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## On the Innovative Structure of University Complexes

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*In the article the authors appealing to their experience raise the questions connected with the problems of the University complexes forming. The readers are proposed the variants of solution of the problems for their consideration and probable discussion on journal's pages.*

*Keywords: innovative activity, Innovative university complex, business incubator, techno park, commercialization of technology services.*

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As a rule, innovative University complexes include Techno park, Incubator of technologies, Commercialization of technology services and scientific technical centers with the trends which cooperate each other, institutes, and University's faculties according to some certain mechanisms and rules, carry out certain functions and solve concrete problems.

The main aim of the innovative infrastructure of the institute of higher education is making conditions for the speeded up process of commercialization of the results of scientific technical creation. The value of such process lies not only in the supplementary extra-budgetary sources of the development but also in the improvement of educational services' quality. Education is more valuable at the market when some new knowledge is not only produced but is used in economy.

Every working out or technology before it is applied passes its way of the innovative cycle, which is represented in its enlarged classical scheme at Fig. 1.

The given scheme is realized mainly when a new product or technology is produced on the base of fundamental complex of the knowledge saved up by the mankind and the level of its technological development. It can be realized during many decades or even centuries. Moreover, the knowledge of many generations and countries is used.

As an example of such innovative cycle there can be the laser's creation process. Its temporal diagram is represented at Fig. 2.

As it is seen from the diagram, the innovative cycle of the working out of the laser in action took almost fifty years. There can be given some more examples where the innovative cycle of a working

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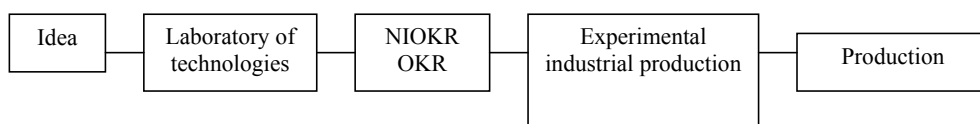


Fig. 1

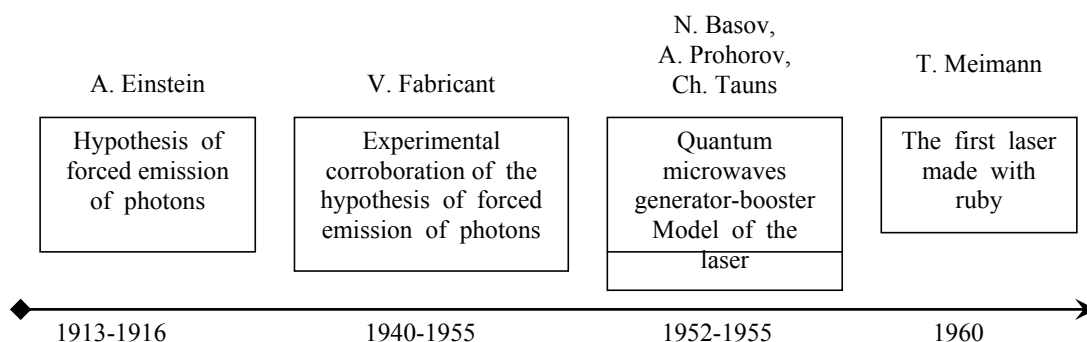


Fig. 2

out took even centuries. As a rule, such working outs were based on the greatest discoveries of the mankind. In particular, the invention of the computer was accompanied with the double code of numbers (Leibniz 17 c.), development of the mathematical logic basis (D. Bull 19 c.), programmed control of the operations and the principle of commands' dividing (Ch. Babbage, 19 c.), with the working out of calculative boards, arithmometers, calculators (17-20 cc.). The first real computer was constructed in the USA in 1946 and it was called ENIAC (Electronic Numerical Integrator And Calculator).

The main aim of the innovative infrastructure at the Universities in the present conditions of the RF legislation is speeding up and optimization of the innovative process. From our point of view, the key factors as an obstacles in forming of the effective innovative structure for institutes of higher education are following:

1. the lack of the law on the possibility for a long-term rent of institutes of higher education lands – analogue of Morrill's law (USA, 1862).
2. the lack of the law on permission the Universities, non-commercial organizations and

small business subjects to have property right of inventions supported by the State - analogue of Bay-Doul's law (USA, 1980). The fourth part of SC, put in force from January 1, 2008, only brings to the solution of the problem but doesn't solve it. According to the Government's resolution № 685 from 17.11.2005, the possibility of attaching rights to the NIOCR results carried out with the Budget means has a row of threatening business difficulties.

The lack of the law of a long-term rent of the Institutes' of higher education lands is an obstacle for the forming of the full innovative infrastructure in the Institutes of higher education territory including enterprises of scientific business closely connected with the University in their work.

From the point of view of the existing legislation, the lack of the irrevocable property right of the inventions of Institutes of higher education makes the trade with the intellectual property objects, made at the expense of the State Budget in private scientific enterprises, doubtful (the lack of motivation of the innovative activity subjects).

The main results of the innovative process in the University are working out of technologies, devices, equipment, programs etc. and their subsequent realization in the technologies of working enterprises, new productions.

The results of the University intellectual activity (RIA) as objects of intellectual property (OIP) can be achieved with the help of:

- financial means of a Client - an industrial enterprise or the Budget financing;
- other extra-budgetary sources;
- own means.

The classical scheme of the procedure of the innovative process and financing of University's working outs is represented at Fig. 3.

In that case an enterprise-Client orders the University a working out. The latter carries out the work and gives it as an object of intellectual property to a Client for the further use.

The given scheme has its disadvantages connected with the specificities of the Russian tax legislation. There are no problems if a Client is the Budget of any level. In that case the University doesn't pay value-added tax and doesn't compensate for it.

When a Client is an industrial enterprise, it, like the University, finds out some questions connected with the compensation for value-added tax.

The RF Tax Code allows Universities not to compensate for value-added tax in the total volume of realization of educational services according to economic contracts, if their volume doesn't exceed 5% from the total realization. On the whole, it is advantageous for the University accounting

department as it makes easier the procedure of accounting and reduces the expenditures on its carrying out. But at the same time the Executors of scientific research contracts are obviously in disadvantageous positions.

As the authors' experience shows, in that case Clients-enterprises working with the compensation for value-added tax usually demand reduction of the sum of a contract to the sum of not compensated value-added tax. On the one hand, reduction of the sum of a contract and, on the other hand, not compensated value-added tax bring to economic losses of the direct Executors of a contract.

In that case, when the University posits value-added tax for a Client in a contract, a structural department carrying out a contract without compensation for value-added tax also has disadvantageous conditions as the expenditure cost is accounted without value-added tax in the accounting of the cost price. And that increases taxation base for the accounting of profits tax and consequently reduces the possibilities of the Executor of a contract on purchasing new equipment or forming the reserve fund.

In that case the University structural departments working on the self-financing base with members in the staff are in very difficult and disadvantageous economic positions. Economic contracts are usually made with enterprises for one calendar year in April-May of the current year. In this connection, the given departments are obliged to form their own reserve fund at the expense of their profit in order they could exist till May at least when the money are received from a Client

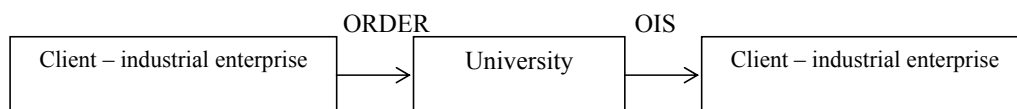


Fig. 3

in the current year. There is an increase of profits tax without compensation for value-added tax and it makes the self-financing department increase the sum of assignment from the part of the profits intended for the forming of the reserve fund.

When a project is a large-scale one and demands simultaneous participation of many co-executors, the necessity of announcement the tender on carrying out subcontract works restricts the University as the main Executor in production of short-term works (one year). As it was mentioned, the period of concluding of contracts in the second ten-day period of the current year, carrying out the tender on subcontract works during two or three months, don't leave any time for the University to carry out contract.

One of the possible legal solutions of the problem can be the scheme successfully tested by the authors in practice (**OOO SRFTI**) where **the financial mediator** between the University and an industrial enterprise is a small enterprise. Two small enterprises as financial mediators with different (simplified and usual) schemes of taxation are formed at the University (Fig. 4). Their aim is to distribute orders for the carrying out of works.

In that case the University carries out the works (**SRW** and **DCR**) connected with their resource possibilities. Subcontractors can be any industrial or scientific-research enterprises; the complex of works can't be carried out without their services.

A small enterprise with the common taxation coordinates the works with a Client, who are interested in compensation for value-added tax, and orders the works to subcontractors without carrying out the tender. On the one hand, it pays, and on the other hand, it compensates for value-added tax. The compensated value-added tax (according to contracts with the University) can be intended to increase the volumes of financing of the University or to its regulation activity.

The forming of small enterprises with the simplified system of taxation (tax 6 % from the volume of realization of production) is stipulated by the necessity of carrying out subcontract works without tenders with the enterprises working without value-added tax (budget organizations, SE with the simplified scheme of taxation, businessmen, etc.). Besides, such small enterprise can serve as a reserve fund without taxation in order to continue financing of self-supporting structural scientific departments of the University in the next financial year.

The SE establishers can be scientists, lecturers of the department of the University where the main part of specialists on the given scientific trend is concentrated. In such a case, the University partially becomes free from the small financial expenditures connected with the educational process and research works of students and postgraduates.

In order to be established at the University, SE can be given a juridical address and can be rented a

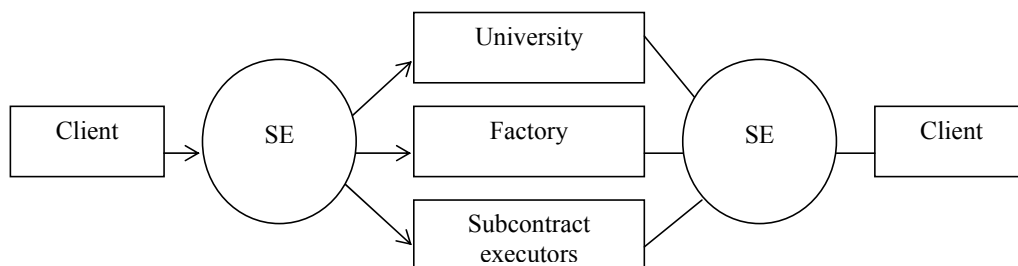


Fig. 4. Small enterprise as a financial mediator

small office provided the enterprise works only as a financial co-coordinator. In a contract between SE and the University there can be mentioned the restrictions on certain kinds of activity connected with the use of equipment, specialists, and the University areas. There also can be mentioned the possibility that the University could control the contracts concerned of the various activities of the University.

**Small enterprise as University’s final product.** In a situation like this the realization of what is to be a financial product of the University is changed in a cardinal way. In that case the final product is not only innovative technology and a specialist of a certain trend but an enterprise equipped with new technology and a team of specialists which could work independently in the contemporary market conditions.

The University takes the part of a generator of small scientific enterprises based on their own technologies and on perspective technologies worked out in other organizations.

The main difficulty in that process is to launch an enterprise into an autonomic working regime at that moment when there is minimal risk of its possible disappearing because of various external and inner circumstances; among them – not qualified enough and well-coordinated team, technologies which are not worked out enough, etc.

The main external reasons of SE disintegration are inadequate exposure of the market, isolation from the University and its scientific and technical potential. Small scientific enterprise can’t exist for a long time without perfection and renovation

of its production which is impossible without the University.

The scheme of SE birth, tested by the authors in the structure of FGNU “scientific research physical and technical institute” having become a member of the Siberian Federal University at the end of 2006, is represented at Fig. 5.

The working out of new technology in the scientific-research laboratory is the base of the forming of experimental production area in the University. Its main function is adaptation of innovative technologies to the demands of the market and the forming of a team. Discovery and research of the market are carried out with the sale of small series of production (“embryological” period of SE forming).

The experimental production area works on the base of the University’s technologies and areas until the volume of the sale allows to get the class of an autonomous small enterprise.

The experience of the FSSU “SIFTI” (S.M. Aldoshin, V.G. Zinov, 2003) has shown that, on the average, the period takes two years. Thus the projects on the forming of OOO “Impulsive technologies” – an enterprise on the metal processing with explosion and OOO “Sibtecom” - an enterprise on geological and geophysical information processing - have been realized.

Some problems, connected with the compensation for value-added tax, can be found out in the realization of the University production (in the “embryological” stage of SE forming). However, these problems can be solved, if, first of all, the norm of realization of production is noted in the University Charta. And, secondly, in the General Permission for the opening of personal

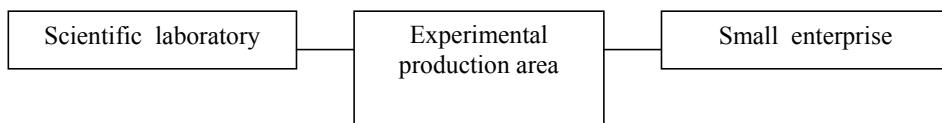


Fig. 5

accounts of the means received through the commercial activity (business activity) in the line “The source of forming of means” there is such source as realization of services and production of the structural departments and territorially autonomous subdivisions, according to the regulations of these subdivisions, provided with the right of bookkeeping and their own estimate of income and expenses on the extra-budgetary means.

As a rule, the Federal Educational Agency giving out the General permission to Universities provides for such line. The only thing which can raise some questions in the University is the necessity to give the right of bookkeeping to the structural subdivision which the planning financial administration of the University cannot always take in adequately.

It is natural that it's not expedient to give right for autonomous bookkeeping to every structural subdivision which has its own production. Then that right can be given to one general structure, for instance, to Business Incubator or to a structural subdivision specially formed for this aim. The problems connected with the compensation for value-added tax will disappear in the case of realization of the University products.

The main elements of the University innovative infrastructure are undoubtedly Techno park, Business Incubator, Commercialization of Technologies Services and scientific-research centers.

The aims and functions of techno parks and business incubators are often mixed up in the literature describing the experience of the innovative structures forming.

The authors of the article suggest the variant of distinct division into aims and functions of techno park and business incubator.

**Techno park as a structure providing with the possibility of a planned and complex approach to the innovative technologies forming.**

From the authors' point of view, the main function of techno park is to offer various services for the SRW and OKR carrying-out:

- information functions (data base on specialists, devices park, production capacities, certificated laboratories, test benches, prices for the services etc. which are not only inside the University but also outside it);
- experimental functions;
- certificate functions;
- industrial functions;
- research functions (first of all, of the Centers of collective use);
- transport;
- mediatory functions;
- consulting functions, etc.

The suggested list of services forms the set of necessary structural subdivisions of the Techno park: an analytical information center, certificate laboratories and standardization of the main trends of the University's activity, experimental and industrial production, research and experiment centers of collective use.

The organization of the data bases and the afore-said structures in the limits of Techno park will allow to change the character and the volume of carrying-put of large-scale SRW and OKR, to start its planned carrying-out, to draw into the work the most qualified specialists not only from the University but also from other institutes; it will allow to offer complex scientific and technical services for small scientific and industrial enterprises.

Taking part in the tender on the carrying-out of SRW and OKR and using the data base, every University scientist will be able to plan the works, and to use his whole scientific and technical

potential, and to define the real cost price of the works.

Thus, in 1999 one of the authors of the article had to substantiate the cost of the large-scale contract on the scientific-research work for a foreign Client. The work was to be carried out by three SRI (Scientific Research Institutes) of Krasnoyarsk and Tomsk cities and by a unitary industrial enterprise. And only the latter had officially registered estimate and price for the carrying-out of the necessary services. The institutes were not ready with the officially registered estimates on the carrying-out of their own accounts, and that wasn't suitable for the foreign Client.

When there are an experimental and industrial production and an appropriate experimental base in the structure of the Techno park, the market can be offered some new more thoroughly worked out and expensive products. The creation of series of test benches will allow to get more competitive advantages for innovative technologies and working-outs. Certificate laboratories will allow to bring the working-outs to the production sample. Competitive advantages proved with the complex of tests and experiments, and with the necessary certificates for the technologies, and with the sample of a product will speed up and make the conditions for an investor more convenient and easier in the future.

Taking into account the fact that the services of the well-planned and equipped Techno park will be offered not only to the educational and scientific structures of the University but also to the small enterprises of the Business Incubator, industrial enterprises and other scientific institutes of the region, one can say with certainty that the Techno park must be repaid.

### **Business Incubator as a generator of small scientific enterprises**

The main "product" of business incubators is steady working small scientific enterprises. For this purpose, privilege conditions are made for a certain time (usually for 2 or 3 years) in the Business Incubator. The privilege conditions can be connected with:

- rent of offices and equipment;
- taxation;
- crediting, etc.

The main "internal function" of the Business Incubator is transmission the intellectual property objects produced at the expense of the State or extra-budgetary account to small enterprises of non-state business.

The authors of the article suggests to consider two types of business incubator. The *first type* is the incubator for the "embryological" development of the future small enterprise's model. This type of incubator as a structural University subdivision with the right of autonomous bookkeeping is based on the federal property.

As it was mentioned above, this type concentrates experimental productions of the innovative products; here technology or a product is adopted to the market, a team for an independent work is prepared. Accordingly such structures as a special design office, advertisement marketing department, business planning department, accounts department are formed in this type of incubator.

There is a possibility to form two small enterprises in that structure - two financial coordinators with different conditions of taxation. It is not supposed to locate small autonomous enterprises in that incubator.

The forming of the *second type* of business incubators is stipulated by the necessity of forming of effective mechanism of co-operating of the University with the territory and administrative units. From our point of view, these types of

incubators are to be formed on the base of municipal property according to the perspective plan of development of the territory.

This type of business-incubator organizes the rent of industrial areas to small enterprises, so the most appropriate and stimulating condition for their development will be the advantageous right for small enterprises to ransom the industrial areas in the future.

The organization of such system of business incubators are to be formed on the base of the contracts with the administrations of the territories. In such a scheme the University takes an active part in the development of territory and administrative units of different levels. And the city and region administrations find out a possibility to form their own innovative structure according to their plans of development and with the use of potential of the University.

#### **Scientific and technical centers as self-financial scientific-research units of the innovative environment of the University**

The development of collaboration with the industry can't be provided without the including of scientific and research departments in the University innovative infrastructure.

Scientific-research and experimental and constructive works are carried out mainly in scientific and research centers or sectors (SRC, SRS) at Universities. Works are carried out on the base of separate contracts and grants with enlistment professors and lecturers staff and other specialists of the institute of higher education holding more than one office.

There is a practice not to employ members of the staff at some Universities. This is stipulated by the fact that contracts and grants can be expired and it makes reduce the staff which is a very painful procedure.

But such position slows down the forming and development of scientific schools and

collectives in the trends in which the University would like to get the leading position. As a rule, large-scale and long-term projects are carried out under the guidance of a famous scientist shown himself to advantage. The scientist gathers a collective of his colleagues, disciples and serving staff around himself. In that case a collective can carry out not only one or two economic contracts, according to which and to the RF legislation intellectual property belongs to a Client, but also with the quite "critical mass" it can develop some new perspective trends on its own ideas which can bring a large return to the University in the future.

The development of a scientific potential and scientific schools cannot be imagined without the permanently working main body of a collective. Such nucleuses can be formed in Scientific and technical centers (STC) in the innovative structure of the University. There can be provided for the forming of a special reserve fund for their stable financial support in the period of lack of contracts (as a rule, in the first half of the year). The fund is to be formed on the account of supplementary assignments from the STC income. The volume of the fund cannot be less than 4-months fund of payment. Exceeding of the fund's volume at collective's discretion can be used for the realization of its own scientific and technical and social programs.

The Centers will be much more defended due to their own enterprises organized within the bounds of the business incubator of the "embryological" development.

For the last years special subdivisions **Services of commercialization of technologies** as an organic part of the innovative infrastructure have been developed in Universities.

There can be said about some real experience of the Services of commercialization and transfer of the technologies of the Universities in Tomsk,



Lower Novgorod, Saint Petersburg, Ural, and other cities (S.M. Aldoshin, V.G. Zinov, 2003).

The every-day work of such offices is organized in such a way there could not be missed the possibility of use of perspective results of researching and working-outs which could have their commercial value at the market in the future. The difficulty contains in the fact that the importance of the large majority of new scientific results on the first stage is not obvious from the commercial point of view. The main specificity of applied scientific results is their embryological character of the development of new technology, the large part of those results are far away from the prototype. That's why it makes them risky to be realized in business.

The mechanisms of cooperation of the Services of commercialization with the structures of the University are formed through the organization of joint work with the patent department, juridical department, international department, the service providing for the State and official secrets, accounts department, personnel department, information service. The most important direction of the work is professional development of scientific employees and lecturers in the sphere of management of innovations.

The first aim of the Services usually becomes the working out of normative documents for the prevention of conflicts connected with the interests of the participants of the commercialization of working-outs. First of all, these are the conflicts between a scientist and an employer connected with the intellectual property problems. The conflict of interests can arise, for instance, if an employee of the University because of his personal material interests can conclude labour contracts concerning the object of his research carried out at the University, at his main working place, not only with the University but with some other organizations. The necessity of working out of the contract on co-operation of the rights on the results

of scientific and technical activity; the contracts on confidence; methodic recommendations on realization of technological audit and the structure of representation of working-outs to an external partner appears at once when negotiations with a potential partner on commercialization start.

Selection of commercially important results of researches and working-outs usually takes the form of an interview with the working scientists and with the preliminary studying of the reports on the carried out researches according to the recommendations for the carrying out of technological audit. There often appears in the process of an interview that there is a possibility to commercialize not only the afore-said applied result but also something as its component (part) or a way of its receipt. As a rule, a researcher is absolutely sure in the necessity of advancement of his working out but after a first interview with an expert it often becomes evident that the research is not competitive with the famous analogues or the expenditures on the bringing the NIOKR results to industrial use are very high comparing with the future income.

It is necessary to consider, if a researcher is not interested in the results of audit, the information he would give can be represented in such a way that there can be made an impression of a fundamental character of a research or of a stage when an applied result is not obvious yet.

The applying of such express examination of commercial potential of the researching results allows to form a methodic base for making administrative decisions for the possible commercialization of working outs through the forming of small innovative companies and collaboration with industry.

The work of the Services is constructed with the account of branch and regional specificity of the University although the important thing of their work is a search for the ways of commercialization of scientific and technical and educational

resources, the main criterion of the activity is supplementary income from the realization of such intellectual resources possessing with the economic value. Among the commercialized University's resources can practically always be found the possibilities not to allow gratis transmission of the base intellectual property at concluding of contracts on NIOKR, the account

of University's interests at the administration of small innovative firms which were given the University resources, the creation of profitable relations with industry, etc. The Services of commercialization are to assist the administration to base and carry out administrative decisions on forming of the extra-budgetary sources of the development of the University.

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