

Successful Elements for Governmental, Industrial and Universities Relations in Siberia.

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Abstract

Innovative activities in the Tomsk Region have increased multiple folds during the last seven years. Hence, this analysis of the top innovative cluster in Siberia – that is “The Innovative Cluster” of TUSUR. The ground work to success between governmental, industrial and universities within the cluster were set forth several years ago resulting in a highly efficient internal activities between cluster elements. The efficiency is determined with a standard / optimal coherence factor of 2.5. The results of the main factors are: financial resources at 1.5, material resources at 1.9, human resources at 2.5 and information resources at 2.6. These allowed the conclusion that when an innovative cluster is laid out as a “Triple Helix” the results of the internal activities are probable to generate success.

Keywords: coherence evaluation, efficiency of “Triple Helix” interaction, efficiency of innovative activities

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1. Introduction

The Rector and his team from The Tomsk State University of Control Systems and Radioelectronics (TUSUR) started innovative activities during the year 2000. They hedged on innovational processes in the development of education, science and managerial methods. One of the most important decisions for the Rector and his administrative team was the cooperation with the business community and the regional government.

Due to the endeavors from TUSUR mutual relations were formed over the last several years resulting in proceeds for all participants:

For the regional government – one of its objectives for the Tomsk Oblast is for it to be a region of innovation, being attractive for both investors and residents.

For businesses – close relations with the scientific community and the chance to pick and choose highly qualified specialists.

For the universities - additional financing and a value added that would attract university entrants.

As a result of all participants and several years of cooperation “The Innovative Cluster” of TUSUR was formed and became the leader in Siberia.

The ground work to success between governmental, industrial and universities within the cluster are:

1. **Partnership.** As a practice the partners are graduates of TUSUR, whom have organized high-technology companies that fit the profile as set forth by TUSUR and agree with TUSUR to be part of their activities. This creates a condition for equality and respect for the interests and peculiarity of all parties involved.
2. **“Dual citizenship”.** This is a partnership that allows a company / team to set up research institutes (RI) or design bureau (DB) or research laboratories (RL) within TUSUR. These are private firms within the structural units of TUSUR which are guaranteed complete financial freedom. Usually, directors of these private firms are also the executives of the RI, DB or RL. If the RI, DB or RL activities are a success, the director is then granted a seat on the University Academic Council. The created units within the University structural are given, by the Rector, the rights to contract on behalf of TUSUR and to maintain their own accounting, but reporting annually to the University Financial Administration.
3. **Privilege internal payment.** The central fund of TUSUR receives a portion of the profits that is earned from the business contracts this way maximum resources remain available for partners and additional development of units.
4. **Guarantees.** In the event that a company exits the partnership. TUSUR guarantees to investors/company to provide the usage of all materials generated by the project (i.e., equipment, repairs, buildings, etc.) but no longer provides salaries, travel expenses and other expenses - these become direct expenses of the investors/company.

Industries collaborate with the university as such:

1. The industries provide the infrastructure for research and development. They make the necessary repairs to the TUSUR premises and provide furniture, computers and scientific equipment. This is their direct investment to TUSUR.
2. Usually the private companies provide their own research and development team but they also may contract parts of their work to TUSUR. Allowing them the broad experience and knowledge of the whole scientific community.
3. These companies supply the university laboratories with modern equipment which essentially advance the students of TUSUR to be better qualified graduates. The university trains specialists according to the requirements of the companies but at the

expense of the companies. Giving TUSUR additional financing and the companies' qualified specialist.

Contractually the university and the companies are not financially liable to each other which could be seen as a paradox. However, the synergetic effect created from the interaction of the university and the companies are so great that the result of the chosen internal active is progressive.

The regional authorities of the Tomsk Regional Administration (TRA) has created favorable conditions and provides financial support, as follows:

1. TRA has programs that provide partial financial support for innovative projects via a competition. TRA is the initiator and one of the investors for innovation infrastructures such as the Commercialization Units and the Business Incubators. Regional authorities reduce the local taxes for innovative projects that are implemented by these industries.
2. Regional authorities insure the support of federal authorities for these innovative projects and there local participants (i.e., universities, research institutes and businesses).
3. The City of Tomsk and regional authorities preserve an image of Tomsk as "The Creative City – The City of Education and Science".
4. Oblast authorities give their moral support - to initiatives developed by the universities and business - through their direction given to both the legislative and city.

The elements for a "Triple Helix Model" of "The Innovative Cluster" of TUSUR are as represented in Figure 1. The green field is Industry, blue is the university and yellow is the government and non-governmental organizations. It is great pleasure to say that the interaction of this "Triple Helix" has already been fruitful.

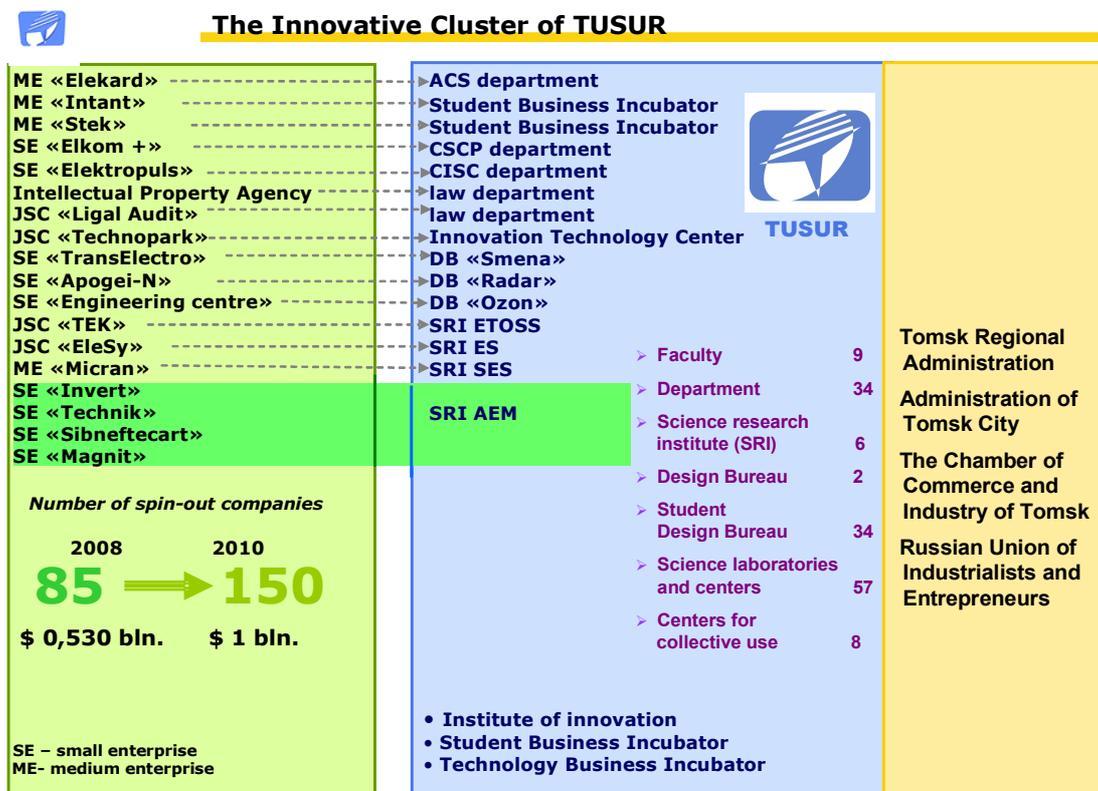


Figure 1. Characterizes the "Triple Helix Model" with a "cross-section" view of "The Innovative Cluster" at TUSUR.

Here is an example of how TUSUR uses the “Triple Helix Model” to foster a cluster. First, the innovative projects were not realized by a linear path but by consecutive contacts from various sources. Such as at the startup stage of an innovative project the university provides resources (space, equipment, knowledge, students, consultants and etc.). The Tomsk Regional and City Administration support the innovative projects with training, grants and consultations. Also, the stage before the “Incubation” (when work starts at a business incubator) there is university support and support from businesses (finance and consulting). Further at the startup stage of the company there is continued support from businesses and government (regional and federal). The wide reaching support from TUSUR, businesses and governmental sources carry on even further. Such the drawback for Russia is that such processes only takes place at a microeconomic scale and per se in micro clusters. The aim for Russia/TUSUR is to create “Triple Helix” on a macro scale for clusters. In order do this it is necessary to show the efficiency of such a model at a micro scale.

Thus, the aim of our investigation is to bring to light the efficiency of “The Innovative Cluster” and to discern the strong points of the cluster and it’s surrounding with their impacts socially and economically.

2. Structural model created based on the investigation of “The Innovative Cluster” of TUSUR

For achieving this ambitious aim, we used methods of systematical analyze and resource approach. The basic attention is given to the model of composition, to the structure of the system and also to the structural model. Investigation of a cluster starts with determination of its elements and sub-systems. The algorithm of investigation is presented below.

2.1. Construction of the model of composition

The system composition model is described from its subsystems and elements that it consists. To evaluate “The Innovative Cluster” the following composition of elements were proposed:

- 1) Education - faculties, departments, institutes, centers.
- 2) Science - science-research institutes, design bureau.
- 3) Infrastructure - Student Business Incubator, Technopark, Commercialization Unit, Patent information office and others.
- 4) Medium Enterprise.
- 5) Small Enterprise.

2.2. Construction of the structural model

Peregudov and Tarasenko (2001) describe the structural model as a complexity of necessary and sufficient relationships for the aim of an achievement. The outcome of intercommunication among the elements can be completely determined by the production of the structural model. The intercommunication is considered like a resource flow or like access to resources. The authors’ opinion of the information resource is important mainly as in association to an innovative cluster and consequently the main performance of the information resource is the degree of a system as in an innovative activity.

3. Algorithm and mechanism of coherence evaluation

The coherence of a system is considered like the characteristic showing the sustainability and the importance of the internal actions among its elements. In general, the higher the internal actions in a system, the more considerable the synergy is. The resource approach can presupposes by calculating the coefficient of coherence. In most cases this is enough to determine the next needed resource:

- Finance
- Material
- Human Resources
- Information

This presupposition takes into account each resource separately.

The degree of the cluster coherence is influenced by many factors but these are the three main factors:

- A) resource pool;
- B) changes in business environment (primarily – market conditions);
- C) limitations of cluster's resources.

The resource pool results in the strengthening of internal communication. This happens because companies reorient themselves to use more available and less expensive resource within the system. In General, most companies and organizations orient to the specific market segments which surround them (customers and suppliers). As result a company changes more concretely in reaction to the influence of external changes. This process of adaptation to market requirements inhibits the complete integration of a company into a cluster. In other words companies can not receive all their necessary resource from inside the cluster and rely on outside resources.

Thus, the value of the cluster coherence will only be at a balance when stipulated with internal resources and interaction with external surroundings. The lower limit of coherence is 0, and upper limit is determined the number of system elements (in our case 5). In the first case the interaction among elements is absent. In the second case there is the whole integration of elements. From the point of view of system conception the optimum value of coherence is the medium value, in our case 2.5. Otherwise mutual addition of elements by resources inheres to a high level, where synergy effects are significant, system are stable but dependency of any element from the system is not critical and enables an independent determination of the aims, priorities and realization of any actions.

For the evaluation of the innovative cluster coherence when using the resource approach we used the following algorithm:

Step 1. Forming of matrixes of influence/dependencies factors (one element of cluster influence on another element) on each type of resources with use of the contracted model. Values of factors are formed, thus at the absence of influences or dependencies they become zero, but under the absolute influence or dependency they are a unit.

Step 2. In the formula (1) for each type of resource the system coherence factor is calculated. The calculated amount for the integral factors corresponds to the amount of the resource types, chosen for the evaluation.

$$S_r = \sum_{i,j=1}^n \beta_{ji} \cdot \alpha_i \cdot P_i \quad (1),$$

where α_i - a factor of innovation activity for i element;

β_{ji} - an influence factor for j element on the element i;

P_i - a potential for i element;

n - the amount of system elements. For "The Innovative Cluster" of TUSUR, according to developed structure model, value $n = 5$.

r – a type of resources on which the evaluation is conducted. In this instance resource r is - financial, information, material or human.

Step 3. Analysis results for evaluating "coherence" and "synergy effect".

4. Results and evaluations

The results of approbations of mechanism of the innovative cluster evaluation for the example of "The Innovative Cluster" of TUSUR received the following coherence factors:

- 1) financial resources: 1.5
- 2) material resources: 1.9
- 3) human resources: 2.5
- 4) information resources: 2.6

Coherence factors on material, information and human resources possible to interpret as an increasing the resources possibilities for system elements (i.e. increases a volume of resources, which possible direct to the development). Proceed from calculated values of factors, recourse possibility are increased by more than two times. Coherence of "The Innovative Cluster" of TUSUR on information and human resources corresponds an optimal

value. Obtained results characterize high coherence of the system of "The Innovative Cluster" of TUSUR on all types of resources. This gives the following advantages for the system as a whole: significant synergy; long-term system stability; increasing of efficiency and rate of R&D execution and so forth.

5. Conclusion

The conclusion is that when an innovative cluster is laid out as a "Triple Helix" the results of the internal activities are probable to generate success. Due to this success and synergy of our "Triple Helix" model the following results were reached by the end of 2008:

- 85 enterprises became successfully organized units and function within TUSUR;
- 120 project had been implements by TUSUR graduates for Tomsk enterprises;
- The last two years the revenue of the companies in the "Innovative Cluster" showed increases of 50% per year;
- 176 new enterprises have been created by the graduates of TUSUR; and
- According to Federal authorities the Tomsk Region has become a leader of innovative activities in Russia.

Since the formation of "The Innovative Cluster" TUSUR has increased its' financing for R&D by 19 times during the last 6 years. In 2008 the enterprises created from graduates of TUSUR produced about 80% of all high-tech products produced in the Tomsk Oblast.

With this said:

The long-term outlook for TUSUR will be to transform itself into an innovative high-tech university in field of radio electronics and control systems, to occupy the leading positions in the Siberian region and to integrate itself into the global scientific and educational community. The University will continue to surround itself with scientific intensive enterprises (no less than 150), headed and remanded by its graduates who will support close scientific and educational ties with the university.

The vision of TUSUR is to maintain a positive influence on "The Innovative Cluster". This is a transference of focus from the engineer to the owners of the companies whom employee the engineers. This is "the wave" of high-tech entrepreneurs with distinctive peculiarities and significant advantages that are formed, by the leadership of "The Innovative Cluster" at TUSUR.