned above, these institutions have adopted the best managerial practices in the grant support, as shown by the survey analysis in Chapter 4 of D1.2.

5.2.4 HUMAN RESOURCES

Building of high-quality human capacities based on principles of equal opportunities, inclusiveness and diversity, ethics and integrity and allowing for work-life balance, academic freedom and knowledge sharing is a key determinant of research excellence. Different types of research institutions have distinct strategies to acquire and support human capacities in order to secure sustainable functioning and progressive development. In order to understand, how the managerial practices declared in the part 4 of the D1.2 deliverable are mirrored in the real life with regard to the composition of the human capacities, gender balance, generation continuum and internationalization, we performed the analysis of HR-related data collected from the A4L_ACTIONS institutions.

There are relatively big differences in the numbers of employees among the A4L_ACTIONS partners. Additional differences are apparent in the proportion of the research staff in relationship to the other categories, such as supporting technical staff and administrative staff. The highest proportion of the research staff was reported by the partners 11, 10 and 5, whereas the highest proportion of the supporting technical staff was reported by the partners 8, 1 and 6, and the highest proportion of the administrative staff works in the institution 3. These differences are determined by the primary character of the work performed at the partner institution (research vs teaching vs clinical work) and are also affected by the institutional practice of how HR data and HR categories are recorded in the institutional systems and further processed and reported in the datasets to this D1.2 deliverable.

However, it also needs to be mentioned that the proportion of time that research staff spends at doing research may widely differ. Indeed, professors and other higher education staff may be classified as research staff, but they spend a significant proportion of their time doing the teaching and/or clinical work, meaning that FTEs are often not directly comparable among different categories of the staff (e.g. full-time researchers who do not teach vs. lecturers who teach as well as do research) not only among the different partner institutions but even within the same institution.

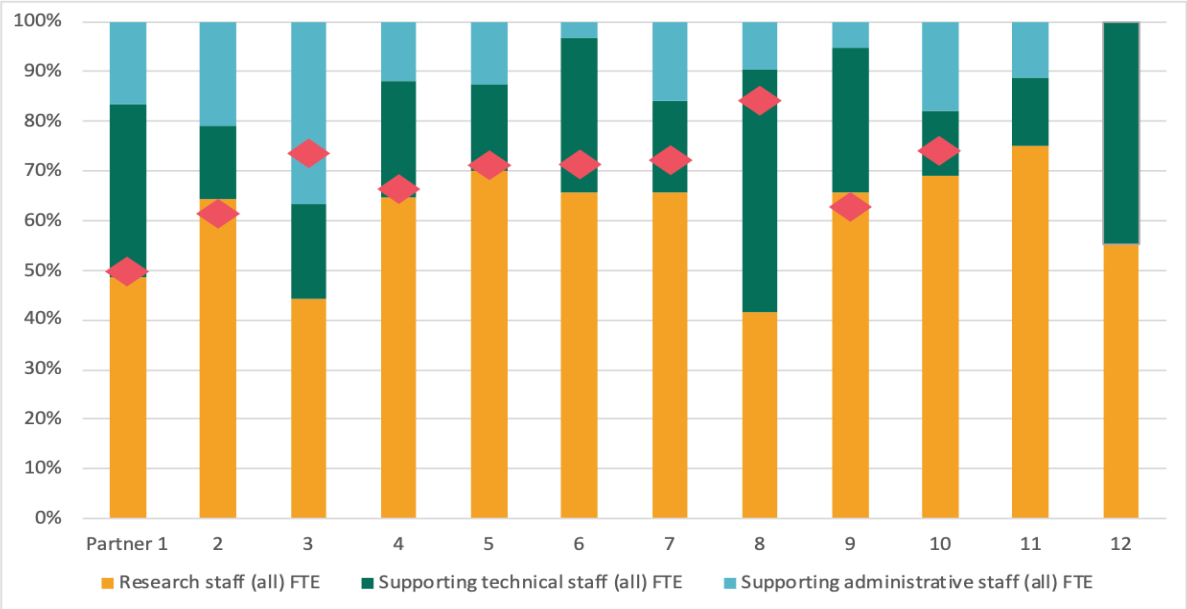


Figure 5.17
Proportion (%) of the main staff categories in the A4L_ACTIONS institutions in the period of 2018-2020. *The data calculated from full-time equivalents (FTE). Red diamonds indicate the % of research staff in the period of 2015-2017.*

GENDER EQUALITY

The majority of A4L_ACTIONS partners show a very good gender balance both with respect to the total staff and the research staff, except the institution 2, which has a very high proportion of the females both totally (85 % FTE) and in the research staff (86.9 %). On the other hand, the partner institutions 1 and 3 display more females in the total staff, but the proportion of females is much lower in the research staff (58.2 % versus 40.3 % at the institution 1 and 65.6 versus 28.7 % at the institution 3, respectively). The proportion of the females at the available PI positions is lower compared to their proportion in the research staff, ranging from 18.9% (institution 10) to 59.5% (institution 2). The institutions 4 and 8 have an equal proportion of the female and male PIs, which is similar to the proportion of the females in their research staff (see Figure 5.18).

Figure 5.18
Proportion (%) of females in total and research staff of the A4L_ACTIONS institutions in the period of 2018-2020. *The data were calculated from full-time equivalents (FTE). NO data on PI positions were available in case of institutions 1, 3, and 12.*

The distribution of the female research staff at different positions is shown on Figure 5.19. In all partner institutions, the major proportion of females are at the position of the staff scientists, followed by the post-docs or the PhD students, and the PI positions. Generally, there are variable causes for gender imbalance, such as objective reasons delaying the career advance (e.g. maternity leave, caring responsibilities for children or closed relatives) as well as certain stereotypes in perception of the capabilities and roles of women in the society. These stereotypes represent barriers to equal opportunities that need to be addressed in order to build healthy and respectful institutional culture. Several institutions already have in place (the institutions 10, 3, 2) the Gender Equality Plan and work to improve the career prospects for the women. This important issue is also in the focus of the European Commission, through implementing the 2020-2025 strategy and monitoring the development in this area using the Gender equality index indicators[30]. Finally, it needs to be emphasized that classification of research staff differs across institutions, which may have affected the analysis. For instance, different definitions of a postdoc, which can sometimes be relatively narrow and/or specific, have most likely contributed to the variability of the number of postdocs reported at partner institutions

[30] https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_357, https://eige.europa.eu/gender-equality-index/2021/country

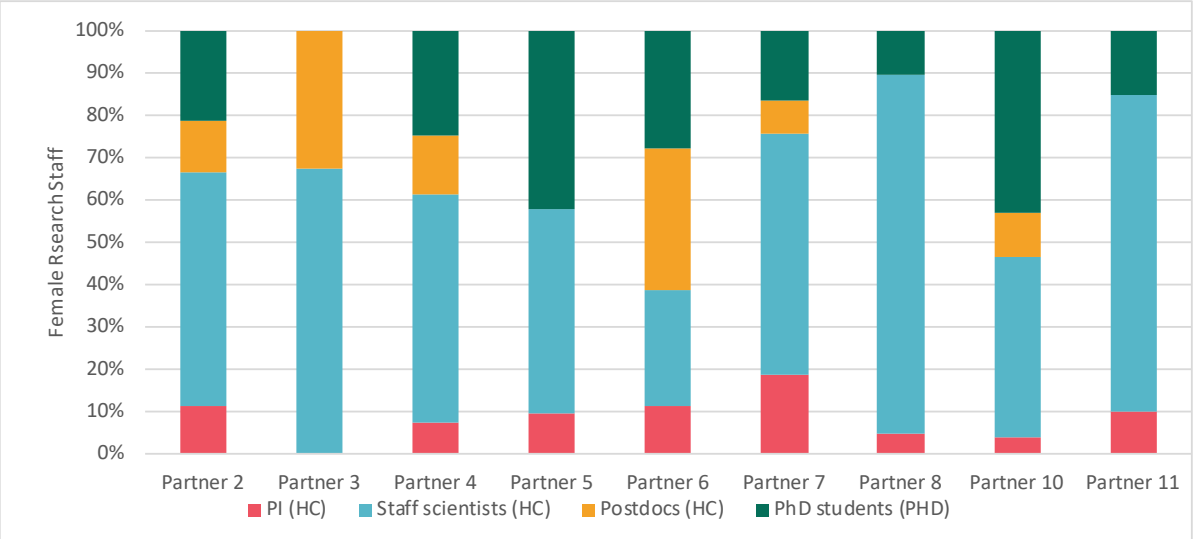


Figure 5.19
Proportion (%) of females at different positions within the research staff of the A4L_ACTIONS institutions in the period of 2018-2020. *The data were calculated according to head-counts (HC).*

INTERNATIONALIZATION

The internationalization of research institutions via attraction and accommodation of excellent researchers from abroad is an important factor with a great potential to improve the research performance. However, its practical implementation faces several barriers both at the macro-level (history, language, cultural traditions, country size, country wealth, geographical distance), and at the institutional level (reputation, resources). There are also personal issues, such different languages, managing personal/family commitments, managing work commitments and time commitments to initiate/conduct the collaboration[31]. The institutions have to develop increased efforts to create the formal, social and financial conditions attractive for the foreign researchers and/or conducive to the acquisition and implementation of the prestigious international grants. In addition, the concept of internationalization needs supportive national strategies, which have not been brought to practice in all less developed CEE countries to the necessary extent.

Figure 5.20 shows the percentage of international researchers in the research staff of the A4L_ACTIONS partner institutions in the period of 2018-2020. The highest degree of the internationalization has been achieved by the institution 10 (41.3 %), 1 (32.8 %) and 5 (14.7 %), which is better compared to situation reported in the previous project for the period of 2015-2017, suggesting an improvement that is apparently resulting from the long-lasting strategy. This is supported by the results of the survey in Chapter 4 of the D1.2, in which all three above mentioned institutions exhibited the best managerial practices in the topic of Internationalization of human resources and mobility.

The international researchers were mostly recruited to the positions of the staff researchers, rather than to the PhD student and post-doc positions (Figure 5.21). Principal investigators are mostly in minority (1 international PI of total 37 PIs in the institution 2; 12 international PIs of total 117 in the institution 5; 9 international PIs of total 139 PIs in the institution 6; 3 international PIs of total 49 PIs in the institution 7). The institutions 4, 8, and 11 have no international PI and the institutions 1 and 3 provided no data. The highest proportion of 8 international PIs of total 37 (21.6%) was reported by the institution 10. The red diamonds in the figure below indicate that the situation has improved in comparison with the results reported during the previous Alliance4Life´s project for 2015-2017.

[31] https://www.europarl.europa.eu/RegData/etudes/STUD/2019/634444/EPRS_STU(2019)634444_EN.pdf

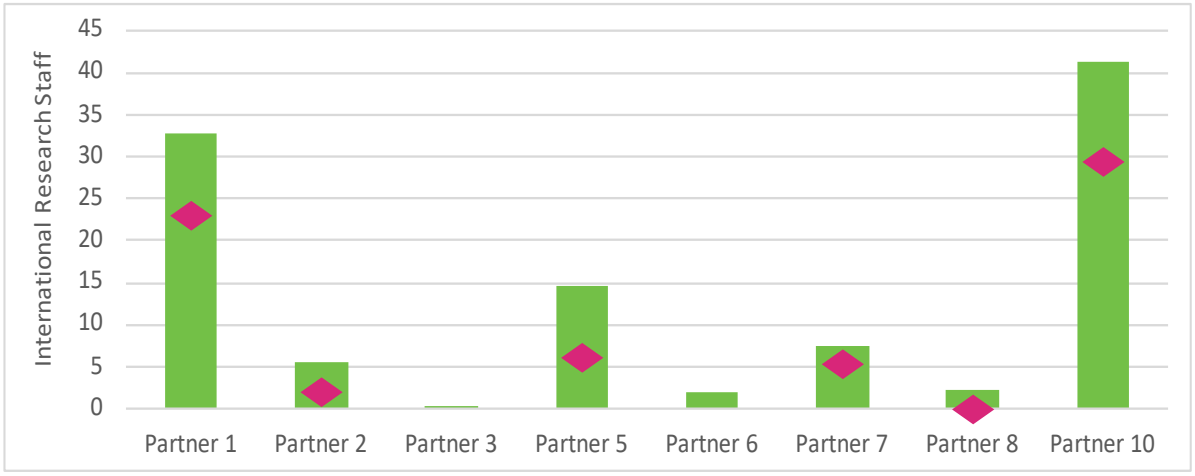


Figure 5.20
Proportion (%) of the international researchers out of the total research staff working at the A4L_ACTIONS institutions in the period of 2018-2020. *The data were calculated according to head-counts (HC). Red diamonds indicate the situation in the period of 2015-2017. The partners that have not been involved in this graph did not refer any international researchers in their staff.*

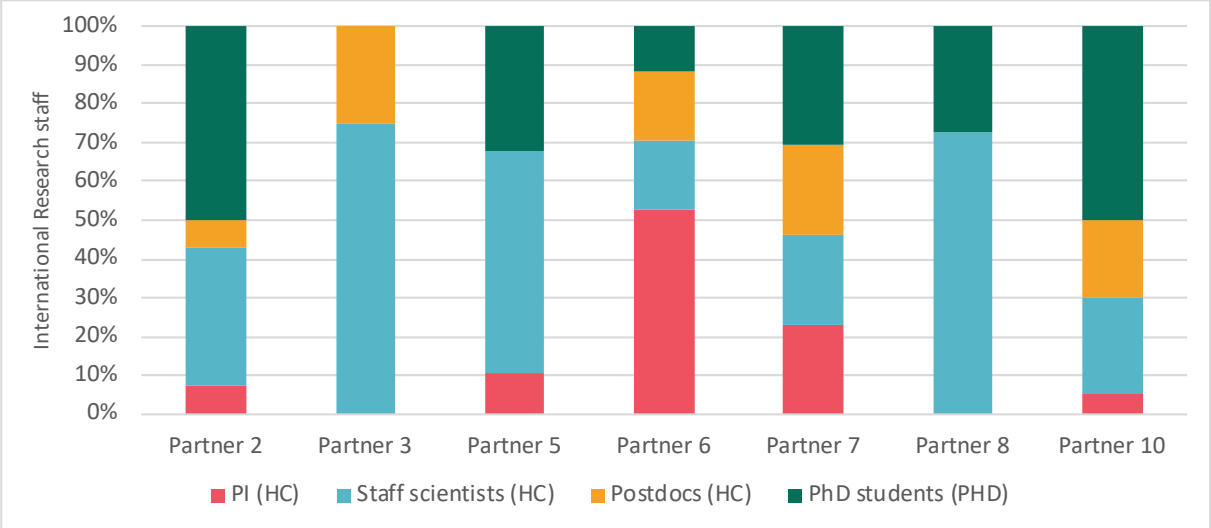


Figure 5.21
Positions (%) of international researchers working at the A4L_ACTIONS institutions in the period of 2018-2020. *The data were calculated according to head-counts (HC).*

5.2.5 CORE FACILITIES AND/OR SPECIAL INFRASTRUCTURES

The last, but an equally important part of this benchmarking analysis was aimed to provide an overview of the implementation of the core facilities concept as well as of the use and operation of special infrastructures as a means for providing highly professional expert services and advises to both internal and external research investigators, or to industrial partners.

We collected the data on the number of the commercial partners/contracts in the period of 2018-2020 (Figure 5.22), as well as the volume of these contracts in M Euro in comparison with the situation in the period 2015-2017 (Figure 5.23). Except of the institution 7, all other partners recorded increased number as well as volume of contracts.

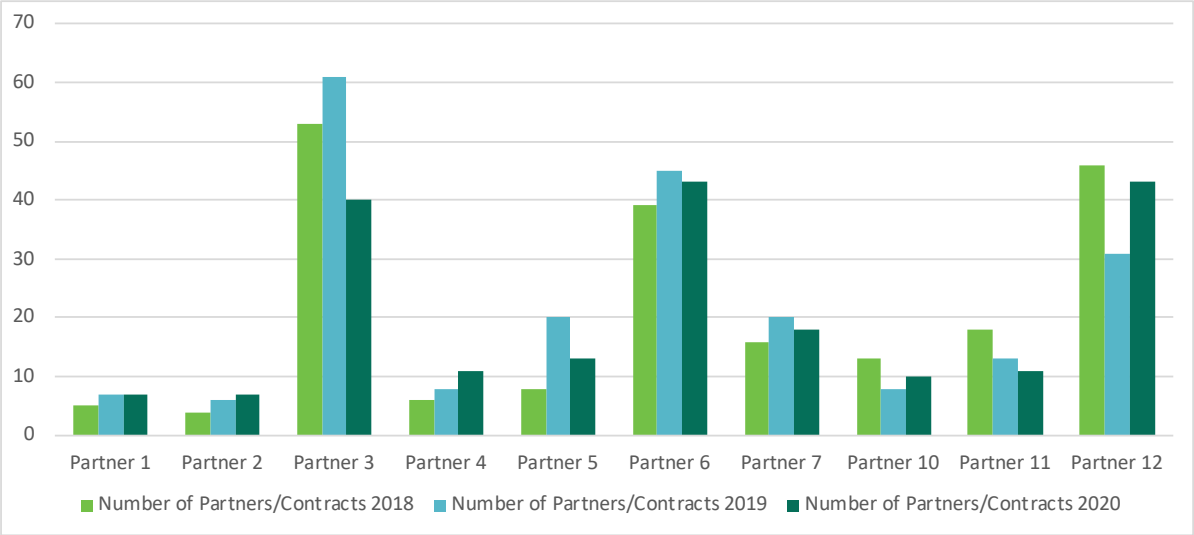


Figure 5.22
Numbers of commercial partners / contracts of the A4L_ACTIONS institutions in the period of 2018-2020.

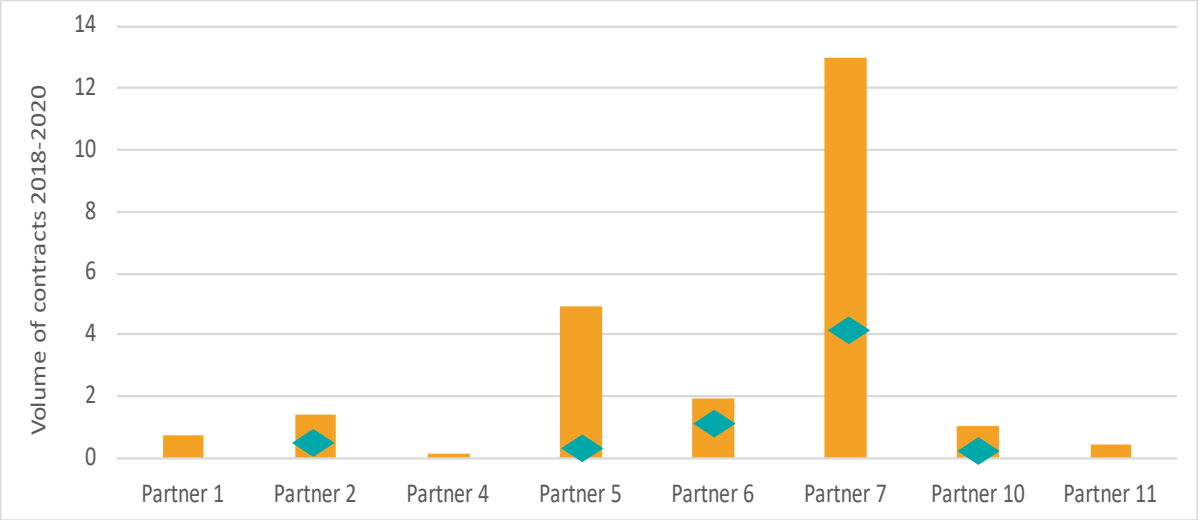


Figure 5.23
Volume of commercial contracts of the A4L_ACTIONS institutions in the period of 2018-2020 in Millions of Euro.
Blue diamonds indicate the situation in 2015-2017.

As declared in the survey of managerial practices described in the Chapter 4 of this deliverable, several A4L_ACTIONS partner institutions have introduced the model of the specialized service-oriented core facilities (CF), while the others did not fully bring this model into practice and thus the data for the benchmarking analysis of core facilities is not complete. In some cases, CF operation is difficult to be properly managed due to the continuous lack of national resources for investments into the update and/or sustainability of the technologically advanced infrastructure. However, the implementation of the CF concept in the latter A4L_ACTIONS institution is in process and will be supported by the best practices and advises from the more advanced partners.

Coverage of the running costs from the CF earnings reported by the partners 1, 2, 3, 4, 7, and 10 ranges from 3 % (in the institution 3) to 75 % (in the institution 1). Most of the partners reported modest, but steady increase in the coverage of the CF running costs from the services up to 2019, which was then partially hampered by the COVID-19 pandemics in 2020.

Several partners also declared the full memberships in the international infrastructural networks, including ECRIN, EATRIS, ELIXIR, EVA GLOBAL, BBMRI ERIC, EMBL, Instruct-ERIC, and Euro-Bioimaging.

These memberships contribute to the transfer of knowledge necessary for an effective operation of each type of the CF and bring clear benefits to all members. The most active in this aspect are the partners 1 (7 memberships), 10 (5 memberships) and 7 (3 memberships).

Figure 5.24 illustrates the relative usage of the CF by different user groups. The CFs of the A4L_ACTIONS institutions are entirely or mostly used by their internal research staff and in less extent either by the external academic staff (particularly in the institutions 4 and 5) or the external commercial staff (in the institutions 4, 5, and 7). Thus, the CFs of the institutions 4, 5, and 7 appear to be the most open to the external users.

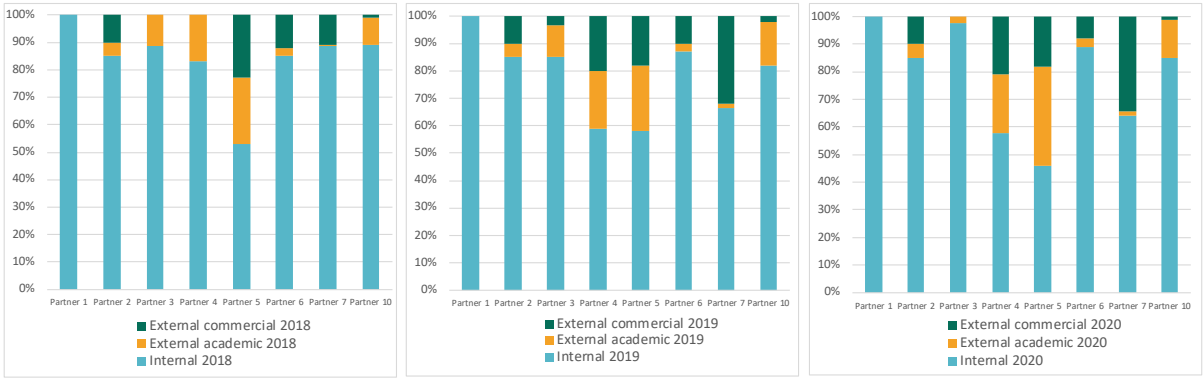


Figure 5.24
Relative usage of the CF by the different user groups of the A4L_ACTIONS institutions in the period of 2018-2020.

Taken together, the analysis related to the operation and usage of the core facilities and/or special infrastructures revealed the diversity of approaches employed by the A4L_ACTIONS institutions. As it was already explained in the deliverable D2.1 Assessment report of the previous Alliance4Life´s project[32] there are also diverse conditions for the CF implementation and sustainability at the national levels. Some CEE countries provide support to CF activities via the National sustainability programmes and/or have other instruments for this purpose. However, despite these disparities, there is always an important role of the institutional strategy and the progressive management stimulating changes that enable meaningful sharing and effective exploitation of the infrastructure.

5.3 CONCLUSION

The Benchmarking analysis of A4L_ACTIONS partner institutions revealed that the quantity and especially the quality of research outputs are being influenced by many intersecting external and internal factors that concurrently create the research environment. The conditions for excellent research are strongly determined at national level by science policy, system of research funding, quality of education, innovation strategies, legislation enabling cooperation between academia and industry, as well as social status of researchers. These external factors markedly affect the principal prerequisites for a solid and sustainable research, namely the amount and predictability of resources as well as ability to stabilise valuable human capacities and attract excellent researchers from abroad. However, these external factors have to be supplemented by internal factors, including high quality research management at the institutional level, fair and complex performance evaluation, system of motivations and rewards, professional services to support researchers in their creative activities and clear institutional strategies.

[32] https://alliance4life.ceitec.cz/assessment-report-2019/

The benchmarking exercise presented here in the context of SWOT analysis, survey on managerial practices and survey on institutional culture clearly shows that the best performing partners in terms of research outputs work in the environment of relatively well functioning national systems, well implemented practices of institutional management and well-developed internal research culture. This analysis also demonstrates that most of the A4L_ACTIONS partners are aware of the challenges related to the creation of an institutional environment that enables excellent research. Despite objective barriers and threats, all A4L_ACTIONS partners can demonstrate very good research achievements that reflect their endeavours and deep interest for improvement. This is particularly visible when comparing the outputs of the period of 2018-2020 with the outputs of the preceding period of 2015-2017. However, it has to be taken into account that the year 2020 was affected by the COVID-19 pandemics, which interfered also with research activities.

6. NEXT STEPS

This Self-assessment Report is one of the **key deliverables of the A4L_ACTIONS project**. Its purpose was to understand how external and internal conditions shape research performance and to follow the progress of the partner institutions in comparison with the previous project period.

To our knowledge, this is the first self-assessment report based on **the complex evaluation of the benchmarking indicators combined with the elements of research culture**, which was elaborated by the research institutions **in the CEE region** by the so-called EU-13 countries that have joined the European Union since 2004, are mostly are located in the CEE region and belong to WIDENING countries. It is important to note that this report results from the inherent motivation of the A4L_ACTIONS partners to assess own performance in the context of similar institutions of the CEE region using consolidated assessment structure and indicators as well as to share experiences and good practices. This approach can offer benefits to all stakeholders, including:

- **A4L_ACTIONS partner institutions** themselves through identification strategic instruments and **clear formulation of specific actions** required for the future institutional development,
- **national policymakers** to understand correlations between science policy and level of research excellence achievable in particular national environment, and
- the **European Commission** to get insight into realistically available opportunities as well as barriers to be addressed to allow for closing the Research and Innovation gap in the EU and to consider whether and how to translate this information into the strategic decisions affecting the future of ERA.

The A4L_ACTIONS partner institutions can use this Self-assessment Report as a background information for the peer review of performance-based evaluation by the International Scientific Advisory Board (ISAB), members of which can be selected from the A4L database of experts. Results of the peer evaluation will be presented in the deliverable **D1.3 Peer evaluation reports**.

Based on the peer assessment reports, all partners will design **research management strategies with action plans** detailing how the strategic feedback will be implemented in to the institutional practice. The actions resulting from the strategies will be subjected to monitoring by ISAB and will be also mapped through the completion of the same managerial survey as it was done for this report. Implementation of the strategic decisions into real managerial practices will be then summarised in the deliverable **D1.4 Reflection of evaluation conclusions in institutional strategies**.

During the entire process, the representatives of the A4L_ACTIONS partner institutions will have opportunities to consult potential challenges with each other, learn from their experiences, and gain new proficiencies through participation in the Alliance4Life´s trainings dedicated to particular managerial skills.

Thus, the A4L_ACTIONS project offers a unique opportunity for advancing the institutional research governance and thereby contributing to a sustainable development of research excellence in the CEE countries.

7. ABBREVIATIONS

A4L – Alliance4Life or Alliance for Life Sciences
AHA – Active and healthy ageing
BBMRI – Biobanking and Biomolecular Resources Research Infrastructure
BMC SAV – Biomedical Research Center of the Slovak Academy of Sciences
CEE – Central and Eastern Europe
CEITEC – Central European Institute of Technology
CF – Core facility
COVID-19 – coronavirus disease 2019
EATRIS – European infrastructure for translational medicine
ECRIN – European Clinical Research Infrastructure Network
EIT Health – European Institute of Innovation & Technology
ELIXIR – European life-sciences Infrastructure for biological Information
EMBL – European Molecular Biology Laboratory
EMBO – European Molecular Biology Organization
ERA – European Research Area
ERC – European Research Council
ERIC – European Research Infrastructure Consortium
ESFRI – European Strategy Forum on Research Infrastructures
ESIF – European Structural and Investment Funds
EU-LIFE – Alliance of research institutes advocating for excellent research in Europe
EVA GLOBAL – European Virus Archive Global
FP – Framework Programme
FTE – Full time equivalent
H2020 – Horizon 2020
H-index – Hirsch's index
HR – Human resources
ICRC – International Clinical Research Center
IF – Impact factor
IMI – Innovative Medicines Initiative
IOCB – Institute of Organic Chemistry and Biochemistry
IP – intellectual property
ISAB – International Scientific Advisory Board
JIF – Journal impact factor
LERU – League of European Research Universities
LIOS – Latvian Institute of Organic Synthesis
MA – Multi-author
MSCA – Marie Skłodowska-Curie Actions
MU – Masaryk University
MUL – Medical University of Łodz
MUS – Medical University Sofia
NCP – National contact point
PCT – Patent Cooperation Treaty
PI – Principal investigator
PR – Public relations
R&D – Research and development
RIS3 – Research and Innovation Strategies for Smart Specialization
SOP – Standard operating procedure
SU – Semmelweis University
SWOT – Strengths, Weaknesses, Opportunities, Threats
UL – University of Ljubljana
UMFCD – Carol Davila University of Medicine and Pharmacy
UZSM – University of Zagreb School of Medicine
VU – Vilnius University
WT – Wellcome