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INNOVATION IN ESTONIAN ENTERPRISES. CHALLENGES AND TASKS FOR NATIONAL INNOVATION SYSTEM IN THE EUROPEAN RESEARCH AREA.

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ABSTRACT

The present paper is aimed at contributing to the development of Estonian national innovation system in the European Research Area.
In the paper it is underlined that R&D activity in the enterprises is low, which is also one of the reasons for the insignificant amount of patenting. The overall objective of the national development is to achieve sustainable economic growth and social stability by strengthening competitiveness of the Estonian economy all over the country. Using science and technology parks, innovation parks and innovation centres and stakeholders it is possible to develop innovation system in the European Research Area.
Keywords: national innovation system (NIS), CIS survey, European Research Area (ERA), R&D.

1. INNOVATIVE ACTIVITY IN ESTONIAN ENTERPRISES

The results of the CIS (Community Innovation Survey) show that 29% of the studied enterprises made expenses on innovation. In most cases, the expenditures were associated with the acquisition of machinery and equipment as well as the accompanying training. Out of the total turnover of innovative enterprises, total expenses on innovation amount approximately to 2.3% in manufacturing and only to 0.8% in services (Terk, E., Kurik, S., Lumiste, R., Heinlo, A. 2002).

The low intensity of R&D (Research and Development) is also reflected in the enterprises sales figures. Only one sixth of turnover of Estonian entrepreneurs was amounted by the sale of new or improved products/services and in turn only 6% were also new for the enterprises' market. A majority of turnover is provided by the sale of established products/services. But when observing the share of innovative products/services of the turnover of only innovative enterprises, it amounts to nearly one third, while the share is higher among the small and medium enterprises. Among the large enterprises the expenditures on innovation amounted to a relatively smaller share of turnover than among the SMEs (Small and Medium-sized enterprises).

R&D activity in the enterprises is low, which is also one of the reasons for the insignificant amount of patenting. Only 4.2% enterprises had filed patent claims and there were 5.6% obtained patents. Patenting as the protection of the entire innovative activity is more frequent among the large enterprises, firms belonging to concerns and with greater foreign ownership. The use of various protective measures is also significantly more active among the innovative firms than among the non-innovative ones. The most extensively used protective measure is pre-empting the competition by acting more rapidly (1/5 of all enterprises and 41% innovators). The registration of trademarks, secrecy and complexity of design are used in almost 50 percent less cases.

European Union 5th Framework Programme EW ISME 2003 survey result is somewhat different from the Estonian Innovation Survey from 1998-2000 (Terk, E., Kurik, S., Lumiste, R., Heinlo, A. 2002), where the majority of the companies innovated through the acquisition of machinery and equipment. But this difference is also normal as the sample of this survey involves only innovative companies (Kurik, S., Elenurm, T. 2003).

Internal research and development was the main innovative activity undertaken in the companies during the last two years (73%, see ch.1.). Also the acquisition of equipment and apparatus directly related to product/process innovation (60%) is very common activity. The third activity with 40% is the acquisition of external know-how directly related to product/process innovation.

The results of the CIS survey show the very small participation of the public sector in the innovative behaviour of the enterprises. Only 5% of the innovative enterprises has received financial support from the state, while the share of aid recipients is even lower when discussing the local governments or the EU programmes. Considering that the period of the study was also the time of major reorganisation in Estonia's state innovation system, it would not be quite fair to use the results to make definite conclusions about the current system.

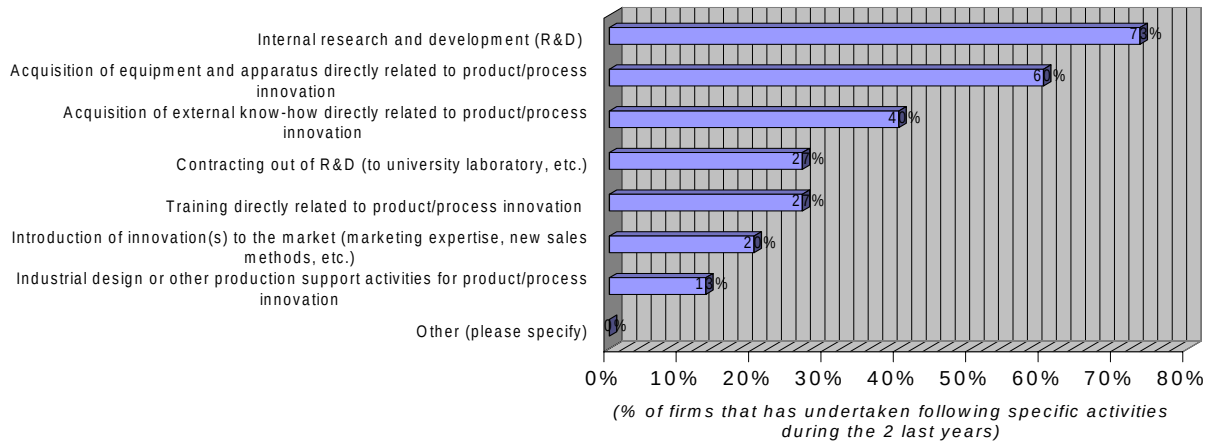

Chart 1. Innovative activities undertaken during the last two years (Kurik, S., Elenurm, T. 2003).

2. BARRIERS OF INNOVATIVENESS

Why then is the innovative activity in the Estonian business so little oriented at radical innovations and relatively unilateral, mainly concentrating on the implementation of machines and equipment? Nearly half of the enterprises, which did not implement innovations in 1998–2000 claimed that the earlier innovations meet their requirements and/or that there is no market demand for innovation. On the other hand, 40% of the innovators experienced obstructive factors in the realisation of their innovation projects. The main obstructive factor is allegedly money: innovation requires large expenditures, but there is a shortage of funds. As for the internal problems of the enterprises, the most significant is the shortage of competent personnel, which is another sign of the low ability of the Estonian educational system to provide human resources corresponding to the development level of economy (Terk, E., Kurik, S., Lumiste, R., Heinlo, A., 2002).

Besides, half of the innovative firms experienced in the realisation of their projects as an obstruction the low responsiveness of the consumers to new products and services. But this may mean that the innovation strategy has not been properly thought out. An innovation project has been launched before it is clear, which trends and demands direct the market. Among the positive aspects, the relatively more dynamic organisational structure of the Estonian enterprises can be mentioned, which poses no obstructions to most entrepreneurs in the realisation of their innovation projects. In the EU countries innovation has been frequently obstructed by organizational rigidity. It is possible that a reason is the short age of the Estonian enterprises, which means that organisational rigidity has not yet developed.

Barriers to innovations currently are still for Estonian companies first of all economical: high cost for innovation, long time span for return on investment, lack of financial resources. These are followed by the high risk factor in developing new products or processes and then by the problem that innovations are easily copied. At the same time the real knowledge concerning protection of intellectual property is very low in Estonian enterprises.

The barriers to innovations in west are rather similar. Western companies see more problems in reaching the technological information than Estonians do. But the lack of technologically competent personnel has higher position among barriers in Estonia than in west (Trott, P. 1998).

3. ROLE OF UNIVERSITIES AND R&D INSTITUTION IN NATIONAL INNOVATION SYSTEM

How must the universities in the new situation develop the new productive relationships with the outside world, the new sources of income, the new pattern of organisation and shift from a passive to an active mode in this process?

The factors promoting innovation processes in universities are (Burton, R. Clark 1998):

- An innovation-friendly culture in which members of the university are working;
- Academics are representatives of innovation in their respective fields of R&D;
- Students are ambitious young people who always bring into the university the newest ideas and needs;
- The labour market demands excellent graduates with an up-to-date education.

To manage these tasks, the following general requirements are essential (EIMS publication No 26, 1999):

1. The university has to design appropriate interface-structure in order to facilitate collaborative projects with companies.
2. A large portfolio of technology transfer services are needed to respond to the specific needs of companies.
3. An active marketing directed towards different target groups is necessary.
4. Long-term relationships to companies are preferred to singular technology transfer projects.
5. To handle small projects efficiently, the grouping of SME-s with similar interests (combined with networking) or using special financial support programmes is needed.

At present, the interplay between the technology and science subsystems, and the knowledge transfer are considerably underestimated. To develop the transfer of high-level technology, the technology competence centres have been established at TTU and University of Tartu. The main areas for these centres are: material engineering, information technology, environmental technology, and bio- and genetic technologies (Luik, A., Küttner, R. 2000).

Education is a key factor for economic growth and technological development. Successful entrepreneurship requires the right background and skills.
The challenges and main objectives of universities are:

- To maintain a high level education in order to promote the intellectual growth of the nation;
- To upgrade vocational skills and promote employment.

Some countries have undertaken major initiatives to encourage the development of technological services at universities. The Testing Centre has been re-established at beginning of the 1990s (similar State Testing Centre functioned at TTU before the 1940s). The main objective of the Testing Centre is the effective use of university laboratories and testing facilities. One of the laboratories has been accredited internationally and six laboratories nationally.

TTU has stated its interest to develop the "University spin-off Programme" for supporting the establishment of technology-based firms, based on the results of R&D projects, originating from TTU and its institutions.
The Innovation Centre of TTU (TUIC) was created for:

- Active marketing of R&D projects, evaluation of the commercial exploitation potential of R&D projects originating from TTU;
- Management staff contacts and co-operation with industry, consulting and training of university staff in entrepreneurship;
- To support the development of an incubation system for start-up technology companies;
- Management of international and domestic innovation and technology transfer.

In legal terms TUIC is a foundation, constituting a non-profit entity under private law, and having founders as only privileged external decision-makers: Tallinn Technical University, Estonian Ministry of Economic Affairs (representing the Government of Estonia), Tallinn City, Estonian Confederation of Industry and Employers, Helsinki University Holding OY.

We consider that universities can do much more to support the commercialisation of R&D results, innovation and know-how transfer through the development start-up companies, providing "venture facilities" (space, access to equipment, infrastructure, expertise, contacts, talented people, etc.) to start-ups. These venture facilities may represent a significant investment in the development of a start-up and can therefore substitute for a significant proportion of the capital needs.

People generate knowledge, but establishing personal contacts between individuals from universities, industry and commerce is a difficult process. Organising and maintaining a network of relationships based on these personal contacts, is a critical factor for success. It means that networking and clustering are a crucial means of stimulating knowledge-based entrepreneurship and must be supported and developed.

The university management, first of all, is responsible for protecting and assuring a stable development and reliable structural framework, in which the highest degree of responses to the requirements of the society becomes possible.

CONCLUSIONS

For successful innovation system Estonia needs one or two large corporate research and production facilities. Also it is needed universities and research centres that are open to co-operation with industry and long-term financial support from the national or regional government, as well as from the private sector. Together, these provide a framework for the creation of new start-up and spin-off companies as research and development performers and suppliers of technology and know-how, then these companies are capable successfully transfer technology.

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