

REPORT OF THE INTERNATIONAL SCIENTIFIC ADVISORY BOARD OF MASARYK UNIVERSITY, BRNO, CZECH REPUBLIC

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ISAB Composition: Thomas Henzinger, Vienna; Josef Jiříčný (chair), Zurich; Mary O'Connell, Brno; Peter Williamson, Cambridge UK.

PREAMBLE

The ISAB was convened upon an invitation from Vice-Rector Petr Dvořák, with a brief to assess the current standing of the Masaryk University (MU) and its various Faculties, and to provide the leading organs of the University with an analysis of the overall strengths and possible weaknesses of the institution. In the past years, the MU lost numerous places in the world ranking tables, finishing in the 601-800 category as compared to Charles University in Prague, which landed in the 401-500 range. Consequently, the MU leadership asked the ISAB for help and guidance in its efforts to improve these rankings and to set the University on a path to international recognition.

The ISAB heard brief presentations from the Rector, the Vice Rector and the Deans or Vice-Deans of all faculties. The ISAB was also supplied with a report of the International Evaluation Board led by Prof. James Gosling, which visited the MU in July 2012.

The following brief report is based on the above information, as well as on informal discussions held with some of the above persons during the business dinner, which was joined also by the executive director of CEITEC, Markus Dettenhofer.

Day 1:

The ISAB heard a presentation by Roman Badík, Head of the Research Office, who provided us with a global overview of the funds available for research. The ISAB is not familiar with the costs of research (personnel and reagents) and infrastructure (scientific and teaching equipment) in the Czech Republic (CR) to be able assess how the support received from the state and industry compares to other European institutions. However, based on Roman Badík's presentation and on the standard of equipment, as well as the fixtures and fittings seen in the various buildings and facilities of the university that the ISAB visited, the board gained an impression that the MU was funded generously. (This point is discussed in greater detail below.) The funds obtained from international agencies were very modest, but this impression might be erroneous; it is likely that the CR funds include not only direct research costs, but also indirect ones and costs of infrastructure, whereas the international costs probably cover only personnel and reagents costs.

The Vice-Rector Petr Dvořák then gave the ISAB an overview of the overall situation in the CR and reviewed the standing of the MU within the republic, as well as its international ranking. The MU selected Sheffield University, an institution of comparable size, as a reference target for comparison purposes. At the present time, the MU ranks lower than Sheffield in all but one assessed criteria. In the Web of Science, the three most prominent research areas are life sciences, physical sciences and clinical/preclinical sciences, followed by engineering and social sciences. Arts & Humanities lag behind, in spite of having the largest faculty.

The Vice Rector then outlined the strategic priorities of the MU: identify and implement research priorities, improve international visibility, increase the social and economic impact

of research, introduce acquisition and sharing of large equipment, implement evaluation strategy and provide professional research support.

In the second session of the day, the ISAB heard presentations by the rector and by the deans or vice-deans of all the faculties. The rector described the administrative and hierarchical organisation of the university. It appears that the powers of the rector's office are very limited; the decision-making body is the senate, in which all faculties are equally represented (irrespective of size) and where professors, staff and students have equal votes. In such a system, making changes that might improve the standing of the university in the long term, but that might affect the power or budgets of the faculties (or even personal income of staff members) was deemed to be extremely difficult if not impossible.

One aspect that raised concern within the ISAB was the archaic system of promotion. If the ISAB understood correctly, candidates who remain at the MU and obtain a PhD remain at the university and can become professors if they obtain a habilitation. This means that professorships are not competitive, i.e. that a "Chair" is not openly and internationally advertised with the goal of recruiting the very best international candidate.

The other worrying aspect concerned the salaries of the academics. These were said to be low, but the income could be supplemented (up to 5 times!) through internal reward schemes, where bonuses are paid for publications. Moreover, it appears that it is the number of publications, not their impact factor or citations, that brings the rewards. In such a system, the pressure is to publish anything anywhere in order to improve one's income, rather than try to publish in the best possible journal in an attempt to gain international recognition for one's science and for the university. It appears that there is also little demand for competitive grants within faculties, which may indicate that the faculty members don't need the funding, or that winning a grant brings no benefits or prestige.

The final topic of discussion concerned the very high number and variable quality of PhD students. Although PhD programs are in place, their standards appear to be variable and they are failing to attract international candidates. A number of PhD students are working only part time, they are internally financed and there is no quality control of project selection, definition or output.

Day 2:

This was devoted to the presentations of the deans and vice-deans. The ISAB was introduced to the different MU faculties and departments in greater detail than on the previous day. The presenters were all very candid and forthcoming. Interestingly, the topics that raised concern with the MU directors were also mentioned by the deans and vice-deans.

The ISAB then met in a closed session, during which it discussed the presentations, considered the specific points listed by the Vice-Rector as requiring close scrutiny, and attempted to put the strengths and weaknesses of the MU as perceived by the various presenters into perspective.

The ISAB also received *a posteriori* a set of documents including the presentations, the minutes of the various meetings and also the report of the 2012 Evaluation.

What follows is a very concise synopsis of the ISAB deliberations and also a brief set of recommendations.

OVERVIEW

The MU has 35,000 students and 1,600 faculty in 9 faculties. It has more than 3,000 PhD students and ~300 postdoctoral researchers (50% international). It is thus a large university, especially when the intake area is taken into consideration.

The ISAB was very impressed with the MU in general, as well as with the high standard and candid nature of the presentations and the discussions.

The campus in Bohunice and CEITEC are modern infrastructures that even the very top universities would be proud of, but also the older buildings are extremely well maintained and are equipped with state-of-the art technology. The MU also appears to have extremely capable leadership that is aware of the shortcomings and limitations, and that is eager and willing to instigate the necessary changes. However, having read the report of the 2012 Evaluation Committee, the ISAB noted that the problems identified then have not been rectified during the past four years. This is a worrying state of affairs, as it indicates either that the political and administrative system does not allow the MU leadership to instigate the necessary changes, or that their efforts are blocked at the local level. It is difficult for the ISAB to distinguish between these two alternative scenarios. As a result, the ISAB resolved to list several key points that it believes might help the MU achieve its ambitious goals in the not-too distant future, but it has to leave the decisions as to which points should be addressed first to the MU directors, because only they know what is possible and what may be a non-starter.

STUDENTS

35,000 students is a high number for the relatively small intake area. This may signify that the requirements for admittance may be somewhat lax, allowing individuals with limited potential and motivation to study at the MU. The ISAB is aware that the funding of the university is dependent on the number of students, but reducing the intake and raising its potential will rapidly yield results. It is much more satisfying for the faculty to teach a class of bright and highly-motivated students. Bright students also challenge the faculty to improve teaching standards. This could be an ideal opportunity for the Faculty of Education to test the latest interactive teaching methodology for example.

Recommendation 1: The ISAB recommends that MU consider continuing to reduce its student intake, implementing higher admission standards and focusing on attracting the most talented, well-equipped and motivated students.

PhD STUDENTS

The MU has over 3,000 PhD students. (Some faculties have more than 8 PhD students per professor or assistant professor, and for almost all faculties this ratio is greater than 5.) It was the impression of the ISAB that this number was too high, especially as the ISAB was informed that quite a significant number of these candidates do not finish, work part time (37% on average and over 50% in some faculties) and/or take too long (an average length of study is 11.3 semesters). It is critical to select only the brightest, most highly-motivated students to do a PhD. These individuals are the future ambassadors for the university and it is in the MU's interest to ensure that only the best have the privilege to carry the flag.

The MU appears to have PhD programs in place, but the ISAB was told that the selection criteria were often unsatisfactory and that the projects were not subject to peer review. The ISAB believes that this is something that can and must be changed as rapidly as possible.

Recommendation 2: The ISAB recommends the setting-up of program-specific admissions committees composed of 3-5 faculty members and an administrator, who would openly and internationally advertise their respective PhD Program each semester,

filter applications and invite for interview only the very top candidates. The invited candidates should then be interviewed by the panel; they should be asked to present their master projects, and tested on their knowledge and understanding not only of the project, but also of the broader subject of study. (It is imperative that all PhD candidates, including internal ones, be interviewed by the admission panel.)

The candidates who pass the interview should then be given the opportunity to visit several laboratories offering PhD places and select their preferred options. The PIs should also list their favourites and a matchmaking process should then ensure that the candidates end up in the laboratories best suited to them. Within the first 6 months, the candidates would have to develop their projects and defend them in front of a committee of at least three people, which would consist of the direct supervisor, a second member of the faculty and an external member from abroad if possible. This committee should then follow the student annually during the course of the project and ensure that he/she is making satisfactory progress, such that a thesis work can be written and defended within 3-4 years.

Recommendation 3: It is recommended that the students leave the university at the end of their PhD to seek opportunities elsewhere. Remaining as postdoctoral researchers in the same laboratory for more than one year after completion of the PhD work should be strongly discouraged. Students should be allowed to return to the *alma mater* only after a period of at least two years.

At this academic level, turnover of talent is extremely important. It also ensures that postdoctoral researchers are recruited from the outside, which offers a greater choice of candidates and the possibility to select the very best.

Recommendation 4: Only PIs who have externally peer-reviewed and funded projects should be allowed to take on PhD students. This ensures higher project quality and avoids awkward situations when panel members sit in judgement of their immediate colleagues.

POSTDOCS

The MU has around 300 postdoctoral research assistants, at least a half of whom are continuing staying on after their PhD studies. For the reasons outlined above:

Recommendation 5: Available postdoctoral researcher positions should be openly and internationally advertised and postdocs should be hired from outside whenever possible. There is a large choice out there and a university such as MU ought to be able to attract very good ones.

The PIs should not be afraid of letting go of their best PhD students. When they return from their postdoctoral stage(s), they will be even better. However, while they are abroad they should not have an ongoing contract with the MU. Returning postdocs must compete for positions with the rest of the world.

FACULTY

The current promotion procedure to professor (if understood correctly by the ISAB) must be changed. The ISAB is not in a position to judge whether this is possible locally or whether it will require major political effort. But if the quality of the research and teaching - and with it the international standing of the MU - is to improve, we recommend:

Recommendation 6: Vacant faculty positions must be openly advertised in English in top international journals and candidates must be selected by a committee composed of existing faculty and at least three outside (international) members. Promotion of local candidates should be the last resort. Successful candidates should be offered attractive start-up packages, possibly help with housing, schooling etc. with the help of an “international office” to attract top international candidates.

Recommendation 7: Mobility is a key aspect of modern science and existing faculty should be strongly encouraged to take sabbatical leave every 6-7 years.

The fear that the professors may not return from their leave is largely unfounded in the opinion of the ISAB. It is not easy nowadays to find positions in “The West”, certainly not ones as well endowed as those at MU. Should some faculty stay out, this will provide the MU with vacant positions to be filled in open competition - i.e. a possibility to find someone even better. The ISAB is not aware how sabbatical leaves are compensated, but if the MU were to pay the travel costs, salaries and housing costs of the professors during their stay abroad, this would meet with higher compliance. How this scheme could be funded is suggested below.

Greater visibility of the MU faculty abroad will bring with it the much-desired international recognition, including possibly also the first EMBO members.

Recommendation 8: A revised tenure track process for assistant professors should be created, including a transparent performance review by independent assessors including international academics, which takes into account performance (research publications - particularly international), citations, and international sabbatical activities among other usual criteria.

DISTRIBUTION OF RESOURCES

The ISAB had the impression that the MU, and especially the faculties, have considerable resources at their disposal. It was also the impression of the ISAB that these resources are distributed too widely, mostly in small amounts and without open competition. The ISAB was not shown the budgets of the Rectorate and the individual faculties, and it therefore cannot make specific recommendations regarding their distribution. However, the ISAB feels that transparency regarding the MU funds and their distribution would result in greater trust towards the MU leadership, encourage open competition for these funds and most likely also encourage the MU faculty to make suggestions regarding their fair and optimal distribution. Paying bonuses for publications, irrespective of journal impact factor, language or citations encourages publishing for personal gain rather than international recognition. Instead of paying for publications, the MU should require the faculty to bring in international competitive funding in return for providing them with excellent scientific environment and infrastructure. Bonuses (e.g. a percentage of grant overheads) at this stage might be more appropriate and would encourage the faculty to strive for the highest- rather than the lowest-hanging fruit.

The ISAB also noted that the MU distributes a substantial amount of funds in the form of grants. It is difficult to judge how stringently peer-reviewed these grants are, but the ISAB had the impression that the review process is only internal and possibly not very competitive. Moreover, the sums distributed appeared to be rather low. Distribution of funds “with a watering can” is popular, because (almost) everyone gets something. But competitive distribution of larger sums means that only those who really merit the awards succeed in

obtaining them. This may create shortages among the less successful and will force them to try harder. The MU is privileged to have these resources, but the ISAB would recommend:

Recommendation 9: That resources be distributed subject to stringent peer-review and that the grants are fewer in number, but the sums are more substantial, so as to permit the successful applicants to fund, for example, an international postdoc for 5 years plus consumables (paid on e.g. the EMBO scale).

Recommendation 10: That MU design a system for distributing internal funds with mechanisms that reward the desired performance (e.g. by considering the international impact of publications, rewarding rather than punishing the acquisition of external funds through the allocation of overheads).

This will mean deviating from distribution according to how the funds are received based on, for example, the number of students taught or papers published.

Another important aspect of the resources available to researchers is the use of assets (e.g. equipment) and other services provided by MU. The ISAB has concerns about the effectiveness, efficiency and equity with which these services are currently allocated. We believe that it is important that the system for allocating asset capacity and services makes them available for the most promising potential use and ensures that users take into account both the direct costs and the opportunity costs of their use of these services. The ISAB therefore recommends:

Recommendation 11: That MU charge for scientific services on a “pay-per-use” basis to research groups and external users based on tariffs that reflect both the true costs and the research priorities of MU.

RANKING

The MU is dissatisfied with its current position (601-800) in the tables of world rankings. The ISAB believes that adopting the measures outlined above will bring rapid benefits to the MU, which will be soon reflected also in the ranking position of the university.

In addition, however, it needs to be recognized that any ranking system may generate potentially large changes in the position of an institution based on a few specific criteria. These cannot be neglected if MU is to sustainably improve its position and are probably partly the reason for the recent drop.

The ISAB advises the leadership of the MU to scrutinise closely the criteria that the various ranking organisations take into account and - most importantly - their relative weighting. It is possible that an improvement in one or a few specific areas may bring about an upward jump without much effort.

Looking at the most recent QS and THE rankings, the ISAB noted four criteria where MU's scores have been particularly harmful to its ranking: citations, industry income, teaching reputation, and research reputation. Targeting some of these areas can lead to a rapid improvement in MU ranking, supporting longer-term actions to improve its position. We believe this can be achieved by implementation of the following recommendations:

Recommendation 12: That MU improve its citation score by shifting faculty incentives to strongly encourage publication in international journals (rather than focussing on the number of publications, many of which are in journals that are seldom cited).

Recommendation 13: That MU improve its industry-income score by more active efforts to secure industry income, backed by shifting faculty incentives and overhead allocation mechanisms to encourage sourcing of industry income (notwithstanding that we appreciate that industry income available in the local region may be limited and so efforts may need to look further afield or abroad).

Improving teaching and research reputation scores will require sustained efforts, but the ISAB believes its recommendations on students, PhDs and post-docs, faculty recruitment and promotion (including encouragement for sabbaticals abroad) can make an important contribution to improving these scores, helping MU to consistently climb in the rankings. Because reputation is based on visibility and exposure of the institution, the ISAB further recommends:

Recommendation 14: That MU make an effort to increase its international visibility by opening its doors to more senior academics from abroad. These should be invited to give lectures, courses and also to spend their sabbatical leave at the MU. Although the latter might require that the MU help the visitors with housing costs, school fees etc., it is an investment worth making, given that the visitors are likely to recommend the MU to their students e.g. as a place to do their postdoc or to start their independent academic careers.

CLOSING REMARKS

The ISAB is grateful for having been given the opportunity to visit the MU. The leadership of the university should be congratulated on its efforts to improve the national and international standing of the university. The ISAB is aware of the enormity of the task, especially given the political and administrative restrictions that make autonomous governance and implementation of changes extremely difficult. But the ISAB is of the opinion that implementation of at least some of the concepts listed above might bring about rapid improvements.

Even though some of these changes might appear to be small, their implementation will help motivate the staff and students. This is important, because the ISAB noted a certain air of despondency among the faculty, possibly because they believe that nothing will change. The MU leadership could change this situation by openly communicating the recommendations of the ISAB, by rapidly implementing the changes within its powers and by actively involving the faculty in bringing about the changes requiring a joint effort. This might inspire everyone to fight for the bigger goals with energy and enthusiasm, rather than seeing their up-to-date efforts go unrewarded.

The MU is a very good university with a substantial future potential. Its leadership set itself the task of realising this potential and the ISAB is going to do its very best to try and help it achieve this ambitious goal.