State Comptroller of Israel | Annual Report 71C | 2021

Institutions for Higher Education

Joint Research Facilities at Higher Education Institutions

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Background

Advanced scientific research needs two critical components – outstanding researchers, who strive to expand the boundaries of scientific understanding, and state-of-the-art research facilities to carry out their research. The research facilities needed for innovative research at the vanguard of science are becoming larger, more complex and very expensive. The costs of establishing and operating facilities used for advanced innovative research often far exceed the budget of a single university. These research facilities constitute a foundation for the potential advancement of research as well as economic growth engines.

The world began contending with this complex challenge in the first decade of the 2000s and advanced countries began creating "road maps" that define the types of national research facilities needed, criteria for assessing their importance and contribution, and a budgeting model that will also ensure their management, operation and upgrading.

Key figures

NIS 1.73 billion

The Innovation Authority's budget in 2019 for assistance grants to approximately 1,600 research and development projects.

USD 486 million

The sum invested in the establishment of 13 national research facilities by members of TELEM, the National Infrastructure Forum for Research, since its founding in 1997 and until 2020.

NIS 133.7 million

The sum transferred for the establishment and operation of joint research facilities by the Council for Higher Education's Planning and Budget Committee ("PBC") from 2016 to 2019[1].

100%

The ratio of university VPs for Research who believe that a permanent academic committee should be formed to advise the PBC about joint research facilities needed for academia and about the long-range strategic planning that PBC needs in order to establish them.

7.5%

Ratio of the cost of joint research facilities recommended by the Horn Committee[2], out of the cost of all research facilities recommended by the committee.

11

Number of joint research facilities recommended by the Horn Committee in 2013.

4

Number of joint research facilities that the PBC has advanced since 2013.

1/3

Utilization ratio of potential hours of operation of MRI-T-7 scanner for brain research in Weizmann Institute.

1 According to a list of key research infrastructures received from the PBC.

2 Advisory committee to the PBC regarding key research facilities for academia, appointed by the PBC in January 2013.

Audit actions

From January to October 2020, the Office of the State Comptroller audited the planning policy for the establishment of joint research facilities, including examination of the existence of a strategic plan for the establishment of national infrastructures and examination of the PBC's activities to plan and establish joint research facilities in academia. The audit also examined regulation of the usage of joint research facilities and the operation of existing research facilities, including aspects of supervision, budgeting and access.

Audits were performed in the National Council for Civilian Research and Development ("the NCCR&D"), in the Council for Higher Education and in the Planning and Budget Committee; in the eight research universities – Tel-Aviv University, Hebrew University, Ben-Gurion University, Haifa University, Bar-Ilan University, Ariel University, the Technion – Israel Institute of Technology and the Weizmann Institute of Science. In addition, four joint research facilities belonging to academic research institutions were also audited – the Mediterranean Sea Research Center of Israel (Haifa University), the Institute for Human Brain Imaging and Research (Weizmann Institute), the National Center for Transgenic Mice (Hebrew University) and the Steinhardt Museum of Natural History (Tel-Aviv University). The Office of the State Comptroller also requested information from Vice Presidents for Research at the research universities about the need for joint research facilities as well as their usage, management and maintenance.

Key findings

Status report on managing national research infrastructures – According to the status report presented by the NCCR&D in November 2019, Israel has no comprehensive strategic plan for national research infrastructures, no budget earmarked for them, and no authority to coordinate the establishment and upgrading of national and joint research facilities.

Activity by the NCCR&D to advance national research facilities – At the NCCR&D's initiative, it received needs surveys prepared over a decade, which specify the future needs for national research facilities[3]. In December 2019, the NCCR&D presented its recommendations to the Ministerial Committee on Science and Technology for the establishment of a system for national research and development facilities – recommendations that include initial components of a "road map," a mechanism for prioritizing needs and implementation methods. As of the audit completion date,

3 The Samuel Neaman Institute for National Policy Research conducted the surveys at the NCCR&D's request.

October 2020, no comprehensive proposal has been formulated for presentation to the government. As a result, none of the NCCR&D's other recommendations were discussed, including designated fund of NIS 100 million for establishing national research facilities.

- **The PBC's planning and establishing joint research facilities for academia –** The PBC formed an advisory committee (the Horn Committee) for the purpose of providing a response to the needs of academia for joint research infrastructures – this committee submitted road map proposals in 2013 and, in 2016, recommendations for their implementation. It intended that these road maps provide the foundation for formulating a strategic plan for the establishment of joint research facilities for academia. The PBC decided to establish four of the 11 recommended joint research facilities.These included three of six small and one of five large facilities. In October 2017, the PBC decided to form the Talmon Committee to analyze the topic of research facilities. In July 2018, the PBC approved the Talmon Committee's recommendations, that focused on establishing private and institutional research facilities. The PBC also adopted the recommendation not to support the establishment of facilities recommended in the 2016 road map for academia. However, it decided to consider the possibility of including the establishment of a portion of the low-cost joint facilities in the multiyear plan at a later date. Subject to resource constraints, it planned to form a permanent committee for research facilities. The committee will act to complete the formulation of the PBC's multiyear plan for research facilities, and map existing plans. The audit found that the PBC had neither formulated a policy for establishing joint research facilities nor mapped the academic institutions' needs for such facilities. The audit also found that the PBC had not updated the road maps for joint research facilities for academia. The PBC could use the road map to define priorities for establishing research facilities. In addition, it has not defined a list of resources needed for recommended joint research facilities; nor formulated a long-range budgeting model adapted to the facilities' characteristics; nor defined criteria for examining the feasibility of establishing these facilities.

- **The PBC's budget utilization for research facilities within the framework of the current multiyear plan** – Until September 2020 (The end of 2020 school year), NIS 352 million were used for research facilities, out of the NIS 935 million allocated in PBC's multiyear plan for 2017–2022. The total budget of NIS 935 included only NIS 18 million for unique joint research facilities. This sum was included in the recommendation for the plan "Research Grants to Make Unique Research Facilities Accessible". The following table summarizes budget usage for research facility construction during the 2020 school year.

Research Facility Funding

Budget Purpose	Allocation in Millions of NIS 2017-2022	Utilized until the end of 2020 School Year
National Research facilities	475	96
Additional research facilities (Talmon Committee)	460	256
Total budget	935	352

The PBC's steering committee for research facilities – The steering committee for research facilities was appointed in October 2018. From that time, until the audit completion in 2020 the committee did not address the subject of joint research facilities; and did not map needs in this regard among the universities and researchers. It also took no action to formulate proposals for joint research infrastructures or to set their priorities; and it did not submit any proposals to the PBC to advance this issue.

Budgeting the establishment of joint research facilities by the PBC – The PBC budgeted NIS 156.6 million for the establishment of eight facilities – the Mediterranean Sea Research Center of Israel (MERCI); the Institute for Human Brain Imaging and Research at Weizmann Institute; the Center for the Cultivation of Transgenic Mice; the Mosaic Clinical and Genome Database; the National Center for Advanced Photonics; the Israeli Biorepository Network for Research (MIDGAM); the Soreq Applied Research Accelerator Facility (SARAF); and the Cloud Computing Services Unit in the Inter-University Computation Center. By the end of 2019, the PBC's funded NIS 86.6 million (approximately 58% of the budget). The PBC transferred funds according to milestones in the establishment of the facilities. The majority of the funds not distributed (NIS 52.5 million) were budgeted for the Mosaic Clinical and Genome Database. Funding for its establishment had not been transferred by the end of 2019.

Strategic planning of large research facilities at universities – According to the response by VPs for Research to requests for information, the universities are not emphasizing a need for strategic planning of major research infrastructures on campuses, including joint research facilities nor have they raised such a need before the PBC or other relevant government bodies. For example: approximately 50% of the VPs noted that their universities have no multiyear plan for the establishment and procurement of large research facilities, and as of 2016, most of them have not mapped their needs relating to joint research facilities.

Regulating the operation, management, use and maintenance of research facilities – The PBC has no document listing all existing joint research facilities in academia and their characteristics. It has neither regulated the mode of use of these facilities, nor defined criteria for making them available to researchers from outside the academic institution, recruiting qualified staff to manage them, control and oversight measures for supervising their functioning.

The PBC's involvement in the management and use of joint research facilities – Institutions that establish joint research facilities are solely responsible for them. The PBC did not monitor the utilization or academic output of these research facilities, which were founded in part with its funding.

The operation of four joint research facilities – The examination of four joint research facilities found that two of them are being under-utilized relative to their optimal capacity. Furthermore, the academic institutions operating them had difficulty recruiting qualified staff to manage and operate them. At the other two facilities, the audit found that the PBC had not yet formulated a multiyear facility budgeting model or had not yet updated the existing budgeting model.

The PBC's initiative in formulating and implementing a road map for joint research facilities for academia – At the end of 2012, the PBC decided to implement a long-range strategic process that would enable it to establish and develop joint research facilities for academia. It established four joint facilities at a budgeted cost of NIS 22.3 million – out of the 21 joint facilities for academia recommended during the process.

Establishment of a website to publicize the research facilities – The Israel Science Foundation website displays details about research facilities at Israeli universities for the benefit of the research community.

Key recommendations

The Ministry of Science and Technology, in collaboration with the PBC, representatives of industry and the Ministry of Finance, should consider ways to advance the NCCR&D's recommendation to establish a system for national research facilities, as presented to the Ministerial Committee on Science and Technology in December 2019. This includes defining the composition of the management body (and possibly regulating the standing of the TELEM Forum) and the mode of budgeting and funding development and upgrading of national research facilities.

- The PBC should formulate a long-range, orderly and transparent strategic policy for the establishment of joint research facilities for academia. This policy should define clear criteria based on priorities and targets, be based on the research needs of universities and researchers, and take into account resource constraints. It should be updated periodically according to all of these factors. The policy should define the existing joint research facilities, and their locations should be publicized in order to increase their availability to external researchers.

- The PBC should improve its coordination with the research universities by involving them in mapping their needs and expressing their views regarding needed national joint research facilities. It should allow them input in formulating the strategic policy for establishing joint research facilities.

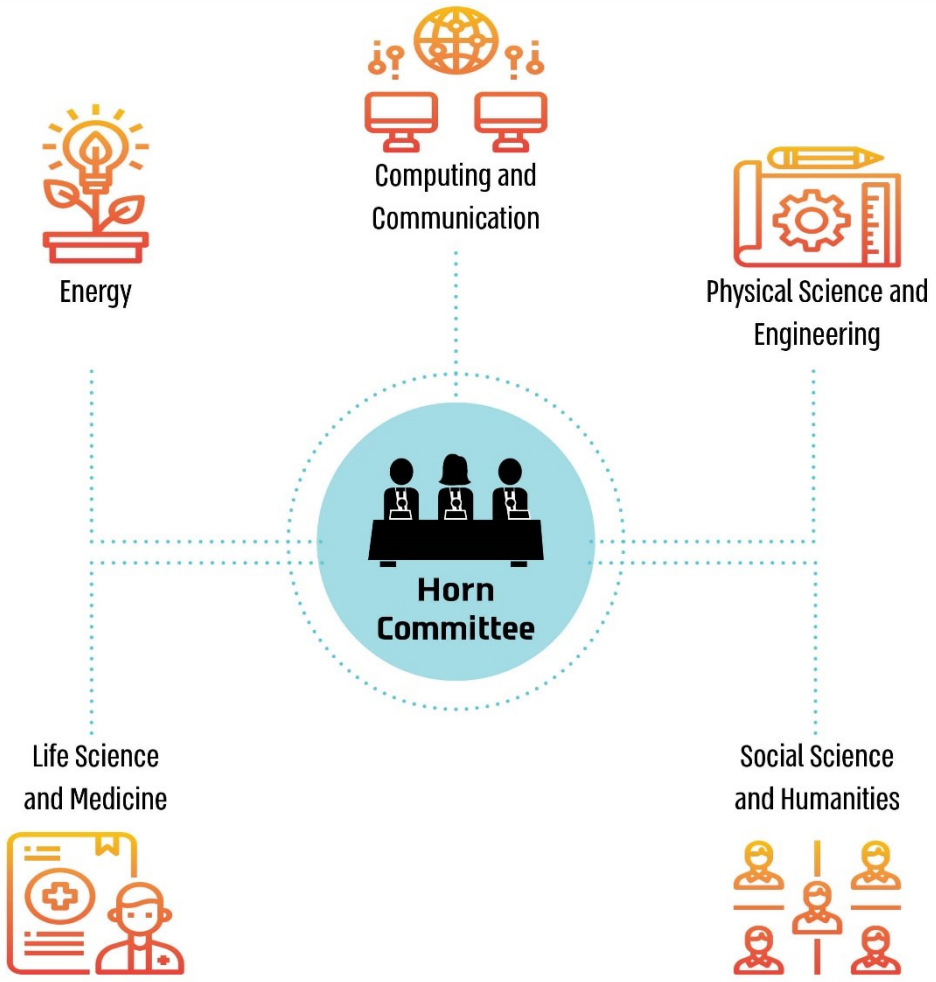
- The PBC should draft binding guidelines for supervision and control over the joint research facilities that it budgets. The guidelines should specify a monitoring and control mechanism over the management and mode of use of infrastructures and their availability to researchers outside the institution. The PBC should be involved in resolving regulatory difficulties relating to the research facilities, so that its investments in these infrastructures are optimally utilized. It is also recommended that the PBC convene an annual meeting to discuss all joint research facilities established with its support, achievement of their targets, obstacles to their operation and their main plans for the following year.

- Before making a decision to award a facility to any particular institution, the PBC should verify that the institution has the professional staff to manage, operate and maintain it. It is recommended that academic institutions operating research facilities recruit the manpower needed to operate them after their RFPs have been selected and during the establishment of the facility in order to ensure they will operate smoothly and optimally once in use.

- It is recommended that institutions whose RFPs are selected by the PBC develop plans in collaboration with the PBC, and announce them to the entire research community and to relevant industries in order to expand the use of joint research facilities. It is also recommended that the PBC monitor the Israel Science Foundation's website that publicizes the research infrastructures, to ensure that it is updated, particularly in relation to joint research facilities. The PCB should take action to make the facilities accessible to researchers from all academic institutions and from industry. It is also recommended that the PBC consider instructing institutions whose RFPs are selected to state on their publicly-accessible websites, that the facilities were founded with the participation and funding of the Council for Higher Education – PBC as well as other government bodies. It should also state that these joint research facilities are available to researchers from both inside and outside the institution.

The PBC should formulate a long-range generic budgeting model for joint research facilities in academia, which will take into account establishment as well as long-term operating and maintenance costs, including adjustments needed for the different types of joint research facilities and their various needs. It is also recommended that international committees take part in the assessment of the joint research facilities in advance, prior to formulating a long-range budgeting model for all facilities.

Horn Committee's recommendations for fields in which to establish joint research facilities



Summary

Formulation of a strategic policy and plan for the establishment and upgrading of joint research facilities is essential, particularly in countries with limited resources. These countries need to define a strategic policy that will lead to logical selection and prioritization of which scientific fields to advance and in which research facilities to invest. Over the last two decades, many developed countries have customarily formulated "road maps" that define priorities for developing national research facilities.

This report presents deficiencies found in the activities of the NCCR&D, the Ministry of Science and Technology, the PBC and of the research universities in relation to the advancement of joint research facilities.

The Office of the State Comptroller recommends that the Ministry of Science and Technology – the NCCR&D, in collaboration with the PBC, representatives of industry and the Ministry of Finance, consider ways to advance the NCCR&D's recommendation to establish a system for national facilities, as presented to the Ministerial Committee on Science and Technology in December 2019. The Office of the State Comptroller also recommends that the PBC formulate a strategic policy for the establishment of facilities anchored in a multiyear plan, based on priorities and targets and periodic mapping of the needs of universities and researchers, while taking into account resource constraints. This policy should define the existing joint research facilities. These facilities should be publicized in order to increase their availability to researchers from outside the institutions in which they are located.