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A business perspective on research funding

Economic assessment of IST Austria

Synthesis report

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SOMMER**

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1. *Management summary*

Acting through the Federal Ministry of Science, Research and Economy (BMWFW) and in cooperation with the provincial government of Lower Austria, the Republic of Austria founded an internationally oriented non-university research institute named the Institute of Science and Technology Austria (IST Austria) in the town of Klosterneuburg, Lower Austria, in 2006. This institute integrates two closely linked core functions of research: world-class basic research in the natural and formal sciences, and the education of junior researchers in the form of graduate programmes at the Ph.D. and post-doctoral level.

This economic assessment was carried out on the basis of the applicable statutory requirements (Agreement under Art. 15a of the Austrian Constitutional Act) in the period from May 2014 to January 2015. The evaluation revealed that – in terms of its aims and mission – IST Austria is a well-managed research institute. In this context, it is also important to note that the evaluation team has come to a positive assessment of key issues related to the sufficiency of funding until the year 2026, the quality of administration at the Institute as well as the manner in which it manages its research infrastructure.

Based on the results of this economic assessment, the further expansion and orientation of IST Austria towards a shared objective for 2026 should be decided and adapted as necessary in the course of the accompanying talks and agreements.

In the course of the assessment, the next steps in the development of the Institute were subjected to intensive discussions with the public funding bodies and IST Austria.

The main findings and recommendations based on this assessment are as follows:

- I. IST Austria complies with the **principles of sound financial management** (i.e. economy, expediency and efficiency) as stipulated in Austrian law. These principles are regularly reflected in the business decisions made and in the approval processes employed by the Institute.
- II. On the basis of the agreements in place, **IST Austria will remain financially secure until the year 2026**. While the funds for the construction of the buildings on campus and for the research activities of IST Austria's 90 planned research groups are assessed as sufficient, the funding of facility management as part of the appropriated financial framework will be the first area to come up against its limits. Therefore, we recommend optimising operations and developing a more precise specification of the necessary facility management costs.
- III. The **governance arrangements** in place between IST Austria and its public funding bodies have largely functioned well. However, the two public funding bodies essentially concern themselves only with that part of IST Austria for which they deem themselves to be responsible for funding, and the management of IST Austria also operates on the basis of this somewhat divided perspective. In particular, what is lacking is a clear vision of IST Austria held by both the Institute and its public funding bodies, including its role within the (Austrian) science and research system, the public

funding bodies' role, as well as the interaction between IST Austria's decision-making bodies and the public funding bodies, and indeed among the public funding bodies themselves. We therefore recommend that IST Austria should make efforts to develop such a shared vision and to use it as a common basis for future cooperation among the different parties involved.

IV. The **leading decision-making bodies at IST Austria** have worked well together since the Institute was founded. In terms of the organisation's external image, the Chair of the Board of Trustees and the Chair of the Executive Committee play a central role, especially in relations with the public funding bodies' highest decision-making bodies. In this context, it would be important for IST Austria's leading decision-making bodies and the public funding bodies to define their relationships more clearly in future.

V. IST Austria's **organisational structure and process organisation** are suitable for supporting the aims of the Institute as it continues on its course of growth. All of its personnel management activities –in particular the international recruitment of outstanding researchers – are already very well organised, and the scientific service units are available as central service providers to support the research groups. In other areas, however, it is still necessary to standardise and automate administrative processes. The senior management at IST Austria is aware of the organisational adaptations that need to be undertaken due to the Institute's constant growth and reacts with appropriate measures in a timely manner.

At the same time, we recommend that IST Austria introduce a regulatory management scheme (including risk management), expand its existing controlling arrangements and define an IT strategy in order to advance the standardisation and automation of administrative processes.

VI. IST Austria's **flows of costs and funds** have been implemented in a way that generally enables proper financial reporting (preparation of accounts), effectively supports management reporting (monthly reporting, target/actual comparisons, etc.) and provides a sound basis for future planning.

In relation to the ongoing planning and payout of funds from the BMWF, we also recommend that IST Austria should implement a comprehensive, integrated and significant planning and reporting tool. This tool should make it possible to determine whether sufficient funds are available as of any given date. On the basis of the legal framework at the federal and provincial government level, the tool should reconcile the actual figures from financial reports (IST Austria accounts; Lower Austrian provincial government expenditure) with planning figures (funds from the BMWF; Lower Austrian provincial government budget; IST Austria planning model). The tool's functionality should also include the ability to update the data automatically to reflect regular adjustments with regard to research groups, expenditure, third-party funds, etc. within IST Austria's planning model.

VII. Regarding **infrastructure**, IST Austria has succeeded in constructing and operating the buildings on the Maria Gugging campus required for its research, administration

and operation. With the support of the Lower Austrian provincial government, the Institute has managed to do so within just seven years and without exceeding essential cost targets. From the current perspective, the further construction of required or planned facilities on campus appears realistic – even in the case of a stronger focus on experimental research at IST Austria – within the limits of the overall construction budget made available by the Lower Austrian provincial government.

- VIII. IST Austria's **facility management** is currently handled by two service providers: FM-Plus Facility Management GmbH (FM-Plus) and IST Austria's own Construction and Maintenance Division. Taken individually, each of these two organisations generally operates in an economical manner. Nevertheless, we see potential for synergies and a need for optimisation in this area, especially with regard to the following issues:
- a) Implementing joint strategic facility management with shared budgetary responsibility in order to ensure the uniform handling of grant funds;
 - b) Supplementing the existing service catalogue with more clearly defined responsibilities, including service level agreements with response and reaction times;
 - c) Centralising incident management arrangements;
 - d) Aligning internal and external service strategies with future requirements.
- IX. At present, the existing potential for standardising IST Austria's buildings as well as enhancing their flexibility and energy efficiency is not being leveraged to its full extent. However, energy efficiency forms the basis for more cost-effective operations. In this context, it is also necessary to bear in mind that the defined goals have to be achieved in parallel to the continually necessary expansion/conversion of buildings. As a result, IST Austria will have to refine and develop common standards for its future construction efforts. This also applies to planning requirements in order to achieve the Institute's own objectives regarding the promotion of multidisciplinary and interdisciplinary research.
- X. IST Austria has addressed the issue of **technology transfer** systematically and with high commitment since the year 2014. The Institute has established a *Technology Transfer Office* and a *Tech Transfer Committee* and created an internal promotion programme for the purpose of preparing the commercial exploitation of research results and supporting the creation of spin-off companies by young researchers. In collaboration with ecoplus GmbH, IST Austria also founded IST Austria Park GmbH and is currently in the process of constructing a technology park at the Maria Gugging site. The first patent applications have been submitted, and a number of parties have expressed interest in setting up locations in the technology park.

Due to the nature of the basic research performed at IST Austria and the general complexity of transferring research results to industry, one can expect long incubation periods before those results can be commercially exploited. We therefore recommend

that IST Austria continue on this path with the same tenacity and endurance it has exhibited since 2014.

- XI. IST Austria has defined a strategy for **positioning and communication**; the latter measures are largely taken only as needed. In particular, room for improvement can be identified in IST Austria's communication with its public funding bodies and in the way in which the organisation deals with recurring criticism. As a consequence, we recommend a more proactive and strategic approach to public relations in order to successfully position IST Austria as an internationally oriented, world-class research institute.
- XII. A benchmarking comparison with selected international research institutes has shown that the Weizmann Institute of Science could serve as a particularly positive model for IST Austria in terms of the commercial exploitation of research results. The Okinawa Institute of Science and Technology (OIST) can also be taken as a benchmark for IST Austria, especially with regard to research infrastructure and positioning in the fields of governance and personnel policy, while the École polytechnique fédérale de Lausanne (EPFL) offers a good example regarding tried-and-tested risk and control structures.

One especially positive achievement is that IST Austria has already attained a 20 to 80 percent ratio of administration to research staff (in terms of full-time equivalents). In contrast, this ratio is 33 to 67 percent at OIST and 30 to 70 percent at EPFL. Only the Weizmann Institute of Science boasts a better ratio (15 to 85 percent), meaning that it should serve as a benchmark for IST Austria in this regard.

In summary, IST Austria is a well-organised internationally oriented research institute offering graduate education. With the exception of the facility management budget, the funding provided by the Austrian federal government and the Lower Austrian provincial government for the expansion and operation of IST Austria will be sufficient until the year 2026.

In using the funds it receives from the Austrian federal government and the Lower Austrian provincial government, IST Austria acts in accordance with the principles of economy, expediency and efficiency. Even at this early juncture, IST Austria's recruitment of outstanding international researchers has been exemplary, and the Institute is certainly on par with its international counterparts in this respect. Assuming that the recommendations in this report are implemented, IST Austria has the opportunity to develop into an internationally renowned example of best practice in the management of research and research infrastructure.

2. *Synthesis report*

Background

IST Austria was founded in 2006 under a special act of parliament known as the Austrian Federal Act on the Institute of Science and Technology Austria.¹ The Institute is a public-law entity with its own legal personality which manages its affairs autonomously within the framework of the aforementioned act.

The founders and public funding bodies of IST Austria are the Republic of Austria, represented by the Federal Ministry of Science, Research and Economy (BMWFV), and the Lower Austrian provincial government.

The Institute was founded for the purpose of performing top-notch research by the highest international standards and thus making a substantial contribution to enhancing Austria's attractiveness as a location for science and research.

The allocation of funding for IST Austria is stipulated in an agreement concluded under Article 15a of the Austrian Constitutional Act:² the Austrian federal government (represented by the BMWFV) allocated a total of up to EUR 1.278 billion to fund the ongoing operation and equipment for research based operations for the period from 2007 to 2026, on the condition that IST Austria raises approximately EUR 260 million in external funding eligible for matching from the BMWFV's contribution during this period.

For its part, the Lower Austrian provincial government will contribute a total of EUR 479.5 million to the construction of the IST Austria campus and its maintenance during the period from 2007 to 2026. Of that amount, EUR 350 million is earmarked for buildings and infrastructure, and EUR 128 million has been allocated to the maintenance and operation of the buildings and infrastructure as well as facility management. The remaining EUR 1.5 million have been made available for a public transport line connecting IST Austria with the city centre of Vienna.

IST Austria is under an obligation to raise third-party funds to cover (part of) the expenditure for the Institute's construction and operation. The main sources of this third-party funding are research grants and donations.

As of August 2014, a total of 416 employees (or 406 full-time equivalents) were working in 29 different research groups at IST Austria, which plans to expand to a total of 90 research groups and a total headcount of more than 1,000 by the year 2026.

The IST Austria campus is being expanded on an ongoing basis. The total usable area constructed in Expansion Stage 1 amounts to approximately 11,000 m². Of that area, approximately 7,000 m² are dedicated to research activities. Expansion Stage 2 envisages a total usable area of 23,800 m², including some 4,500 m² for parking spaces. The laboratory

¹ BGBl. I No. 69/2006

² BGBl. I No. 100/2012, as amended

buildings in Expansion Stage 2 are envisaged to comprise a total usable area of approximately 11,600 m², to be split into approximately 6,900 m² for experimental research and 4,700 m² for theoretical research.

Of the 11,600 m² of usable area for laboratory buildings in Expansion Stage 2, over 7,000 m² (60%) will have been built by the end of 2016. The remaining area (approximately 4,000 m²) will be contained in three further buildings which will be completed gradually by 2024.

IST Austria sees itself as an important part of the Austrian higher education and research system in terms of both personnel and infrastructure. The Institute's specific focus within this system is on the recruitment of top international researchers in both the natural and formal sciences as well as the global recruitment of highly qualified Ph.D. students and post-doctoral researchers.

IST Austria's mandate is to become a world-class research institute offering graduate education. The Institute's main objective is to ensure that it can compete for scientific personnel on an equal footing with other leading research institutions worldwide at each and every level – from students up to post-docs and professors. All of the measures accompanying the development of the Institute serve this overarching strategic objective.

The key principle underlying IST Austria's recruitment policy is a clear focus on the quality (excellence) of the researchers hired. Their fields of research are therefore a secondary concern (i.e. "people before research fields"). IST Austria's mission makes it unique in the Austrian science and research landscape, which creates specific challenges and tensions for all of the parties involved.

One challenge is to balance the considerable autonomy in self-administration which IST Austria enjoys under Austrian law on the one hand and its legal obligations arising from the Austrian federal government's involvement as the main public funding body on the other hand. In particular, IST Austria must simultaneously (be able to) meet Austria's strict federal requirements regarding public accounts as well as its own aims of attracting the best possible researchers.

The basic principle at IST Austria, "people before research fields", poses the additional challenge that it only becomes clear whether a researcher works with a theoretical or experimental focus once he or she has been recruited. This has implications for the spatial design of the campus and for facility management, among other things, and may therefore make building modifications necessary in specific cases. Moreover, it also means that after a certain period of time IST Austria will have payment obligations towards the research group, which in turn requires liquidity planning and must be brought into line with the planning standards of the Austrian Federal Ministry of Finance and the BMWF.

A further challenge is posed by the fact that IST Austria has two public funding bodies which are responsible for funding different parts of the Institute's budget under the existing legal framework. As a result, ongoing coordination is required between the persons and institutions involved. This is especially evident in the case of facility management, where a clear separation of "pure" facility management (for which the Lower Austrian provincial government bears responsibility) and "facility management for research operations" (for which the BMWF bears responsibility) is not always possible. A similar challenge applies to

the conversion or modification of buildings. In recent years, it has been necessary to adapt the legal frameworks and agreements between the public funding bodies and IST Austria in relation to these issues, and more adaptations will (have to) follow in the future.

Over the last few years, IST Austria has grown rapidly, and this dynamic development will also continue in the years to come. In the initial phase, the focus at IST Austria was on the implementation of personnel management with a smoothly functioning recruitment process. Now, however, IST Austria is making efforts to standardise and automate its other administrative processes. This has been accompanied by necessary developments in the Institute's senior management, such as the appointment of a Vice President in 2014. The Institute's administration is also subject to constant adaptation and development, which is also evidenced by the fact that some of the evaluation team's recommendations were already implemented by IST Austria during the ongoing evaluation.

In order to assess whether these challenges can be dealt with effectively, in particular with regard to economic aspects, the agreement under Art. 15a of the Austrian Constitutional Act³ calls for an economic assessment of IST Austria. This assessment is to serve as a basis for decisions regarding the further development and funding of the Institute.

Economic assessment procedure

As the result of a two-stage, Europe-wide tender procedure, the BMWFV and the Lower Austrian provincial government commissioned an expert team consisting of individuals from PwC Austria, Technopolis Group Austria and Drees & Sommer to evaluate IST Austria from an economic perspective.

The purpose of the evaluation was to review whether IST Austria's structures and processes are suitable for the purpose of achieving the aims stipulated in the Federal Act on IST Austria using the funds allocated by the Austrian federal government and the Lower Austrian provincial government, and to derive recommendations with regard to the Institute's future development.

The issues defined by the public funding bodies in eight different evaluation areas provided a framework for the evaluation:

1. Orientation and funding
2. Governance
3. Organisational structure and process organisation
4. Human resources
5. Infrastructure
6. Intellectual property / technology transfer
7. Positioning and communication
8. Costs and funding

³ Article II (3) Art. 15a Austrian Constitutional Act Agreement, BGBl. II No. 100/2012

The economic assessment was carried out by analysing and evaluating 328 documents requested from IST Austria (some of which were confidential) as well as additional documents and materials published or made available to the evaluation team by the benchmark institutes (see below), by conducting 49 semi-structured interviews, and by fine-tuning the results with a steering group, a “sounding board” and IST Austria itself on an ongoing basis. In the course of the evaluation, a benchmarking exercise was carried out with selected comparable institutes:

- Okinawa Institute of Science and Technology (OIST; Okinawa, Japan);
- École polytechnique fédérale de Lausanne (EPFL; Lausanne, Switzerland);
- Weizmann Institute of Science (Rehovot, Israel).

The benchmarking exercise relied on documents that were publicly available and made available by the benchmark institutes. Two of those institutions, OIST and EPFL, were also visited by members of the evaluation team.

The economic assessment took place between May 2014 and January 2015.

Outcome of the economic assessment

The outcome of the economic assessment can be summarised in the following sentence:

“IST Austria is a well-ordered organisation.”

The legal requirements for funding investments and maintaining scientific research operations at IST Austria are appropriate for the purpose of realising the Institute’s long-term development and growth plans. The organisational structures at IST Austria are generally suitable for the purpose of meeting the objectives defined in the Federal Act on IST Austria (and the accompanying agreements) using the funds provided by the Austrian federal government and the Lower Austrian provincial government.

The principles of sound financial management stipulated in the Act are regularly observed in business decisions and in approval processes at IST Austria, meaning that the Institute acts in accordance with the principles of economy, expediency and efficiency. IST Austria’s (annual) funding requirements depend heavily upon the persons recruited as heads of research groups; specifically, these requirements vary depending on whether the Institute recruits new experimental researchers or theoretical researchers. One clear objective of IST Austria is to recruit people of scientific excellence regardless of their field of research, a policy which is best summed up in the phrase “people before research fields”. Naturally, this strategy has an impact on funding requirements as well as the provision of infrastructure.

IST Austria’s **flows of costs and funds** have been implemented in a way that generally enables proper financial reporting (preparation of accounts), effectively supports management reporting (monthly reporting, target/actual comparison, etc.), and provides a sound basis for future planning.

The outcome of a model calculation shows that even if the current planning model (not including facility management costs, which are borne by the Lower Austrian provincial

government) were changed to the most costly scenario, in which only experimental research groups are added after the year 2016, the total expected revenues of IST Austria can be expected to cover 95% of the Institute's planned costs.

The figure below shows a combined overall analysis of the Institute's funding based on these flows of costs and funds, and provides answers to the question of the sufficiency of funds. For this purpose, the figures available on the basis of the legal framework (Austrian federal government and Lower Austrian provincial government) were reconciled with actual financial reporting figures (IST Austria accounts, expenditure of the Lower Austrian provincial government) and planning figures (Lower Austrian provincial government budget, IST Austria planning model). This reconciliation did not reveal any funding gaps (combined overall analysis of funding from the Austrian federal government and Lower Austrian provincial government; Figure 1).

Combined analysis of funds

in EUR millions

Federal government Acts and Agreements

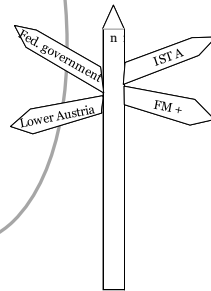
Federal government	Foundation - 12/2016	1/2017 - 12/2026
Global amount 2007-2011	75	
Global amount 2012-2015	80	
Global amount 2016	40	
Global amount 2017-2026		659
Third party funds (max.)	95	165
Quality criteria (max.)		165
	290	988

1.278

Province of Lower Austria

Province of Lower Austria	Foundation - 12/2016	1/2017 - 12/2026
<i>Phase 1</i>		
Investments until 12/2011	80	
<i>Phase 2</i>		
Investments 1/2012-12/2026		270
Utilisation and operation	22	30
- sufficient funds (max.) / lasting value (CPI 2005)		
Own FM 1/2009-12/2016	8	
Ongoing operations until 12/2016	30	
- needs (max.)		
Ongoing operations 1/2017-12/2026		98
- needs (max.)		
Public transport line	2	
	142	398

540



Use of funds from federal government, (province of Lower Austria) in IST Austria based on closing of accounts incl. UGB deferral

	Based on closing of accounts foundation - 12/2013	UGB deferral	Liquidity
Federal government	4,6%	3,6%	8,2%
Province of Lower Austria	20,1%		20,1%
Third party funds	4,9%	2,5%	7,4%
Personnel	6,1%		6,1%
Physical resources	9,3%	-0,8%	8,5%
Investments	3,3%	3,9%	7,2%

Use of funds - province of Lower Austria (direct / indirect)

	Foundation - 12/2013	Plan 1/2014-12/2016	Plan 1/2017-12/2026	Total	Δ
Investments Expansion Stage I	80,0		80	80	0
Investments Expansion Stage II	33,9	93,7	142,4	270	0
Inflation adjustment 5/2006-11/2014	11,2			11	11
Energy efficiency	5,9			6	6
Additional budget	2,0			2	2
Shifting of project reserves into Phase II	-1,0			-1	-1
	132,0	93,7	142,4	368	18
Utilisation and operation	9,4	9,0	30,0	48	-4
Own FM 1/2009-12/2016	2,9	5,1		8	0
	12,3	14,1	30,0	56	-4
Upkeep obligations until 12/2016	11,4	16,3		28	-2
Upkeep obligations 1/2017-12/2026			98,0	98	0
	11,4	16,3	98,0	126	-2
Public transport line	1,5			2	0
Technology park		5,0		5	5
	157	129	270	557	17

Use of funds from federal government (province of Lower Austria) in IST Austria incl. Planning

	Foundation - 12/2013	Plan 1/2014-12/2016	Plan 1/2017-12/2026	Total
Federal government	8,2%	10,1%	81,7%	100%
Lower Austria	20,1%	22,8%	57,1%	100%*)
Third party funds	7,4%	9,9%	82,7%	100%
Personnel	6,1%	10,9%	83,0%	100%
Physical resources	8,5%	11,4%	80,1%	100%
Investments	7,2%	13,8%	79,0%	100%

*) This amount does not cover the upcoming obligations of the province of Lower Austria for Phase 2.

Building

Facility Management

Figure 1: Combined analysis of funds from the Austrian federal government and Lower Austrian provincial government from the establishment of IST Austria until 2026

Adherence to the various phased funding requirements calls for an integrated planning tool coordinated with the public funding bodies and for a unit or person responsible for enabling regular revisions of the research groups' plans and depicting the accompanying construction measures in IST Austria's facility management.

Moreover, the planning and payout of funds from the BMWFW to IST Austria should be embedded in a jointly defined liquidity management process. This process should account for the Austrian federal government funds earmarked for but not yet requested by IST Austria, investment opportunities for IST Austria itself, and the BMWFW's requirements pertaining to maximum (or minimum) holdings of funds at IST Austria.

Furthermore, the third-party funds eligible for matching require a more concrete definition. To date, IST Austria's annual calculation of such funds has been reviewed by the BMWFW on the basis of records from IST Austria, agreed upon jointly and paid out accordingly. In this context, it is worth noting that a performance agreement⁴ has now been signed which includes a definition of funds eligible for matching.

In addition to requiring a certain degree of flexibility, this joint planning and management of funds also calls for a vision of IST Austria and its future development which is shared and accepted by the public funding bodies and the Institute. An analysis of the governance system – i.e. of the interaction between IST Austria and its public funding bodies – has revealed that no such vision currently exists, although it is urgently needed.

This **governance system** must be suitable and function properly for a group of very different parties. It must accommodate different logics, approaches and background experience, and it must also bring together the languages and cultures of research policy and public administration, of construction and infrastructure, and of science and research operations. Furthermore, the governance system has to comply with demands of public management that have grown since the foundation of IST Austria, i.e. the requirements of the Public Corporate Governance Code, the new federal budgetary rules, and various other regulations. In some respects, it is challenging to reconcile these demands with the specific logic of a scientific institution.

In principle, IST Austria perceives its public funding bodies as sympathetic, supportive and cooperative, but repeatedly too focused on specific details. At the same time, the public funding bodies seem to exhibit too little coordination and coherence among themselves. These circumstances clearly show that the public funding bodies and IST Austria would need to develop a shared vision of the Institute. Such a vision would also require a common understanding of IST Austria's role within the (Austrian) science and research system, the role of its public funding bodies as well as the interaction of IST Austria with its public funding bodies and of the public funding bodies among themselves. This creates a particular kind of systemic stress on all three sides. One example is the concept of "research planning", which is understood differently by the parties involved and thus leads to friction among them. The claim that "research cannot be planned" is indeed true in relation to the knowledge-oriented basic research conducted at IST Austria, since concrete research findings

⁴ The performance agreement was concluded in March 2015, i.e. after the completion of the economic assessment.

and their timing can never be predicted. On the other hand, this claim is not true in the context of constructing and operating a research institute. At IST Austria, planning is carried out permanently and at a high level, and plans are repeatedly adapted as required by the results achieved (e.g. appointments of new professors). In order for the public funding bodies to be able to perform their tasks in relation to IST Austria in a satisfactory manner, they require regular updates on the state of planning, on the results achieved and on the necessary adaptation and development of plans. It is therefore all the more important to work on a common vision and understanding of roles as well as a coordinated set of expectations.

A common vision as such would also make it possible to defuse the currently evident tensions between the extensive independence of IST Austria in all scientific matters and in the fields of organisation, management and personnel selection on the one hand, and its reporting obligations (financial and risk controlling, Public Corporate Governance Code, etc.) arising from the Austrian federal government's involvement on the other hand. In this context, it is necessary to consider the specific requirements of IST Austria.

The main decision-making bodies at IST Austria, i.e. the Board of Trustees, the Executive Committee and the Scientific Board, have worked well together since the very outset, with the Chair of the Board of Trustees and the Chair of the Executive Committee having played a central role in the external perception of the organisation since its foundation. Both figures have played decisive roles in the establishment and positive development of IST Austria. However, even after this pioneering initial stage, the leadership of IST Austria – especially in relation to the public funding bodies – appears to remain very much in the hands of these two figures. In the future, it would be important to work on the role concepts of these bodies and of IST Austria's senior management, especially vis-à-vis the public funding bodies. According to the legislative basis and statutes of IST Austria, the power of external representation lies with the President alone, not with the representatives of the Board of Trustees or its committees. A strong positioning of the leading decision-making bodies already established at IST Austria is crucial to its future, especially as they have long since assumed this role both internally and in relation to the scientific community.

In the early years (from 2006 to 2008), IST Austria focused on carrying out tender procedures and constructing the necessary infrastructure, establishing its basic organisational structure and, above all, recruiting its first researchers and administrative staff members. Since the appointment of the current President in 2009, however, the necessary governance and management structures have also been developed further in a gradual and structured manner. This is also reflected in IST Austria's organisational structure and process organisation.

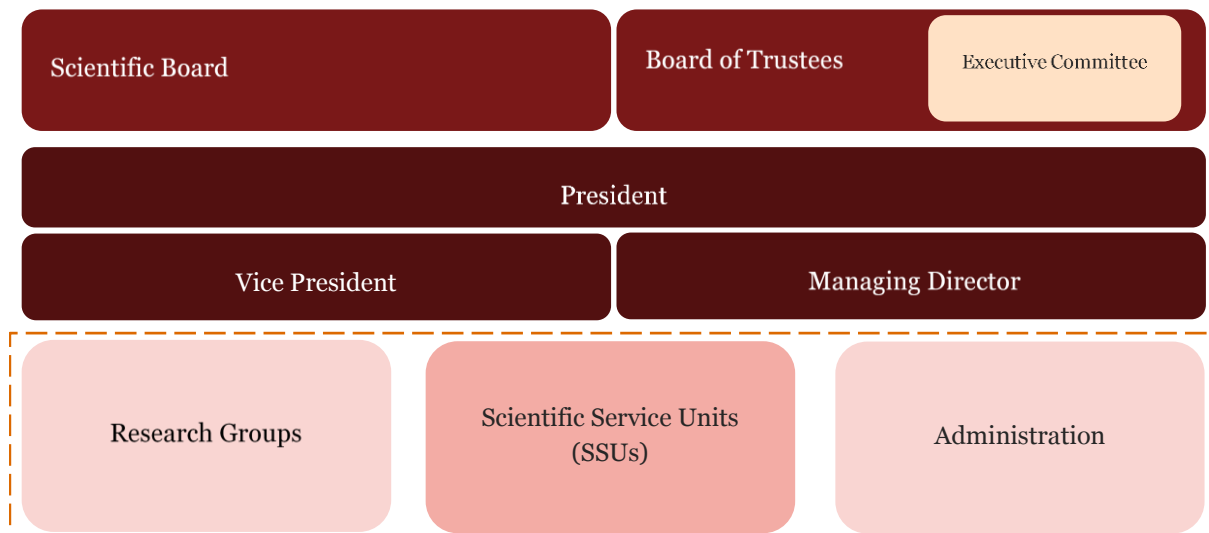


Figure 2: Organisational structure of IST Austria

The organisational structure in place is suitable and – thanks to the people working within it – able to achieve the Institute’s growth targets. Given their know-how, the people recruited to work in administration and in the scientific service units (SSUs) are capable of supporting the continued development of IST Austria. The President – who is supported by the Vice President, the Managing Director and, not least, the new Head of the Finance and Operations Division – has played a major role in enhancing the professionalism of IST Austria’s management. All in all, IST Austria has been successful in instilling a high degree of motivation and commitment in its staff members.

The internal governance structures and policies ensure that the existing legal framework can be observed. Only a few internal policies would require improvement. At the time of the evaluation, the Institute did not yet have staff positions in the field of regulatory management, but the process of advertising the positions necessary for this purpose had already been launched.

One especially positive feature of the organisation is the fact that at a very early stage IST Austria chose to set up SSUs for the purpose of supporting the research groups in their work. For reasons of quality assurance, cost allocation and efficiency enhancement, the Institute decided to set up these SSUs as shared service centres. Cost centres for individual SSUs and research groups have been defined. At present, IST Austria is working with external support towards the introduction of a cost unit accounting system, not only to ensure even greater transparency of costs but also to ensure a more transparent (and thus more equitable) charging of costs to individual research groups. Another positive development was that an experimental professor was appointed IST Austria’s Vice President on 1 June 2014. The Vice President oversees the SSUs on behalf of the President; this will contribute to enhancing their professionalism even further.

With regard to the reporting system, planning, controlling, implementation monitoring, risk control and above all the systematic networking and professionalisation of individual

systems, the process organisation at IST Austria is characterised by differing speeds, *ad hoc* solutions and discontinuities between systems. For example, controlling and reporting at IST Austria is currently based largely on Microsoft Excel reports. In order to automate monthly reports in the future, a web reporting tool is currently being developed in-house; this should simplify monthly cost centre reporting, making it more transparent and efficient. What is also lacking is an overarching IT strategy as well as comprehensive IT governance. These should help the administration in pursuing the goals of efficiency and transparency (keyword: standardisation) in order to ensure the level of flexibility and security required in the field of research.

On the basis of the work done by IST Austria so far, it has both the potential and the opportunity to establish a reputation as a best-practice example for research management in the coming years. In order to achieve this, however, a number of measures still need to be taken, above all in the standardisation and automation of administrative processes. Examples include the universal application and optimisation of process management arrangements (including an internal control system), the introduction of a risk management system, and above all the further development of the IT landscape. IST Austria's decision makers have already recognised the need for further development and are working on a number of implementation measures.

In IST Austria's process organisation, the entire field of **human resources** is already very well organised and clearly designed and structured according to the Institute's particular needs. This is all the more apparent in the organisation's strong service orientation towards research and its special focus on hospitality. The recruitment processes – both in the field of science (researchers, students and post-docs) and in the field of administration – are on par with those of similar top-notch institutions such as OIST and EPFL.

By the year 2026, when IST Austria is expected to complete its expansion plans, the Institute will host up to 90 research groups. By 2014 alone, IST Austria had already managed to establish some 29 research groups on its campus.

As of August 2014 there were 405.59 full-time equivalents (FTEs) working at IST Austria. In relative terms, the distribution of employees was as follows:

Research	270.81 (67%)
Scientific Service Units	53.10 (13%)
Administration	81.68 (20%)

According to the current plan, by 2026 there will be a total of 1,050 full-time equivalents working at IST Austria, of which 725 FTEs will be in research, 165 FTEs in the SSUs, and 160 FTEs in administration; this corresponds to a percentage ratio of 69:16:15.⁵

The ratio of researchers to SSUs and administrative staff is appropriate for the purpose of effectively supporting IST Austria in achieving its present goals and with a view to the growth

⁵ See also details in the benchmarking section.

envisaged. In light of the synergy effects expected from the increased standardisation and automation of administrative processes, IST Austria will seek to reduce the current share of administrative staff in future.

As for IST Austria's **infrastructure**, the organisation has succeeded in constructing and operating the buildings necessary for its research, administration and operations on the Maria Gugging campus within a period of just seven years and without exceeding essential cost targets. This is, not least, due to the effective cooperation between the Lower Austrian provincial government, IST Austria, and external consultants who have been managing the construction of the IST Austria campus and the efficient use of funds. This cooperation can be traced back to similar structures successfully established in the Province of Lower Austria, and it corresponds to the standards set by comparable organisations in German-speaking countries. However, there is still room for improvement in the standardisation and automation of processes, in particular with regard to the documentation of requirements analyses within IST Austria.

The further expansion of the IST Austria campus is assessed as feasible within the limits of the overall construction budget made available by the Lower Austrian provincial government, even in a scenario where IST Austria focuses far more heavily on experimental research. This assessment is mainly justified by the cost indicators and approaches underlying the cost planning for Expansion Stage 2 (2012-2026) as well as the planned reserves, which are consistently deemed to be both realistic and adequate.

At present, IST Austria has not yet taken advantage of several opportunities for standardisation, and the Institute should also continue to focus on enhancing the flexibility of its buildings. The latter recommendation refers to the recurring need to renovate due to IST Austria's recruitment policy as well as the specifications of building use in general (theoretical vs. experimental research). A high degree of standardisation and flexibility in building use would form the basis for ensuring greater operational efficiency and a systematic reduction of renovation costs.

At present, IST Austria has defined too few planning requirements for the purpose of achieving its own objective of promoting multidisciplinary and interdisciplinary research through the buildings. The Institute's requirements with regard to multidisciplinary and interdisciplinary research should therefore be re-evaluated, redefined and subsequently laid down in specification documents for future planning purposes, if necessary with external support.

IST Austria's facility management is currently handled by two different service providers: FM-Plus Facility Management GmbH (FM-Plus) and IST Austria's Construction and Maintenance Division. The services rendered by FM-Plus primarily focus on building construction works as well as the maintenance of outside facilities, winter services, energy supply (energy procurement), cleaning and care as well as security. The Construction and Maintenance Division is in charge of technical facility management on the IST Austria campus, including technical operations, maintenance and inspections, caretaker and in-house technician activities, incident management, monitoring of warranties, repairs and energy management as well as all facility management services in the laboratories. Taken individually, the two organisations generally operate in an economical manner. At the same

time, there is considerable potential for synergies and optimisation. In the present configuration, however, the actual realisation of potential synergies is only possible to a limited extent. It would therefore make sense to ensure that in future both FM providers are linked by way of a joint strategic facility management board. Any necessary decisions should be taken unanimously (as is the case with agreements adopted by the Construction Committee and Steering Committee), with the necessary frameworks being created accordingly. Such a new organisational structure would also involve the introduction of joint planning and control of the facility management budget, including joint cost monitoring and controlling.

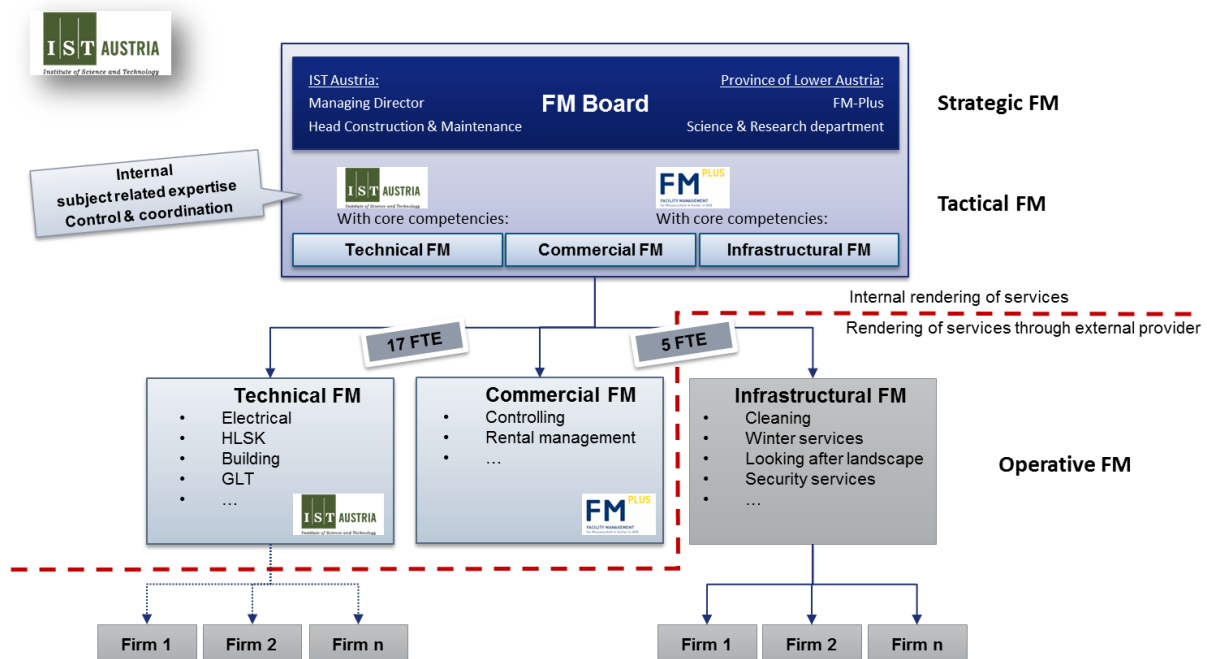


Figure 3: Proposed organisational structure

In the current development scenario, the financing of facility management in Expansion Stage 2 is the only aspect which is assessed in a critical light. On the basis of the development plans for Expansion Stage 2 and the facility management costs actually incurred to date as well as the available forecasts and the specific indicators derived from those figures, the facility management budget was extrapolated up to the year 2026 with attention to a number of different variables (including inflation adjustments). The result of this calculation shows that – even without accounting for a potentially stronger focus on experimental research – the operating costs budget defined for facility management in Expansion Stage 2 must be considered insufficient.

The establishment of IST Austria has also been associated with high expectations regarding the **commercial exploitation of research findings**. These expectations largely manifest themselves in the following three strategies: (i) patenting research findings and their (global) exploitation, (ii) spinning off companies through junior researchers from IST Austria and (iii) attracting companies (especially specialised research teams from those companies) as well as

public and private research institutes and universities to establish locations at the Maria Gugging site.

After a certain period of reluctance in the early years due to its start-up activities, IST Austria last year decided that it would begin to address this issue systematically and with high commitment. In this regard, it is worth mentioning the establishment of the *Technology Transfer Office* and the *Tech Transfer Committee* with both internal as well as external members, the establishment of an internal promotion programme to support the exploitation of research findings and spin-offs for young scientists and, not least, the foundation of IST Austria Park GmbH. In the meantime, IST Austria has launched cooperation talks with both Austrian and international firms, the first patent applications have been filed, and a number of organisations have expressed interest in establishing locations at the technology park.

Given the nature of the research conducted by IST Austria as well as the general complexity of realising and exploiting results attained through basic research, long incubation periods can be expected whenever research bears wider implications. It is therefore important that the main parties involved – i.e. the management of IST Austria and its two public funding bodies – continue to pursue the transfer and exploitation agenda very tenaciously, but at the same time with a sufficient degree of patience. It is also especially important to adhere to the opinion shared by all three parties that the Maria Gugging site is – and should remain – primarily a research location, even (and especially) in relations with industry. The motivation for establishing a location in Maria Gugging should largely be characterised by the notion that it is a place where research can be conducted jointly with people who work within walking distance of each other. The regular discussions of this exploitation agenda in the trilateral talks planned between the BMWFV, the Lower Austrian provincial government and IST Austria will also help to ensure that exploitation and location issues receive the attention they deserve.

IST Austria has defined a strategy for **positioning and communication**; the latter measures are mainly taken only as needed. In this context, the evaluation team identified room for improvement in IST Austria's communication with its public funding bodies in particular. The challenges posed by new media and their use as well as the need to ensure efficient internal communication have also been recognised. Intensive efforts are being undertaken to make IST Austria known to the Austrian general public (i.e. beyond the scientific community). This will be especially necessary in order to proactively deal with the recurring criticism of the Institute.

In order to succeed in positioning IST Austria as a top-notch research institute offering graduate education and special opportunities for multidisciplinary and interdisciplinary collaboration on campus (a set of characteristics which distinguish IST Austria from other Austrian research institutions), the Institute will have to engage in proactive and strategically oriented public relations work.

Cooperation with other research organisations at both the national and international level is supported by the organisational structure and process organisation at IST Austria. Whether and how such cooperation actually takes place will primarily depend on the persons involved, in particular the researchers working at IST Austria.

Benchmarking

The evaluation team relied on a body of available information and specific facts for the purpose of comparing IST Austria with selected international research institutes. The table below summarises the results of this benchmarking exercise:

Area:	IST Austria	OIST	EPFL	Weizmann Institute
Graduate education	Yes	Yes	Yes – University	Yes
Number of staff in full-time equivalents (rounded)	406 in total, including: 29 IST professors 215 Other researchers 80 Research support 82 Administration ⁶ As of August 2014	659 in total, including: 50 OIST professors 337 Other researchers 53 Research support 219 Administration As of January 2015 ⁷	5,096 in total, including: 301 EPFL professors 3,272 Other researchers & research support 1,523 Administration As of December 2013 ⁸	2,620 in total, including: 250 Weizmann professors 750 Other researchers 1,220 Research support and research students 400 Administration As of 2015 ⁹
Number of students (headcount)	77 As of August 2014	79 As of September 2014 ¹⁰	9,921 (bachelor's, master's, Ph.D. & post-doc level) As of 2014 ¹¹	1,000 (Master's and Ph.D. level) As of 2014
Percentage of research, research support and administrative personnel (full-time equivalents)	60% Research 20% Research support 20% Administration As of August 2014	59% Research 8% Research support 33% Administration As of January 2015	70% Research and research support 30% Administration As of December 2013	85% Research and research support 15% Administration As of 2014
Performance agreement	Yes ¹²	Yes	Yes	No
Financing provided by	BMFWF & Lower Austrian provincial government (81%) and third-party funds (19%) As of 2013	Japanese government (95%) and third-party funds (5%) As of 2014 ¹³	Swiss government (72%) and third-party funds (28%) As of 2014 ¹⁴	Israeli government (25%) and third-party funds (75%) As of 2014 ¹⁵
Risk management	No	Yes	Yes	No
Internal control system	Under development	No	Yes	No
Exploitation of research results through	Dedicated office	Dedicated office (with external consultants involved in special cases)	Vice President for Innovation and Technology Transfer	Yeda Research and Development Company Ltd. (commercial arm of the Institute)

Table 1: Benchmarking results

⁶ „Other researchers“ do not consist of employees belonging to „Scientific Support“. In order to ensure comparability between the different benchmarking institutes, these have been added to „Research Support“. Therefore, the number of „Other researchers“ deviate from the number of employees in the SSUs (see page 16)

⁷ <http://www.oist.jp/oist-nutshell> - 05.03.2015

⁸ Annual Report 2013 - <https://documents.epfl.ch/groups/e/ep/epfl-unit/www/rapport/EPFL-annual-report-2013.pdf> - 05.03.2015

⁹ <http://www.weizmann.ac.il/pages/facts-and-figures> - 13.10.2015

¹⁰ <http://www.oist.jp/oist-nutshell> - 13.10.2015

¹¹ <http://information.epfl.ch/facts> - 05.03.2015

¹² Service Agreement from March 2015

¹³ <http://www.oist.jp/oist-nutshell> - 05.03.2015

¹⁴ <http://information.epfl.ch/facts> - 05.03.2015

¹⁵ <http://www.weizmann.ac.il/pages/facts-and-figures> - 13.04.2015

In conclusion, IST Austria serves as an outstanding example for the Austrian science and research system. The Institute is well on its way to becoming a role model in the management of research and research infrastructure. The recruitment of top-notch international researchers, the education of young researchers, and the opportunities they will enjoy in their own careers are exemplary. Therefore, IST Austria is certainly on par with its international counterparts.

3. *Main recommendations*

On the basis of this economic assessment, the following recommendations can be derived with regard to the future development of IST Austria into a leading international institute in terms of research management:

1. The public funding bodies and IST Austria should make efforts to develop a **shared vision of IST Austria** and its position within the (Austrian) science and research landscape. This includes clarifying the various roles, the associated requirements and the interrelationships between the public funding bodies and IST Austria as well as among the public funding bodies themselves. This vision should be developed further in the future and adapted as required due to changing circumstances.
2. With regard to external communication, IST Austria should seek to communicate its objective – i.e. to position itself as an internationally and nationally renowned research institute – **in a more active and targeted manner**. This would mainly require people from IST Austria to approach key persons in the Austrian science and research system directly and in a targeted manner. IST Austria should showcase not only its scientific achievements, but also its achievements in the construction and management of the Institute.
3. The relationships between the decision-making bodies of IST Austria and the public funding bodies should be more clearly defined.
4. Process management should be advanced further, especially through the systematisation, standardisation and documentation of key administrative processes.
5. An **integrated IT strategy** for IST Austria's administration needs to be introduced and implemented in order to increase the degree of standardisation and automation and, not least, the security of processes (among other positive effects).
6. In order to enhance the efficiency and accuracy of planning, IST Austria should set up an **integrated planning system** that enables the regular adaptation of research groups' plans and at the same time includes the associated construction measures in facility management.
7. IST Austria needs to introduce a **risk management system** in line with the needs of a research institution and to implement its internal control system in accordance with planned actions.
8. Furthermore, it will be necessary to develop and introduce a **liquidity management process coordinated with the BMWFW** for the payout of federal government funds.
9. **Controlling** should be further expanded to include appropriate indicators in order to increase transparency and enhance control by IST Austria's senior management.

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10. A **significant reporting system supported by IT tools** should be agreed upon with the public funding bodies and be implemented to replace the existing Microsoft Excel-based reporting system.
 11. Both **FM-Plus and IST Austria's Construction and Maintenance Division** should be linked by way of a joint strategic facility management board with a centralised location and service budget as well as central controlling in order to eliminate redundancies and enhance efficiency.
 12. In parallel to the expansion of the Institute itself, IST Austria should also continue to promote the Maria Gugging site, preferably by attracting research groups and units from companies as well as public research facilities and universities. The Institute should continue to devote attention to patenting and commercially exploiting research findings as well as the establishment of spin-offs by IST Austria's researchers. In this context, the development of **Maria Gugging as a research location**, the long-term perspective in implementation, and the maintenance of high quality standards should serve as essential guiding principles.

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List of abbreviations

Abbreviation	Definition
Art.	Article
BGBL.	Bundesgesetzblatt; Federal Legal Gazette
BMWFV	Bundesministerium für Wissenschaft, Forschung und Wirtschaft; Federal Ministry of Science, Research and Economy
BV-G	Austrian Constitutional Act
e.g.	Exempli gratia (<i>for example</i>)
EPFL	École polytechnique fédérale de Lausanne
etc.	Et cetera (<i>and so on</i>)
EUR	Euros
FM	Facility Management
FM-Plus	FM-Plus Facility Management GmbH
FTE	Full-time equivalent
GmbH	Gesellschaft mit beschränkter Haftung; Austrian limited liability company
HR	Human resources
IST Austria	Institute of Science and Technology Austria
i.e.	Id est (<i>that is to say</i>)
IT	Information technology
m ²	Square metres
OIST	Okinawa Institute of Science and Technology
Ph.D.	Doctor of Philosophy
Post-docs	Post-doctoral researchers
Prof.	Professor
PwC	PwC Wirtschaftsprüfung GmbH Wirtschaftsprüfungs- und Steuerberatungsgesellschaft
SSU	Scientific Service Unit