



THE UNIVERSITIES PROJECT OF THE SALZBURG SEMINAR VISITING ADVISORS REPORT

MOSCOW INSTITUTE OF PHYSICS AND TECHNOLOGY MOSCOW, RUSSIA

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Introduction

Few institutions anywhere in the world capture a specific era in history in the same way as Moscow Institute of Physics and Technology (MIPT). It is an institution developed and organized around the needs of its society during the last fifty years. It played an important role in building the Soviet Union's competitive advantages in technology and science since the end of World War II, and educated a significant share of its most elite scientists. MIPT graduates today are still assuming leadership positions throughout a new emerging Russian society, less centered on state priorities—a society characterized by different values, different aims and different relationships.

MIPT has always played an important role of leadership and it is now called on to do so again. This will require three challenges of the institution and its faculty.

Redefining the mission and creating a new vision for the institution that is appropriate both to its history and to a changing environment

Recognizing the enormous strengths that have contributed to the institution's success and using these strengths as leverage to build towards the future

Developing a resource strategy that will stabilize and protect the institution's most important assets during an uncertain period of

transition and create conditions for sustained growth over the long term.

This report, prepared for the consideration of MIPT leadership, is written by members of a Visiting Advisors team under the auspices of the Salzburg Seminar's Universities Project. It is organized around the above three challenges and is offered with great confidence in the ability of the institution and its people to chart a course for continued success and service to Russian society.

Background of the Visit

The Visiting Advisors were very impressed by the hospitality extended by the Rector and his team. MIPT administration and staff were gracious hosts and did their best to make our visit as pleasant and productive as possible. We were offered excellent meals, a very impressive cultural program, and computer facilities. We particularly appreciated the openness, candor and vigor that characterized every phase of the visit. All representatives who participated were interested in the discussions and stressed the importance of this visit for the University's advancement.

The sessions involved seminar-type discussions, focused largely on the two main issues identified by the University administration—general management issues faced by University administrators, and the role of the marketplace in teaching and research priorities. This concentration of efforts on two main areas of interest enabled us to devote our efforts to the careful analysis of the topics which are considered by the University leadership to be most important for institutional development at the present time.

Our task was not to perform a formal evaluation of MIPT. Rather, in this report we share our observations and offer our recommendations on the issues presented to us. Today, as universities in Russia redefine their relationships with the government and try to become more integrated into the global intellectual community, international dialogue as well as exchange of information and expertise are of vital importance for the institutions. Thus, we share our understanding of the problems chosen for discussion and propose possible solutions in the hope that they will be of assistance to the senior administrators of MIPT in the process of institutional self-assessment and change during this period of transition. We understand that as outsiders who have spent only four days at MIPT, it is not possible to understand the many complexities of Russian society, its system of higher education reform, especially during this period of transition, and the distinctiveness of MIPT among other Russian universities. However, as outsiders we have distance and objectivity that we hope, together with our personal and international experience, will be of value in re-orienting the University.

Institutional Context: The Emerging International Environment

Moscow Institute of Physics and Technology (MIPT) began operation in 1947, following the order signed in November 1946 that founded the institution. It

emerged from the Department of Physics and Technology of Moscow State University. In 1951 the Department became an Independent Federal (State) University, called Moscow Institute of Physics and Technology (State University). The founders and the first professors of MIPT were the Nobel Prize winners P. Kapitsa, N. Semeyonov and L. Landau. Their idea was to establish an institution to train “elite” specialists, i.e. highly qualified professionals in the fields of fundamental sciences and technology. The purpose was to promote training of research scientists and engineers of the highest level who could work in the various research institutions of the Russian Academy of Sciences or in scientifically oriented industries. Thus, graduates were expected to have fundamentally sound, basic scientific knowledge as well as to be technically sophisticated and practically oriented.

The system of training at MIPT is called the “Phys-Tech” system. Its main purpose is to bridge the gap between theory and the implementation of scientific results into practice. To achieve this result, MIPT provides a broad and fundamental education in the natural sciences. The first stage of training is at the level of the Bachelor of Science degree. Students at this level study courses that provide fundamental knowledge of physics, including theoretical physics, mathematics, applied mathematics and computer science, among others. The students are also expected to have a mastery of the English language and background knowledge of social sciences, such as history, economics, law, philosophy, and the history of culture.

After four years of study for the Bachelor of Science degree, students continue their education at departments of the University in affiliation with various research institutions, i.e. “basic research institutions.” Students work there side by side with distinguished scholars, therefore providing for future generations of scientists.

The administration of MIPT asked the Visiting Advisors to focus on two broad areas: first, the area of academic structure and governance within the University; and second, the role of the market place in teaching and research priorities. The foundation underlying our discussions was the history, mission, and future of the University. In addition, financing for institutional priorities was determined to be a critical issue.

The University administration provided excellent insight into the institutional context: “After the fall of the USSR and the end of the Cold War in 1991, the transition within the Russian Federation saw new social and economic relations which are oriented towards a liberal market economy. The Russian Federation now faces an imbalance between the interests of the state on the one hand, and private capital on the other hand. This is affecting the preparation of specialists in science and engineering.”

“A sharp demilitarization of the economy, which resulted in the reduction of the share of Russian arms in the international market, the reduction of financing of fundamental science, export orientation in fuel and energy complex and extractive industry, along with other reasons resulted in cutting

the budget financing of state educational establishments in general and higher educational institutions in particular.”

“Higher educational institutions, including MIPT, which prepare highly qualified specialists for work in scientific organizations of the Academy of Sciences and high technology branches of industry, are experiencing especially difficult problems at the present time.”

The administration underscored that its main aim is ***“to preserve and modernize the unique system of preparation of specialists in elite scientific and engineering fields for the development of the Russian economy in the next century. This preparation should be oriented towards the changing socio-economic environment in Russia.”***

The team was presented with a very complete analysis of the development and growth of the MIPT since its creation after World War II as an enterprise for innovation, quality engineering and creative scientific research based on mathematics and physics. Thus, from the beginning it became closely linked to the Russian Academy of Sciences (RAS), the foremost institution for scientific innovation in the country. The MIPT has received priority funding from the national government as part of the defense establishment of the Soviet Union. It has evolved into an outstanding example in Russia of how to successfully integrate education and research. The sixty institutes of RAS and forty basic research institutions together with the University have produced high quality graduates and research that is comparable to the best in the world.

High caliber academic achievement and scientific excellence are only possible in a conducive environment. Today, this environment is characterized by a shift from the centralized-redistributive system of the Soviet period to a more open economy. During the Soviet Union era (a) the university primarily trained highly specialized experts, (b) students were centrally located within specific academic programs, (c) a substantial number of graduates were placed in centrally planned employment. With reduced funding and less centralized support for specific academic programs, along with a high degree of centralized regulation, the MIPT faces new challenges that requires substantial changes.

The MIPT is now operating in a complex socio-economic environment, determined by the new demands and constraints on Russia. The central government is no longer charged with developing a long-range strategy for a single university or a cluster of universities throughout the Federation. The University must now work closely with business partners, with governmental and private agencies, and especially with other universities, in order to gain fiscal, political and administrative support. These activities must be shaped by the traditions of the MIPT, its faculty, students, staff, and administrators, although different federal rules and regulations must also be taken into account when charting its new strategic direction.

The MIPT should bear in mind that the social context, structure, purpose, and financing of higher education have changed dramatically in most countries over the past few decades. The society of the 21st century is moving from the paradigm of the engineer to that of the gardener, from the use of raw material that needed to be shaped, to that of life that can be steered and monitored. In the new century, such a revolution of the mind leads to a reorganization of society. Political and intellectual power can no longer stem from one decision-maker. Thus, national structures are being eroded while regional authorities and local communities acquire larger responsibilities.

There is a loss of common reference and common identity at the national level, not only in Russia but also in France, Germany, the US and Canada as well as in other countries of Europe. Countries are now required to delegate social and economic responsibilities to larger groupings, such as the European Union, or to smaller entities, such as the former provinces that had been included in the nation-states born out of the French Revolution. There is a movement of inner de-colonization that goes with the transformation of the global paradigm.

We are all moving to a multi-polar system of collective organization, to multi-functional institutional set-ups, to non-linear modes of thinking, in short to a world of complexity. We are all confronted with the challenges of globalization and the need for internationalization. Against this backdrop of a politically monitored system of growth and social progress, emerges an increasingly complex organization of communal life. We understand that this new component of society develops its own rules, implicit or explicit, and rewards its actors differently in terms of time and finances. Some people equate this with the so-called market economy; however, this is only one facet of that evolution. In the global economy, it is not only economic structures that change, but social structures as well. Thus, a changing society also needs a strong sense of values to accompany change, rather than to force it. These values are accompanied by norms and regulations in order to make collective life possible, here or in the rest of the world.

Today, the new paradigm requires a new type of strategic thinking. This does not mean that we should not be prepared for instability, ambiguity and complexity. The rules are changing. This should be the training focus of tomorrow's leaders. Accordingly, one of the strategic targets of the MIPT is to cultivate a new generation of graduates for a multi-polar, multi-layered and multifunctional society.

Strengths of the Institution and Opportunities to be Addressed by the Leadership of MIPT

As stated earlier, MIPT has earned and fully deserves a reputation of enormous distinction for the quality of its students, the accomplishments of its faculty, and the rigor of its curriculum. The institution has a history of world-class leadership in the fields of mathematics, physics and engineering. Since these have been the most highly valued scientific fields for the later half of the

twentieth century, it may be said that MIPT has played an important role in shaping the world in which we now live.

It is important to recognize that the institution has always operated in response to strong social demand as expressed by the state. This politically driven type of market has rewarded technological superiority as the basis of economic and military survival, and in order to remain competitive over the last fifty years, it has been necessary for MIPT to attract, select and educate the most serious and talented individuals and to provide them with an environment in which they could pursue the most advanced forms of research. In exchange for providing the very best program that might be conceivably organized to meet these goals, Russian society and the government of the former Soviet Union were eager to provide generous resources to MIPT so that its pre-eminence could be maintained at the apex of the Russian higher education system.

Thus, in the past, MIPT has organized itself to succeed in the market place of ideas that characterized the latter half of the twentieth century. Now it is time for MIPT to use its traditions of leadership, the brilliance of its faculties and the energy of its students and graduates to be pre-eminent in the market place of the 21st Century that focuses on a greatly varied social demand. It is important to realize that the very same qualities that made MIPT the leader in its first fifty years—rigor, discipline, vision, bold and imaginative thinking—will be the qualities that will ensure its success into the future.

Just as the best scientist recognizes that changes in certain laboratory conditions require a different approach to his work, so it must be recognized that changes in the external circumstances in which MIPT operates demand changes in the internal organization, the structure and the culture of MIPT as an institution. This requires flexibility to adapt to new circumstances. In other words, the Rector and his team must embrace a regimen of change with the same tenacity and discipline that a great theoretician or research scientist would give to his work. The Rector and his team must take responsibility for the development of the institutional plan and ensure that the organizational authorities and relationships are in place to implement the plan. Fortunately, there are some specific advantages inherent in the current traditions and operations of the institution that can be redirected to this effort.

Recognizing and Building on the Loyalty of the Faculty¹ of MIPT. The faculty of the institution has demonstrated its loyalty and commitment to MIPT by many years of individual and collective service. Over the course of our visit, many of the individuals whom we met indicated that they had spent their entire career at the institution, coming to MIPT as young individuals full of talent and new ideas. In the past several years, although their overall circumstances have been reduced in relative terms, the faculty has remained devoted to the institution and to its values. Furthermore it is plain to see that this loyalty has been passed along to a new generation of students. This

¹ Faculty is used here as it is in the US, to designate academic staff rather than departments and schools, as is the case in Europe.

commitment to the University is impressive to observe. It is also a powerful asset upon which to build the future of the institution. It is very clear that the most senior members of the institution, including the Rector's team and many of the most distinguished faculty, would make any required sacrifice to assure the institution's continued survival.

While it may not be obvious from the perspective of one who has spent a lifetime at the institution, this asset of devotional loyalty is rare when MIPT is compared with institutions elsewhere. This loyalty, however, comes at a certain expense. The nearly exclusive employment of MIPT graduates and life-long personnel means that few new ideas enter the institutional culture from outside the walls of the university. Many innovations that have been incorporated into the organization following trials at institutions elsewhere arrive at MIPT as foreign imports. The Rector and his team have demonstrated an openness to hear and to experiment with new ideas. It is important that this trend is encouraged throughout the organization; equally important, as discussed in our recommendations, is that MIPT seize every opportunity to consider ideas from outside the institution, and recruit and select faculty and staff to join the MIPT community who have spent time in other circumstances.

Benefiting from Expertise in the Use of Statistical Information to Guide Decisions. Few institutions can match MIPT for the ability of its faculty, staff and students to organize and use mathematical and statistical information and to develop information models to guide complex decisions. This strength should now be applied to benefit the internal management of the institution.

Drawing on the very promising work being conducted to create an integrated student database that was demonstrated during our visit to MIPT, the institution should develop an information guidance system that will provide management data in the areas of finance, student achievement, resource development and human resource management. The software to operate such integrated information systems is commercially available or it could be developed at the institution. But the development of the functional system is less important than the philosophy that supports its use. The choice and retrieval of information in these areas will uncover implicit structures of power, thus requiring trust and confidence in the decision-makers' goodwill and sense of purpose. Thus, only the leadership of the Rector and his team will be sufficient to create the conditions through which information-guided decisions will become the norm throughout the operation of the institute. Fortunately, the faculty of the University are very sophisticated in their understanding of mathematical and statistical data as the basis for process control and improvement. The remaining challenge is to help everyone at MIPT recognize that the internal management of the institution, especially the management of its resources, is a legitimate matter for the application of scientific analysis and operations management which will lead to a common understanding of institutional reality.

Cultivating A Results Orientation. The essential work of the faculties of MIPT places a high value on outcomes and achievement. This is a strong feature of the MIPT philosophical culture. This remarkable strength can be successfully used to move the focus of organizational energy away from the processes by which students are recruited and selected for the institution—an input approach—towards outcomes that result from the student experience at MIPT. This is a subtle shift of thinking but is vitally important to redirecting the effort of the institution.

The historic process by which students are chosen to attend MIPT is impressive and effective. Only a very small percentage of the very best students across the country and the Russian Federation are admitted. Considerable time during our visit was devoted to describing this aspect of the institution's delivery system, but comparatively less time has been devoted so far to understanding what happens to an MIPT student following graduation. In order to address the crucial step of demonstrating value in the new context of the market place of Russian society, it will be necessary to employ the long practiced "results orientation" of the MIPT faculty in a new way.

Until recently, it had been considered something of a frustration when a promising student did not choose a career of scientific study and commitment to the Academy. But in the new Russia, it is inevitable that young men and women, after being given the very best education available, will pursue a wide range of occupations and professions. It is commendable that MIPT faculty are increasingly recognizing this fact and point with pride to the ways in which the excellent MIPT curriculum prepares students to respond to a wide range of opportunities in their lives and professions. The curriculum must become flexible enough to respond to the new educational outcomes expected by a changed society.

We suggest that careful study should be given to the new roles that MIPT is playing and can play in Russian society. Not only will this help to guide the continuing development of the curriculum and pedagogy, but it will be a great benefit to students as well in that it will guide their choices when selecting fields of study and research projects during the course of their education at MIPT.

This focus on results will also be absolutely essential in the maximization of an "analysis of value" that is discussed in the section below. We are aware that the leadership of the institution already has a good understanding of the cost of recruiting and preparing an elite scientist for service to Russian higher education. Members of the Rector's team spoke with great precision about the price of this investment. We strongly suggest that the equation be considered from the other side—i.e., the market side of the formula. What value does an MIPT graduate bring to society? What is the unique contribution that MIPT is making through its work?

Demonstrating Value in the Many Market Places served by MIPT and its Graduates. Central to the experimental process is the challenge to clarify and demonstrate differences in outcomes and to identify those variables that can

be associated with the outcomes. Every scientist works routinely with information of this type.

The market place has its own logic about outcomes and values. The logic of the market place is based on the demonstration of “value added” by a given process or condition. MIPT brings significant value to the emerging market place in the contributions of its graduates, but also in the scientific innovations, research findings, new applications of technology and even through its impact on the local economy.

It is critical that MIPT take steps to recognize and describe for others its unique contributions to the lives of its graduates, to the intellectual and academic community, and to society at large. This will require two related actions.

First, it will be necessary to engage in a systematic assessment of the added value that MIPT bestows on its graduates through measure of such items as the increase in lifetime earnings, career opportunities, and other contributions to society. Only when this information is available can the institution meaningfully appeal to students and their families for greater tuition support to the institution or ongoing philanthropic support following graduation.

Second, it is important that MIPT be in a position to articulate its contribution to society and government. For many years, under the prevailing exchange system of the former planned economy, the value of MIPT was unquestioned. Now MIPT is in danger of being treated as an expense, a dependent obligation of the state, rather than the asset that it truly is. In order to avoid this disfiguring characterization, which is potentially at the root of many of its resource issues in terms of state funding, MIPT must make a serious study of its contributions to the state in terms of the *new* values of the market place.

Protecting the Identity and Prestige of MIPT in the Market. MIPT enjoys high recognition among key decision-makers and a reputation unmatched in Russian society. This is an asset that few institutions anywhere enjoy to a degree comparable to that demonstrated by MIPT. It might be argued that in the terms of the market place, the reputation of excellence held by MIPT might be its greatest single asset.

The University must move immediately to protect this valuable asset. In changing market conditions, other institutions and competitive organizations will certainly claim that their products and services are as good as, if not indistinguishable from, those at MIPT, and this is not true. In the minds of those who make use of these products and services—the mind of the market in other words—the qualitative difference associated with MIPT services and a MIPT degree should not be lost. To protect a unique identity, there is a need to create a “brand identification” in the market place.

Managing MIPT activities that are critical to its success. Related to the challenge of maintaining control of the MIPT reputation in the market place is the challenge to develop an optimal relationship between the institution and

the research activities that are such an important part of its preparation of students, its relationship to the Russian Academy of Sciences and its contributions to Russian technological standing.

Steps can be taken to develop a new basis for this vital work to continue. The new basis for this relationship should recognize the legitimate interests of the institution that are derived from the investment made in the preparation of students and the intellectual property rights of the institution to enjoy benefits that result from the research conducted under cooperative agreements.

Taking advantage of the entrepreneurial skills of MIPT faculty. Over the course of our visit, the energy and industrious nature of many members of the MIPT faculty was demonstrated time and again. This creative expression of high motivation and remarkable intellect is a matter to be commended in the highest possible way.

Up until now, this activity has been required for sheer survival, and perhaps that will not change in the near term. But this remarkable energy and impetus must not be allowed to go to waste in a thousand well-intentioned but poorly supported adventures. One of the challenges for the Rector and his team will be to help to assess the very best opportunities for new program innovations and to provide organizational, facility, and staffing support for a limited number of highly promising initiatives. We recommend that the University take careful stock of its ability to support perhaps six to eight high potential projects that could make a significant contribution to its long-term future. These projects should be carefully chosen on the basis of the institution's existing comparative strengths, and on the potential for each project to make a recognized, financially viable contribution to the new society.

Making Full Use of the Leadership of the Rector and his Team. The Rector and his team are another great asset to the University. The Rector has experience inside and outside of the Academy. He demonstrates a thorough understanding of the challenges facing the institution and he brings the courage, the vision and the energy to lead the institution forward. The Rector's team brings a great reverence for the institution and its history along with a high level of competence and insight to their various assignments.

The challenge of the next five to ten years will call on all of these qualities of leadership. It will be necessary for the Rector, working with his team, to develop and most importantly to articulate a plan for the institution's future development. It will be up to the Rector to encourage the most promising developments within the institution and to nurture the emergence of younger faculty and new ideas.

The Rector's communication with his colleagues, in particular the annual report of the institution and other formal and informal documents, reports and presentations, should be used to convey a sense of progress and opportunity to the whole MIPT community. It might be helpful to organize the institutional development plan in terms of five or six key issues that face the University with a brief plan for addressing each aspect of the plan. Since outside support

is also needed, it would be desirable to publish a plan for University development in a form that can be shared with others who share the hope for the University's long-term success.

Resource Development Strategies

One of the most important issues identified by the administration of MIPT for discussion during our visit was resource development. Without the necessary financial resources, it becomes extremely difficult for the University to realize its goals. MIPT has a strong foundation on which to build for the future, including a proud tradition of accomplishment in educating the most promising youth for careers in science, mathematics, and engineering. But it will be nearly impossible for the University to continue to serve the nation's needs for educating future leaders if funds are not available to provide educational programs of the highest quality.

Among the most difficult issues identified by the administration and faculty leaders that relate to resources are:

- Inadequate salaries for faculty
- How the University should manage itself through the transition economy
- How the University should respond to the market economy
- How to capitalize on the ownership of intellectual property
- How to position the University for increased international cooperation
- The relationship to business and industry
- How to adequately support the development of faculty and staff
- How to provide adequate financial assistance to students
- How to manage the institution when the state defaults on promised budget allocation
- How to engage in middle range and long range planning in the context of high annual inflation rates

The purpose of this section of the report is to reflect on these challenges and to offer some recommendations for areas of possible revenue enhancement over the coming years.

Looking at higher education in the international context, there are perhaps ten typical categories of income that universities have the possibility to rely on for institutional support. Few universities are able to draw on all such resources, and in some countries, as few as one or two of these areas of support are feasible. In Russia, it is clear that a few of these areas of support have a long history, a few have a more recent history, others show potential for the future, and still others may not be entirely practical. Nevertheless, it may be helpful to review all of the sources.

1. Governmental Support. Public universities customarily enjoy significant support from municipal, state, regional, or national governments. Support from the government has been the principal source of income for the

educational programs of MIPT since its founding. In addition, significant support for research has customarily come through MIPT's partnership with the Russian Academy of Sciences and the joint faculty appointments with the Academy. However, the percentage of the University's budget provided by the Russian government is not only lower today than formerly, but continues to remain uncertain: today only 58% of the current projected allocation has been received. Although this percentage of fulfillment has improved during the last three years, it is unlikely that government support alone can elevate MIPT to the levels of service and excellence to which it aspires in the coming decades. This is a typical phenomenon throughout the world, and thus other sources of support must be identified.

2. Tuition. Universities, not only in several Western countries but also in many Central and Eastern European nations, have increasingly turned to tuition to support the institutional mission. This revenue source, historically associated only with private universities, has now become more common among public universities as well. In the United States, for example, virtually all public universities charge its students tuition. In Europe, East and West, the trend is more recent and not as widespread, but it is likely to increase. MIPT may wish to consider the degree to which tuition could become a source of revenue in the future.
3. Research. The world's leading research universities are heavily involved with funded research. Research funding can come from many sources, but typically the government funds most research. This has certainly been the case in Russia. However, universities are increasingly turning to other external sources to diversify their research support base.
4. Industry-sponsored and Foundation-sponsored Research. An important potential area of revenue lies in potential partnerships with business and industry. In the market economy, discovery and invention is the lifeblood of marketplace advances, especially in areas related to technology. Producing and selling the most recent products determine company profits. Such advances can benefit greatly from university research. Thus, corporations are often eager to form research partnerships with universities to support their work. In addition, there are a number of philanthropic organizations that support research projects. This is an area to be explored. Diversifying areas of support for the critical research mission of MIPT also has the advantage of helping to keep certain research programs functioning in times when one funding source may not be in a position to maintain its support.
5. Philanthropy. Private support for MIPT may be increasingly possible in the future. Such support can come from alumni, friends of the University, corporations, and foundations. MIPT has extremely loyal and proud alumni. Many of them are very successful and are earning incomes that allow them to maintain a very high standard of living. Some of these graduates may be now in a position now to make a financial contribution to the University. It is likely that more will be in such a position in the future. It is important for the University to begin now to instill in its future graduates

the notion of “giving back” something to the University later in life. In addition, there are many foundations and companies that are accustomed to supporting University programs, in some cases with unrestricted funds. Scholarships for students are an area of popular support for philanthropy. Some individuals will provide funds to construct a building if it bears their name. Some companies will provide equipment in the hope that graduates will purchase their company’s equipment in their future jobs. These are just a few examples of the numerous possibilities.

6. Student fees. At some universities, students themselves are willing to pay a fee to support projects or causes that interest them. For example, students themselves might fund certain clubs, athletic activities or facilities, social events, or trips, through a fee charged to all students each year. In addition to providing a revenue source for some worthwhile activities, such a fund could improve the quality of life for students on campus, thus making the University more appealing to prospective students.
7. Auxiliary Enterprises. Universities such as MIPT have great assets that may not be fully exploited. Some of these might have revenue potential. For example, concert halls could be rented to special groups. Vacant space in University office buildings or dormitories could be rented. Conferences could be sponsored that require fees from participants. In addition, there are possible opportunities for faculty and staff to offer services to companies at the site of the organization needing MIPT’s expert services.
8. Continuing and Distance Education. One idea that could be explored is the creation of one or more organizations, closely related to the University but separate organizationally, that employ faculty, staff, and students. In other words, it might be possible to create an income stream for MIPT and for its employees and students by setting up a partly independent company that provides educational services to industry, engages in continuing education, provides distance education programs, or provides various consulting services. This also has the possibility of helping with the difficult salary situation whereby faculty often must find additional employment on their own, possibly dividing their loyalties and commitment to the University.
9. Sponsorships. Some businesses are willing to provide equipment, services, and funds to a university in exchange for some visibility on campus. Sometimes a formal partnership is possible. This is typical now in major American universities, for example. MIPT may wish to approach major companies and agree to allow the companies to have their names associated in partnership with MIPT in exchange for certain support. An example would be a donation of equipment to a laboratory that would feature the name of that company as long as the company provided updated equipment for the laboratory for free.
10. Technology Transfer and Intellectual Property. The intellectual property (IP) being produced by MIPT faculty is a valuable resource. Formerly

when the government provided all of the necessary support for universities, it was logical that inventions and discoveries should revert to the government or more generally to the public. But in many countries, faculty patents and discoveries are increasingly seen as something that should benefit the faculty member and the University. In fact, some MIPT faculty on their own have commercialized their discoveries. MIPT may wish to consider establishing a system of ownership of intellectual property. Such IP, of course, has value, can be marketed and sold, and can benefit the University in the long run. This may require changes in the laws established by the government, as well as changes in University policy and faculty behavior.

These ten areas of resources do not include some other areas occasionally found in university budgets in other countries, such as medical and health services found in universities that run medical schools and operate hospitals, or investment income from universities that have endowments or a cash balance that they are allowed to carry over from year to year and invest.

In summary, MIPT has distinguished traditions, has earned tremendous respect throughout Russia and internationally for the quality of its academic programs, and is able to attract the most intellectually gifted students. But in order to continue to realize its potential, it will need to establish an adequate financial base to maintain its facilities, purchase modern equipment, hire and retain outstanding faculty, encourage its employees to interact with professional colleagues through travel and collaboration, and maintain its value in the educational marketplace. This will require a continuing effort of promoting the merits of adequate funding to government, alumni, friends, corporations, and foundations. It will also require an entrepreneurial spirit in which the faculty strongly supports the administration in efforts to achieve these goals.

Recommendations

On the basis of discussions with members of the MIPT faculty and administration, the VAP team offers the following recommendation in three general areas:

Vision, Mission, Role for MIPT

Organizational Opportunities for Strengthening Institutional Outcomes

Strategies for Resource Development and for Sustaining the Institution

These three areas of recommendations relate to the challenges cited in the introduction to this report, and also to the observations made in the foregoing sections of the report. None of the three vectors can be pursued independently of the other two. In fact, many of the recommendations below address several of the basic challenges in related ways. It is the task of the Rector and his team to put these challenges before the MIPT faculty, staff, students and alumni and to direct institutional efforts towards meeting them.

1. Overall, MIPT is challenged to retain the best of its traditions, structure, culture and people and yet at the same time be willing to change to fit the demands of a new market. A strategy that makes full use of its strengths by realigning them with needs of the new economy must be given the highest organizational priority.
2. A statement of vision and mission for the University should be established for the next decade. This statement should be in a form that is easy to grasp for the public, the government, and alumni, as well as for internal audiences.
3. This vision and mission statement should be followed by a strategic plan, both short-term and long term, that can guide the institution. Such plans, of course, need to be updated periodically, and should be highly flexible, especially in times of changing economic circumstances.
4. As a part of the creation of an institutional development plan, the Rector and his team should identify a small number of highly promising new initiatives around which it will attempt to place resource investments. The initiatives should be chosen on the basis of three factors:
 - The degree to which the initiative addresses an important need in the emerging market place;
 - The degree to which the initiative takes advantage of the existing strengths of the institution;
 - The potential for the initiative to make a significant return to the long-term well being of MIPT (i.e., its “added value”).
5. Recognizing that the institution faces a mix of short term and slightly different long term challenges, the Rector and his team might organize a six year effort for institutional development into roughly three periods: Stabilization (2001-2002); Development (2003-2004); Growth (2005-2006). Efforts to align the internal strengths, address the internal weaknesses of the organization, and secure resources for each phase should be plotted accordingly.
6. The Rector should share his plan for institutional development with stakeholders within and outside the institution. The plan should ideally be translated into five or six key points that address the future vision of MIPT. Such a document will also be helpful if it can be made available to potential funding sources, influential graduates of the institute, legislators whose support is important; and potential corporation and foundation partners.
7. As the basis for the development of a new mission and statement of vision, a formal effort should be launched to scan the emerging environmental context in which MIPT operates. This would involve studying the local, national, and international context in which the University will conduct its affairs over the period 2001-2006. MIPT may

wish to assign a staff member on an ongoing basis to be responsible for analyzing the market for higher education, the opportunities for MIPT graduates, and gathering and analyzing data to assist the institution in its planning.

8. On the basis of its unique intellectual features, MIPT should look for opportunities to collaborate with other entities, including other institutions of higher education in Russia, business and industry, and professional associations. MIPT could lead or share in partnerships as strategic alliances are becoming a key concept for the future. Advisory groups that can assist the University in choosing external commitments should be considered.
9. The University needs a concerted effort to bridge any gaps that might exist between the administration and the faculty. Of special concern is the need for the faculty and the students to be supportive of the directions of the administration. This may require more open lines of communication than currently exist.
10. MIPT should more actively recruit faculty and staff who received their advanced training from other universities. A mixture of expertise on the faculty from both MIPT and other institutions of higher education is an excellent way to broaden the academic base of the institution, foster new ideas, and expose students to different approaches to science.
11. MIPT could benefit from a formal assessment of the value of the University's graduates to society. Russia has benefited greatly from the existence of MIPT, and securing adequate resources for the future of the University will depend on continuing financial support.
12. In order to more widely promote the value of MIPT to Russia, we recommend that the administration consider development of a formal public relations plan. Such an effort would be designed to bring to the attention of the public, national leaders and decision-makers, and others the great contributions of the University. This can be done through brochures, public speaking engagements, radio and television appearances, newspaper and magazine interviews, web sites and the Internet, and other efforts.
13. The development of a more formal network of alumni might be considered to promote philanthropy, to advise the administration on changing conditions in the marketplace, and to promote continuing loyalty to the University.
14. The University should develop a concerned plan to address the exodus of faculty, the aging of the faculty, and the challenge of attracting a younger cadre of new faculty to the University. Such a plan must address compensation, benefits, opportunities for funds to supplement salary, and the overall employment context. The use of funds from the Russian Academy of Sciences should, of course, be a part of this plan.

15. A program of continuing professional faculty development should be considered. This would include opportunities for scholarly updating and other forms of professional development. Of special interest is the need for faculty who are moving toward leadership positions in the administration to gain skills in management and budgeting.
16. The institution must continue to represent the legitimate right of faculty members to earn a fair level of compensation, recognizing that the current approach to remuneration threatens the continued retention of the institution's most valuable assets and restricts MIPT in its ability to recruit the next generation of scholars, teachers and researchers.
17. The University needs to develop a formal plan to handle the ownership, marketing, and licensing of intellectual property. This is a potentially valuable resource that can benefit MIPT as an institution as well as its faculty members individually. For example, it might be possible to ask faculty members to agree that the University owns intellectual property but that faculty members would share generously in any profits from such discoveries and developments. There are some good models of intellectual property ownership that have evolved in countries with more established market economies.
18. International higher education relationships have been identified as a priority by the administration, and there are numerous areas for possible expansion. These include study opportunities for students, exchange or visiting programs for faculty, and joint research programs. To attract more foreign students, it will no doubt be necessary to offer courses in the English language for such students. These courses could, of course, also benefit Russian students who are seeking greater language proficiency.
19. MIPT should consider assigning to a member of the staff the responsibility for fund raising (philanthropy). This could become an important financial resource in the future, and it is not too soon to think about how such support can be maximized from alumni, friends, corporations, and foundations.
20. Support should be sought from corporations and foundations for sponsorships, funding for scholarships and fellowships, and contributions of equipment. Such partnerships with MIPT could be of value to companies, and MIPT should exploit this.
21. Similarly, MIPT should inventory its strengths in applied research to determine if some of their research interests match up well with the research needs of certain companies. The companies might be in a position to support such projects financially.
22. MIPT may wish to take advantage of international resources that are available to develop and review curricula, especially in new areas of

program development. This would include, as one example, EQUIS, which is a means of evaluating business management programs.

23. Discussions emerged during the review of topics such as admissions criteria, faculty/student ratios, and curriculum requirements. Other topics included the use of examples from market economics in courses in mathematics and sciences as well as the evolving importance of biology, genetics, and the life sciences in the 21st Century and how this might affect new curricula that tie into other areas of science and engineering.
24. Efforts should be undertaken to invest in the continuing professional development of internal managers at work within the institution. As the institution continues to develop and takes on great responsibility for directing its own future, the need for leadership skills and appropriate managerial practice will increase at all levels of authority.
25. In order to take advantage of the significant opportunity to provide continuing and life-long education in fields of the institute's pre-eminent expertise, it will be necessary to address several implementation barriers over the next one to two years. Chief among these may be a decision whether to situate the program in Moscow where it will be convenient to potential students. It may also be possible to place MIPT programs in the workplaces of growing corporations. There is great potential for real financial benefit for the institution in such arrangements, but most of the advantages will accrue to the institution that first makes a name for itself in the marketplace as a leading provider of such services and programs.
26. Where possible and appropriate, the institution should examine the roles and responsibilities of non-instructional staff to be sure that their efforts continue to support the emerging priorities of the organization. The overall staffing assignments of non-instructional staff should be reviewed.
27. Across the world, the role of women is changing, and access to careers in science, mathematics and technological fields is enlarging. Very serious consideration should be given to the recruitment of more women as students and faculty members, not only in areas of current concentration (such as languages), but across the spectrum of institutional work.
28. MIPT should take aggressive steps to protect its identity in the market place by asserting control of all programs and services provided in its name. As the institution enters new competitive markets, consumers will only be able to distinguish between competing products on the basis of name recognition and perceptions held about the comparative quality of what is delivered. Since MIPT deserves a reputation of the highest quality, it must move to protect its name. This might suggest the incorporation of an officially recognized trademark, more uniformity of the use of that trademark, and licensing restrictions on its goods and services.
29. The institution must explore new cooperative arrangements with the research activities that engage its faculty and students. It is crucial that

these venues be used as a way of returning value to the institution for its investment in student preparation and faculty support. This is a legitimate and appropriate step in the evolution of institutional adaptation to a market economy.

30. It may be appropriate for MIPT to renegotiate the terms of its relationship to the Russian Academy of Sciences. As the Russian system of higher education evolves, with universities increasingly responsible for the integration of teaching, research, and service to the citizens of the nation, the relationship between the University and the Academy of Sciences may need to evolve. How research is supported, ownership of intellectual property, and the funding for the education and training of researchers may need reevaluation.

Concluding Comments

The members of the visiting team were grateful for the opportunity to participate in the visit to MIPT. We learned much from the visit ourselves. In the spirit of continued international cooperation, the members of the team wish to reiterate our willingness to be of service in the future if we can continue to be helpful to the leaders of MIPT. We wish you the best as you continue to lead your University in the years ahead. The Visiting Advisors express their sincere gratitude to the Rector, Vice-Rectors and their colleagues for the stimulating and wide-ranging discussions held during the week. Also, we express our sincere thanks to the interpreters, the caterers, the drivers, and to the many people who made this visit successful.

The considerable amount of time that University personnel spent with the team members, despite very busy schedules, is an indication of their commitment to meeting the challenges which face the MIPT. A rich and diverse cultural program enriched our stay and we left the MIPT with very pleasant memories. Team members learned a great deal about Russia's contextual environment, the challenges that it is facing, the distinctiveness of the MIPT and the constraints under which MIPT must function. We complete this mission convinced that we have gained at least as much as we have given, and we stand ready through the Salzburg Seminar to maintain our connection with the University, whose continued advancement we will follow with great interest.

We sincerely trust that our report will make a contribution in realizing the goals of changing and strengthening MIPT, so that it can play its rightful part in the development of Russia in the 21st century. We wish our best for the future development of this comprehensive University.

The Visiting Advisors Program of the Salzburg Seminar's Universities Project, particularly the visit to the Moscow Institute of Physics and Technology, has been made possible by a generous grant from the Kellogg Foundation.

Visiting Advisors Team

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Dr. Barblan has served as the secretary general of the Association of European Universities (CRE) since 1976. The CRE, located in Geneva, Switzerland, is the coordinating body of more than 500 universities from over forty European countries. The association organizes international conferences for university leaders on the management and development of university institutions in Europe. Dr. Barblan is a member of the administrative board of the European Centre for the Strategic Management of Universities in Brussels. He received a Ph.D. in political science from the University of Geneva, and currently serves as a member of the Universities Project Advisory Committee.

Dr. John Burkhardt USA

Dr. Burkhardt is professor of higher education and director of the Kellogg Forum at the University of Michigan. Formerly he was program director for Leadership and Higher Education at the W.K. Kellogg Foundation, a position he held from 1993 until 2000. Dr. Burkhardt consults a wide range of clients specializing in organizational assessment and change, strategic planning and leadership issues. From 1989 to 1993 he was vice president for planning and administration at the University of Detroit Mercy and has had significant involvement with other institutes of higher learning. He has also been recognized for extensive community involvement and leadership. He received his Ph.D. in philosophy from the University of Michigan in 1986, an M.A. in psychology also from university of Michigan in 1985, an M.A. in education from Michigan State University in 1974, and B. A. in psychology and political science from Oakland University in 1972.

Dr. Helene Kamensky Austria

Dr. Kamensky is Russian program coordinator for the Universities Project, based in Salzburg. In addition to her work with the Universities Project, she is a lecturer in philosophy and Russian Studies at the Institutes of Philosophy of the Universities of Salzburg and Vienna. Previously, she was a research fellow at the Institute of Scientific Theory, Salzburg International Research Center. From 1985 through 1989 Dr. Kamensky was dean of the faculty of foreign languages, Novosibirsk State Pedagogical University, Novosibirsk, Russia, where she served earlier as associate professor and senior lecturer in the Department of Philosophy. She earned a Ph.D. from the Department of Logic and Epistemology at the Russian Academy of Sciences.

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Dr. Spanier is president of The Pennsylvania State University. His prior positions include chancellor of the University of Nebraska-Lincoln, provost and vice president for academic affairs at Oregon State University, and vice provost for undergraduate studies at the State University of New York at Stony Brook. Dr. Spanier is chair of the Kellogg Commission on the Future of State and Land-Grant Universities and the National Association of State Universities and Land-Grant Colleges Council of Presidents. He earned his Ph.D. in sociology at Northwestern University.

THE UNIVERSITIES PROJECT OF THE SALZBURG SEMINAR

Universities throughout the world are undergoing systemic changes in their governance, academic design, structure, and mission. The Salzburg Seminar's Universities Project focuses on higher education reform in Central and East Europe, Russia, and the Newly Independent States as universities in these regions redefine their relationships with governments and try to become more integrated into the global intellectual community.

The Universities Project is a multi-year series of conferences and symposia convening senior representatives of higher education from the designated regions with their counterparts from North America and West Europe. Discussion in the Project's programs focuses on the following themes:

- University Administration and Finance
- Academic Structure and Governance within the University
- Meeting Students' Needs, and the Role of Students in Institutional Affairs
- Technology in Higher Education
- The University and Civil Society

OBJECTIVES

Universities and other institutions of higher learning are seeking to reshape themselves in ways that will prepare them more fully for the twenty-first century. Even as these institutions are considering extensive systemic changes in their academic design, structure, and mission, all desire autonomy in governance and in their intellectual life. Accordingly, the Universities Project aims to promote the higher education reform process by inviting senior administrators to participate in conferences and symposia concerning issues of university management, administration, finance, and governance.

THE VISITING ADVISORS PROGRAM (VAP)

The Salzburg Seminar launched this enhanced aspect of the Universities Project in the autumn of 1998. Under this program, teams of university presidents and higher education experts visit universities in Central and East Europe and Russia at the host institutions' request to assist in the process of institutional self-assessment and change. By the end of 2000, twenty-three VAP visits have taken place to universities in East and Central Europe and Russia. A full schedule of visits is planned for 2001. The addition of the Visiting Advisors Program brings to the Universities Project an applied aspect and serves to enhance institutional and personal relationships begun in Salzburg.

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FOR MORE INFORMATION

For more information regarding the Salzburg Seminar's Visiting Advisors program, the Universities Project, and Salzburg Seminar programs, please contact one of the Seminar's offices below.

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