

# **THE DEVELOPMENT OF SCIENCE PARKS IN ST. PETERSBURG (RUSSIA)**

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## **Abstract**

Russian universities faced with severe budget cuts have been active in the creation of science parks in order to promote the commercialisation of in-house research and provide additional income for their academic staff. The first science parks were set up in the early nineties, but had to survive in a very difficult environment given the steep fall in the demand of innovation in the domestic market. Exporting has also been problematic due to the scarce knowledge of foreign markets and to the high costs involved. Due to this, just a few science park tenants are doing quite well. In St. Petersburg the number of jobs created in the science parks has, however, been significant. The main plus offered by these science parks to tenant firms has been, rather than the local scientific milieu, the support services available and the good quality accommodation, which nowadays are either unaffordable for small technology-based firms not linked with these structures or scarce commodities in Russia. A weak point has, however, been the scarce collaboration with local industries. This should be overcome with the creation of a number of innovation centres financed by the state whose aim is to produce technologies which can be utilised by the local industries.

## **Introduction**

A new system for the financial support of science was created in Russia during the postcommunist period. This is based on a plurality of sources of financing, choice of projects on a competition basis with the help of independent experts and the introduction of a contract system for the realisation of state orders, but financing has been insufficient considering the dimension of the science sector. Budget allocations for science fell from 2.03% of the GDP in 1990 to 1.23% in 1997, but were as low as 0.82% in 1994 (Matveev, 1998, p.1). Considering that the GDP has halved in this period the reduction in financing for science amounted to about four fold between 1990 and 1997. The difficulties experienced by the science sector is emphasised by the fact that in Russia during the last few years the registration of patents has decreased by 4-6 times (Alekseeva, 1997, p.17). The creation of science parks responded to the need of the universities to overcome the vacuum following the destruction of the previous system in order to direct the research of academics towards the needs of the market at a time when the severe cutbacks in state funding obliged universities to find alternative sources of income.

## **The development of science parks in Russia.**

Science and technology was thought to be one of the main assets of the Russian Federation, the basis for an economic recovery once it was no longer submitted to central planning. It was expected that this wealth of knowledge bequeathed from the Soviet Union would give rise to a boom in the creation of innovation companies and that foreign investment would flow in large amounts into the science sector, but both these expectations did not materialise. There was a boom in the creation of small science firms' in the early nineties, but it was short-lived. The number of small scientific firms increased six times between 1991 and 1993 (from 10,000 in 1991 to 65,000 in 1993), compared with a 300% increase in the number of small businesses, but decreased in the following years, while the total number of small businesses remained stable (Krutik and Ignatev, 1998, p.75).

In Russia the first science park (science parks created by universities will be subsequently called by the Russian name technoparks) was established in Tomsk in 1990 jointly by higher education, scientific institutions and industrial enterprises. Most of the technoparks have been set up under the state programme "Technoparks and Innovations" which aims at promoting the scientific potential of the Institutes of Higher Education. This was the first state programme for the creation of technoparks, but very few resources were allocated. For this reason just a minority of technoparks have reached an advanced stage of development. At the beginning of 1998 there were 62 university technoparks located in 51 cities. Seven are considered to be the technopark leaders comparable to Western science parks and 15 are in the process of reaching this level, while all the others remain at more elementary levels. More than 1,000 small firms are hosted in these structures (Lurie, 1998, p. 36). One peculiarity of Russian technoparks is that not all firms are accommodated on site due to space limitations. Some are located in the nearby university or in other structures connected with the technopark. In Russia technoparks are usually dependent on other structures, mainly universities. As a rule, the university provides the building, pays the current expenses and sometimes receives rent directly from tenants, while the state finances the purchase of some equipment and the reconstruction of the building. Yearly the federal programme provides support to the existing technoparks, but this support is rather meagre. Local bodies have not been very generous either in providing approximately the same amount of funding as federal sources (Lurie, 1998, p.39). St. Petersburg will represent an exception if its programme for the development of entrepreneurship is approved by the municipal assembly.

A new state programme "Activation of Innovation Activity", was approved in 1997, with the aim of creating a network of innovation centres in regions with high scientific, technological and innovative potential and a network of regional training centres for staff of small technology-based firms. These centres should provide suitable and non-expensive premises for industrial and office use, but at the same time have to be self-sufficient. In 1997 total financing for this programme accounted for 50 million dollars which allowed 7 centres to open (Davidova, 1997, p.VI). Four of them are linked with existing technoparks. Two of these centres were opened in Moscow and in St. Petersburg, and the others in Novosibirsk, Kazan and Ekaterinburg. By the end of 1997 the total space of these centres already utilised was 14,482 sq. meters in which 104 firms were accommodated with a total number of 1,557 workers employed (Spiridonov, 1998, p.2). One of the achievements of these centres is considered to be that the amount of taxes paid in that year turned out to be almost a third of the state financing received (Spiridonov, 1998b, p.2). These centres have proved to be a popular option for small technology-based firms. The problem of having empty space is rare -- on the contrary there is usually a waiting list (Ricev, 1998, p.73). As of the beginning of 1998 26 regional administrations and more than 10 federal departments have shown their interest in taking part in this programme.

Most of the innovation centres and technoparks in Russia are non-profit making organisations which, according to the statute, must re-invest any eventual profits to develop its infrastructure and the services to tenant companies, but their financial situation is not easy given the low demand for innovation products in Russia and the difficulties in attracting private investors. The highly technology-based industrial sectors are those which have fared worse since the switch to the market economy. A unusual feature of Russian technoparks and innovation centres is that the vast majority of them have originated from institutes of higher education, despite the fact that these accounted for only 6% of R&D personnel in the Soviet Union, while branch research institutes, where the bulk of R&D personnel was concentrated, have participated very little. This is because in the opinion of O. Melnikov (the vice-director of the technopark of the Technical University) the latter has suffered much more from the disintegration of the command system. For example, in St. Petersburg from the 66 project bureaux existing in 1990 which employed 27,200 people, by mid-1995 only 14 with a total number of 929 employees were left (Daviduk, 1996, p.18).

## **The development of science parks in St. Petersburg**

Saint Petersburg was the second scientific centre in former Soviet Union. About 20% of Soviet R&D expenditures took place in Saint Petersburg. Due to the industrial crisis and to the severe cutbacks in federal financing, the scientific institutions, more than 70% of which were in 1990 still connected with the military industrial complex, are nowadays experiencing a serious crisis. The number of scientific workers decreased more than twofold between 1989 and 1994 (Leontief Center, 1995, p.22) and continue to fall (Peterburgkomstat, 1998, p.6). Wages of scientific personnel are among the lowest of all branches of the local economy. However, the city still boasted 11% of the scientific organisations and 14% of scientific workers in Russia in 1996 (Ribakov, 1998, p.6) and had the highest proportion of workers engaged in science and education in Russia, together with Moscow, both at 10%. For this reason Saint Petersburg represents a fertile ground for the development of technology-based firms. It accounted for 16% of all small science firms in Russia in 1998 with 4% of the population (Leontief Center, 1998, p.10). Unlike Russia where the number of science firms has gone down since 1993 in Saint Petersburg the number of science firms has tripled between 1992 and 1996, in spite of the fact that the propensity of the Russian industry to innovate has continued to decline (Goxberg and Kuznezova, 1997, p.19). The number of science firms in St. Petersburg has subsequently stalled in 1997 and 1998. Statistics on firms' births and closures are not available, but according to some of the directors of the science parks the stall is the result of a widespread closure and opening of new firms, which rather than a sign of vitality is a consequence of the low level of development achieved by most science firms. The average turnover was just \$15,000 per firm in 1997 (Peterburgkomstat, 1998, p.15).

At the beginning of 1998 there were 2 technoparks and 3 innovation centres operative in the city, the newest of which was set up in 1997 in the framework of the programme "Activation of Innovation Activity". The oldest dates back from 1991 while the others were set up between 1994 and 1995. Of the 3 innovation centres one is located in one of the major factories of St. Petersburg named "Svetlana Plc" (this innovation centre will be subsequently called ICS), another in the Technical University (this innovation centre will be subsequently called ICTU) and the third in the Electrical Engineering University (EEU). Extensive interviews were carried out with the managing staff of 2 technoparks and 2 innovation centres in St. Petersburg. The innovation centre of the EEU was not analysed as it was in the process of being set up. Only one of these -- the ICS -- has a distinct juridical entity, while the two technoparks are subdivisions of two different universities, and the ICTU is managed by a non-profit making organisation, the Fund TBH, set up for this purpose in 1995, the same year of the creation of the innovation centre. Its founders are the State Fund for the Support and Development of Small Business in the Scientific and Technological Sphere (later called State Fund), the Technical University, a branch of the Academy of Science and a few private firms. The ICS, the only of these innovation structures not linked with any university, is also a nonprofit making organisation, which has been set up by the Regional Fund for the Scientific and Technological Development of Saint Petersburg (later called Regional Fund). The necessary conditions to be accommodated in these places are that firms must have a scientific nature. For scientific nature it is intended they must have a patent or a licence to exploit a patent.

The technopark of the Electrical Engineering University (this technopark will be subsequently called TEEU) set up in 1991 is one of the first technoparks in Russia and the very first in Saint Petersburg. The Electrical Engineering University where it is located is one of the oldest in Russia and a renowned centre of domestic science. This park is considered nowadays to be the fourth most important in Russia. Two of the first three are located in Moscow and the other in Tomsk. A formal procedure of admission to the park does not exist as any technology-based firm created by academics of this university is automatically a member of the technopark, while outside firms are not accepted. Firms generally continue to belong to the technopark even if they choose to leave the university and find premises in the city because it is advantageous for them to have their name associated with the university. It inspires more trust among clients. The technopark of the Technical University (this technopark will be subsequently called TTU) set up in 1994 is also aimed at favouring startups from university staff, but not all the technology-

based firms created by university staff are members of it. In the Technical University there are about 20 more technology-based firms created by its staff which have never requested to enter the technopark because in the opinion of the vice-director of the technopark they fear that the university might interfere in their activity. In reality, the interference in the activity of the tenant firms is minimal. No information on the firm activities is required by the university.

The innovation centres have a more commercial profile and, therefore, are more selective in the choice of the tenants as they have to become self-sufficient and repay the debts arising from re-construction of their premises. The target of becoming financially independent is, however, still elusive in the opinion of the director of the TBH Fund, while the ICS having reached the target of accommodating 20 firms by July 1998, half a year in advance, should have become financially autonomous. The factory "Svetlana PIC and the Technical University have pledged buildings which were renovated with state financing, the great majority of which was given on a returnable basis. These were previously vacated buildings which were adapted in order to meet the engineering and technological requirements of the firms. For this purpose the TBH Fund received financing from the State Fund, while in the ICS the capital expenditures which at the first of January 1998 amounted to about 1 million dollars were financed from the Ministry of Science --19% of the total -- from the city budget 23% -- and from the above-mentioned Regional Fund -- 58% -- (data provided by the V. Spivak director of the ICS). The requirements of the ICTU are that firms in addition to a scientific nature must be in a good financial situation. The director says that at present the centre can not afford to incubate new firms. Due to financial constraints it is necessary to have the guarantee that these firms will be able to pay the rent which is well below market value. The ICS has, instead, accepted both existing firms and new firms which were spin-offs from the Svetlana factory as one of the aims of the centre was to create a mutually advantageous relationship between the factory and the small technology-based firms. In the ICS tenant companies are chosen via open contests by the board of the innovation centre after an evaluation of the feasibility of the project. The agreement between the firms and the centre dictates that 60-70% of the turnover must come from high tech. Both innovation centres offer long-term rents (up to three years) which in Svetlana is subsidised for start-ups and goes up in relation to the increase in the turnover of the firm. However, in case a firm wants to leave the ICS and buy its own production premises the Regional Fund can act as guarantor on behalf of the firm requiring financing.

Specifically built premises are provided by 3 of the 4 innovation structures. All of them also offer shared rooms with office equipment (photocopy machines, fax and computers) which are freely available for tenant firms, but in the TTU case these services are utilised only by the firms located nearby due to the great distance of some of the tenants. Technoparks also give the possibility to rent university equipment on an hourly basis. The total space occupied by the TTEU is 4,527 sq. meters. It has a main building of 1,000 sq. meters, built in 1994 with state financing, where research and small-scale production can be carried out. Here there are 12 firms, 8 of which are involved in industrial production, while the remaining firms are located in the departments of the University. The ceiling set by the technopark regarding the number of employees is 20. The cost of the rent is about half of the market price. The policy of the universities towards tenants is very accommodating. Sometimes, upon request from tenant firms, reductions in the rent can be conceded. This is usually done for firms which have just been set up or in cases where firms have liquidity problems which according to the technopark management can be rectified in the future. In the TTU tenants do not risk being thrown out of the premises occupied even if they fail to pay the rent. In this case an alternative solution is considered. For example, they may do some work on behalf of the university. The TTU has never benefited from any state financing and for this reason it is rather underdeveloped. It does not have its own building to house the tenant firms, which are scattered around the university. Much larger are the premises of the innovation centres. Svetlana occupies a space of 4,500 sq. meters in an up-to-date production building inside the Svetlana factory, one of the city's largest instrument-making manufacturers in Saint Petersburg which in 1998 was working at 20% of its production potential. The factory has, indeed, a very run-down appearance. The ICTU was set up in 1995 in a building belonging to the Technical University which was heavily

damaged by fire a few years before. Up to mid-1998 3,500 sq. meters had been reconstructed and a further 2,500 are planned to be ready for 1999. In addition to the standard services in the ICS it is possible to have access to information networks and remote databases through optic-fiber cables, to make joint use of the testing and other technological equipment available in the centre, and even to buy this equipment, while the ICTU offers few facilities, just a common room with some office equipment and a conference room, as almost all tenants are in a financial position to be able to afford to buy the necessary equipment themselves. For the same reason they do not rent equipment per hour as in the technopark of the same university. The equipment of the university is in any case judged to be too old to be of any use to the companies.

Consulting is provided by staff of technoparks and innovation centres usually free of charge. They are mainly involved in managing the park and providing consulting in business planning, in the search for financing and partners on behalf of the tenants and in organising participation at various trade fairs, but participation in the management of the tenant firms is very limited, unless specific assistance is required usually when a firm is experiencing serious difficulties. In Russia financing for technology-based firms is provided by a number of state and foreign funds, while banks have shown to be very reluctant to concede loans to small firms and especially to newly set up firms. Innovation centres have a larger staff because they also have to supervise the reconstruction of the building and to prepare the premises according to the requirements of the tenant firms. The ICS is managed by the Regional Fund which has about 13 people in its staff, while the Fund TBH which manages the other innovation centre has about 10 people, and the TEEU has 2 full-time employees and 8 part-timers. In the Technical University there are 3 staff members with duties concerning the technopark, but in reality only the vice-director is actively involved in the management of the technopark. The technopark at the Technical University clearly suffers from a lack of financing and is only able to offer a limited number of services, but it has nevertheless been successful in providing finance for tenants. This technopark hinges on the figure of the vicedirector who despite his age -- he is more than seventy years old -- is still very active and has a wide network of contacts in Russia and abroad.

In addition to its own staff the TEEU also has an infrastructure of support for small businesses made up of seven firms which provide consulting in business planning, accounting, marketing and transfer of technology in both the domestic and foreign markets. These firms also publish educational and scientific literature for tenant firms, certify and test scientific products in conformity with domestic and international standards, organise training for quality control managers in accordance with the ISO-9000 standard and management training in collaboration with the Catholic University of Louvain (Belgium). The technopark also gives the possibility to the tenant firms to participate in several national and international trade fairs at the expense of the State Fund. Consulting by these firms is given as a rule at a price which is below market value. Collaborations have been realised by the park in the fields of environmental monitoring with firms and science parks in Germany, Finland and China and in the promotion of innovative products in international markets with several foreign firms specialised in these subjects. The ICS and the ICTU also offer to their tenants a wide range of information and consulting services comparable to those provided in Western parks, but have to rely on the Regional Fund and the State Fund for the provision of most of the services to the tenants. A training centre is also operative in the ICS in which more than 200 people have been trained. Given the more commercial orientation of these structures these services are provided at cheaper rates for firms at the early stages which are not yet self-sufficient, but reach market level once the firm is well developed. However, in the ICTU up to now the request for consultations has been rather modest, as tenant firms are already quite developed. Sometimes firms themselves have provided consultations to the TBH Fund regarding technical problems in the reconstruction of the building.

The number of firms accommodated in these structures varies from 10 to 45. No real interaction exists among firms of the TTU as these are scattered around the university often at great distance from each other. This is true also for the firms located in the ICTU given the fact that all work in different sectors. Networking among firms is instead more developed in the TEEU as there are more firms working in the same field. In the TTU the number of firms

has grown from 3 in 1994 to 11 in 1998, 7 of which are technology-based firms, while the remaining four belong to other sectors and have been accommodated in order to cover the expenses of running the technopark. All, but one of the technology-based firms, have been set up by university staff, who have continued to work for the university. Eight patents, 3 of which belonged to enterprises which have closed up were registered up to October 1998. In the development of innovative projects the firms utilise the industrial equipment in the faculties where the academics turned entrepreneurs teach. The equipment is rather old -- the average age being 10 years -- but neither the firms nor the university can afford to buy new equipment. Budget allocations for the university are just enough to cover personnel expenses in spite of the fact that salaries are very low -- below the Russian average. The turnover of these firms varies from \$10,000 to \$200,000 per annum and the number of employees from 4 to 30. In total about 150 people are employed in technoparks' firms. The low turnover per head of staff testifies to the scarce development of these firms up to now. Now only a couple of firms are prospering. The turnover of the other firms is at best stationary and at worst in decline especially for the producers of medical equipment, as the budget allocations for health in the city budget reached a record low in 1997. Three out of the five firms which closed in 1996 and 1997 after about three years of existence also produced medical equipment. Given the limited possibility to sell high-technology products domestically nowadays the vice-director is striving to find clients abroad. Several contacts have been established with foreign companies, but only one firm was able to find customers abroad. This firm builds, reconstructs and improves the efficiency and ecology of boilers in thermoelectric stations. It has worked in Poland and has recently signed new contracts to work in the Czech Republic and in China.

The financial situation of most of the 45 TEEU tenants is not much different. According to the director 15 firms have been successful, while seven of these firms are doing very little and the others just survive. The most successful firms had a yearly turnover of \$1 million and \$300,000 in 1997, while the average turnover was close to \$50,000 in that year (Kiselev, 1998, p.4). Despite the difficult economic environment the amount of jobs created has been significant. These firms have created 200 full-time jobs (4 on average per firm) and 1,400 part-time jobs (28 on average per firm) (Innovations, 1998, p.27). Most of the part-time workers also work in the university. All but a few firms have as their main market the Russian Federation. Only 5-6 firms have been able to find a market abroad.

The average turnover of firms in the innovation centres is much larger than in technoparks. In the ICS the average turnover is \$130,000 (Fursenko and Nikkonen, 1998, p.4), while in the ICTU is \$240,000. The higher turnover compared with technoparks is due to the fact that innovation centres are mainly aimed at firms which are already quite developed rather than at start-ups. The average number of people employed is also much larger. It is 25 per firm in the ICTU and 12 in the ICS. All the twenty small enterprises accommodated in the ICS by July 1998 have become financially self-sufficient. The ICS centre was declared by the Ministry of Science to be the best innovation centre in Russia giving it the right to receive loans at favourable terms in order to realise new innovation projects. The success of the centre is emphasised by the fact that according to an estimation of the number of small firms interested in becoming tenants the centre will have to more than double the available premises to 10,000 sq. meters. The only disappointment has been the weak relationship between the innovation centre and the factory where it is located. This despite the fact that some of tenant firms were spin-offs from this factory (Eskin, 1998, p.6). The management of the factory hoped that the companies belonging to the innovation centre would provide additional work for the factory and that it would be possible to create joint ventures between the factory and the small technology-based firms with the objective of utilising their R&D in production, but this has not taken place yet. The ICTU hosted in October 1998 ten technology-based firms with a total number of 250 workers, but the objective is to accommodate 20-30 firms. In addition, at present there are 14-15 firms which receive consultations from the TBH Fund, but are located elsewhere. Two firms have left the centre in the past years, but this was due to financial difficulties. The ICTU does not have a stated profile of activity. Tenant firms are all mature firms set up 5-7 years ago which work in different sectors. Almost all of them have two different activities. About half of the firms were created by staff of the Technical University. In total 6 of the 10 firms have some kind of collaboration with Western

partners. Two work only for foreign clients while the market of the others is confined to the Russian Federation and in a couple of cases also to the Baltic States, the Ukraine and Belarus. Two firms are very small, one having only one employee and the other four employees, but the four biggest are relatively big for the usual standards of innovation centres having 31, 36, 50 and 61 employees. The most successful is a firm of software production which employs 61 programmers and occupies an entire floor. It was financed by a group of American business angels and works exclusively for a software house in the United States. Software production is one of the fastest growing sectors in Russia. Some of the biggest software houses in the West outsource to Russian companies the development of software and Internet tools taking advantage of the abundance of well trained engineers.

### **An assessment of science parks in St. Petersburg**

As a rule, the objectives of science parks can be divided into four categories (Broadhurst, 1993, p.35):

- the creation of new enterprises in order to generate new jobs and wealth.
- the transfer of technology from academic institutions to industry.
- the commercial exploitation of existing or newly developed technologies.
- the realisation of income for the founders and the increase in the value of the premises.

The fourth point in Russia can be applied only to the most advanced science parks which offer high-quality accommodation where rent is close to market levels. Regarding the second point, the transfer of technology to industries has up to now been weak. In Saint Petersburg some success has been achieved only by the ICS whose technologies have allowed the creation of 300 jobs in the local industries (Fursenko and Nikkonen, 1998, p.4). Subcontracting of research to tenant firms on the part of industry is also very rare. In the opinion of B. Salov, editor of the magazine "Innovation" located in the TETU, the major industrial firms might be interested in subcontracting research, but their economic condition does not allow it. Even in the few cases in which research has been subcontracted, payment difficulties have arisen. It is very hard to assess the net contribution of science parks regarding the other points as comparative statistics on technology-based firms in and outside parks are lacking. We can not judge the effectiveness of these science parks from the rate of surviving firms as some of these firms are almost inactive. In Russia the mechanism for bankrupting firms is hardly ever applied. The amount of jobs created by the technoparks' firms has, however, been significant considering they are all newly-set up firms. In general, we can say that these science parks have demonstrated that through their leverage on public and private resources they have been successful in providing financing for tenant firms, but have not yet demonstrated an ability in promoting self sustaining growth exploiting local innovations and the production of new knowledge. However, this task is almost impossible to achieve considering the current economic conditions. The realities of the declining Russian economy mean that there is very little demand for high-tech products. The number of firms which have passed to the stage of serial production is very limited. The majority of firms in technoparks would be classified as rather soft according to the Bullock model, while in innovation centres they tend to be harder due to the policy of accepting mainly firms which are already developed. However, even in innovation centres the average turnover per head is just \$10,000.

Contacts with foreign partners have become more and more frequent as in the last few years science parks have participated in several international trade fairs and conferences. A network abroad is already quite developed in the TEEU. However, up to now technoparks have not been very successful in attracting foreign capital nor in finding markets abroad. In the TEEU there are 3 joint ventures, while in the TTE none. This applies less to innovation centres because of the above-mentioned policy. At present the commercialisation of high-technology products in foreign markets is hindered by the fact that the costs of acquiring the necessary certificate and patent is very high for the average high-tech firm. For this reason only 1% of Russian patents are registered abroad (Alekseeva, 1997, p.17). Another obstacle seems to be the lack of marketing skills which is one of the major weaknesses of these

technology-based firms. Usually they can not afford to have a marketing department and even if they can they earmark few resources for this purpose. It is still not in the mentality of Russians to spend money on marketing. In Saint Petersburg the role of science park managers is primarily to market and manage the park, while business assistance to the tenant companies has been limited to consultations on the drawing up of business plans and on the search for financing, partners and markets abroad. They are generally content with maintaining a general interest in the activity of the tenant firms, but participate very little in the management of these. All the information they generally receive from tenants are data on turnover, personnel and taxes paid. On the other hand tenants seem to be reluctant to provide anything but the basic information required to outside people and seem to take into little consideration the need for consulting in fields such as marketing. The limited consulting provided is in contradiction with the concept of science parks, which is to assist new entrepreneurs in order for their firm to succeed, since a good proportion of these have a technical background and little or no management experience. In science parks around the world this is precisely one of the main reasons why companies locate in these places. However, even in the U. K. the utilisation of management advice was found to be very limited in some science parks, even if tenant firms were experiencing difficulties, and in a few almost non-existent (Monck and others, 1988, p.190).

What distinguishes Russian science parks from their Western counterparts is the very unattractive surroundings. While Western science parks tend to be spacious, attractive and well-landscaped Russian science parks do not look very attractive from the outside, as they are located in run down areas (Svetlana, TBH) or in simple buildings in the university, but currently this is not seen as a handicap. What counts for the entrepreneurs is the infrastructure of the park. Innovation centres and the TEEU for a limited number of firms provide the possibility of renting, for several years without the risk of being thrown out at short notice, premises tailored to the requirements of the tenants at a price which at least initially is often below market rates. Other pluses are a guarantee of a reliable supply of energy, a common security policy which protects tenants from undesirable visitors and also the supply of other facilities. Nowadays modern buildings and up-to-date infrastructures are scarce a commodity in Russia, and even if their supply is increasing the prices are unaffordable for most newly set up firms.

Indeed, it seems that in Russia firms might find science parks attractive not because the local scientific milieu is important for their operations, but because these places offer a range of services and good quality accommodation. Science parks can be seen more like service organisations providing a range of business support facilities to technology-based firms than scientific centres of excellence. This even if it may not have been the original aim of the founders of such structures it may nevertheless represent a significant contribution to the development of technology-based firms. It must be noted that world-wide many science parks can be covered by this definition not having lived up to the most optimistic expectations of producing leading-edge technology (Autio and Klofsten, 1998, p.33).

## **Conclusions**

The creation of technoparks in universities responded to the need to overcome the lack of experience in world-wide technology co-operation and competition and lack of skills in marketing, design and financial management in order to assist "would be" entrepreneurs in the technological sphere. Despite the severe demand constraints the firms incubated by technoparks have provided a discreet number of jobs for academics. It is presumable to think that without the assistance of these structures many of these firms would not be created and would not have been able to receive financing to continue their activity. The possibility of receiving consulting does not seem, however, to be exploited in full. For example, marketing is little requested by tenants despite the fact that few employ specialists in this field. The weak point of the existing technoparks has been the scarce collaboration with local industry. The second phase has as a promoter the state which through a special programme "Activation of Innovation Activity" has financed the construction of state of the art innovation centres, whose aim is to make technology-based products which can be used by the local factories. These innovation centres are not necessarily linked with a

university, but may or may not be linked to research institutes. Innovation centres are still in the initial stages of development and it is too early to judge whether they will be more successful than technoparks.

## Notes

<sup>1</sup>According to Russian statistical bodies a science firm is a firm involved in research, development and production which has not yet developed to the stage of serial production.

<sup>2</sup> The term technopark is utilised to distinguish it from an innovation centre. The term science parks will be subsequently utilised in the Russian context to indicate both technoparks and innovation centres.

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