

KNOWLEDGE SERVICE SUPPLIES AND BUSINESS MARKETING TASKS OF HIGHER EDUCATION INSTITUTIONS

Szilvia DEÉS¹, Krisztina SZONTÁGH²

¹College for Modern Business Studies, Hungary

²University of Pécs, Hungary

dees.szilvia@mutf.hu

ABSTRACT

When the marketing activities of Hungarian universities are analyzed, it can be concluded that these activities focus almost solely on the marketing of enrollment and neglect any kind of communication with corporations. Yet modern universities have a wider range of tasks than merely education and research. The third objective of universities is to create new knowledge and utilize it: a new entrepreneurial function additional to traditional research and teaching activities. This also influences communication activities, since universities should compete not only for the best students and academics but also for corporate commissions. Also, they should cooperate with industry players, other private R&D institutes, investors, and other universities. The corporate sphere takes the view that universities should contact companies in order to widen cooperation with companies and expand commissions for innovation and that they should acquaint companies with their services, which is likely to require hard work. The establishment of relationships between a corporation and a university depends on people qualified and positioned to take on the task. Personal and face-to-face communications are necessary for effective communication. An element of this communication is analyzed in this study: the appearance of knowledge service supplies on Hungarian university web sites. The study also focuses on the usable knowledge provided by doctoral schools and the websites of Technological Transfer offices established in 2010-2011 through EU tender resources and the connections of these websites.

Keywords: innovation, knowledge transfer, technology transfer, university-corporate relationship

TRENDS OF HUNGARIAN RESEARCH-DEVELOPMENT AND INNOVATION

In a financial crisis and in its aftermath, innovation has an essential role in the sustainable and lasting upswing and long-term, economic growth of countries; however, science, technology and innovation can lead to new ways of handling of the biggest challenges societies face such as demographic changes, global health issues and climate change. The role of innovation has never been so important, and countries should invest in knowledge productively if they wish to achieve results in the above-mentioned areas. Economic affairs of the past years, however, have also placed innovation in a difficult situation, and companies faced decreasing demand and borrowing difficulties, which hindered their innovation efforts. In order to handle the crisis and improve perspectives of future innovation and economic

growth, countries should now increase their investment in the academic basis, governmental research and human resources development, that is, their investment in education, and they should also improve their national and international collaborations. One of the most essential areas is a more effective regulatory system so that not only research-development and higher education, but also connections between the industry and research can be strengthened, and interested community members should also be involved via structural expansion. Most countries develop technologies and have investments in key areas of research and developments of high technology (including biotechnology, nanotechnology, info-communication technology, new materials and modern production technologies); however, they should not forget to develop their political support in different phases of the innovation value chain (for example, ensuring incentives for research and development such as support and tax relief, or supporting the establishment of concrete technical clusters or venture capitals) in the interests of a better return on investment. Increasingly more countries rely on incentive tax reliefs; however, it is still the direct governmental financing in the form of support, subventions and credits that is the most prevalent way of supporting business research and development, in which programmes based on competition and merit are considered growingly more important. The balance between direct financing and indirect measures varies due to certain factors such as the industrial structure of a given country, the presence of large research and development intensive corporations and the intensity and specialization of research and development activities (OECD, 2010).

It is the research development expenditure relative to GDP, also known as “R&D intensity”, which is the most frequently applied method to measure innovation activities and compare them internationally¹. R&D expenditures are normally categorized by financers and by utilization areas or academic fields. On the basis of this, expenditures of the government, those of the business sector (enterprise) and foreign expenditure are distinguished. R&D expenditures of the business sector even have a different name: BERD². These indicators, which demonstrate how much a country spends on the production of new knowledge relative to its financial capacity, might suggest that a lot of new inventions are created and utilized in countries which spends a lot on knowledge production.

In our country, the amount of money spent on research and experimental development has been increasing continuously since the beginning of the post-communist transition period, and the rate of increase in expenditures has accelerated significantly in the past years. The proportion of the total research-development expenditure relative to the gross domestic product can be considered relatively low compared to proportions in the European Union and the world. Statistical methodology defines the research-development expenditure as the total sum of research-development costs and research-development investments (cumulative expenditure). It includes any financial resource from a domestic or foreign source, which was intended to be spent on research or development originally. Research-development expenditure includes labour costs and material expenditures, and

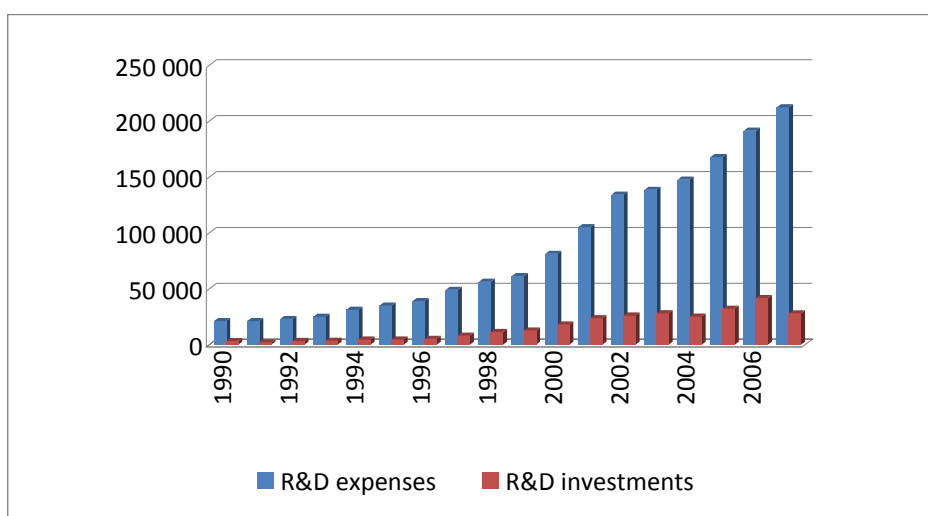
¹The indicator is also known as GERD (Gross Domestic Expenditure on R&D).

²Business Expenditure on R&D

research-development investment means the acquisition value of new and used tangible assets and computer softwares. The majority of domestic research-development expenditures comprise research-development costs, which are used to cover the wages of those employed in the process and the costs of research-development work related to the existent equipment. If the share of investments or else a more effective allocation of resources were to be implemented, it could significantly improve the competitiveness of the research-development sector and this way, it could also contribute to the growth of knowledge and technology intensive sectors (Figure 1).

Figure 1

Distribution of R&D expenses and investments (million HUF)



Source: Hungarian Central Statistical Office (HCSO), 2009

The financing structure of expenditures comprises four parts. First, significant material resources are provided by corporations, which conduct research-development activities besides their main profile and have their own research centres to develop technologies to be used for their production and manufacturing. The government as another main actor providing financial resources also appears in the financing structure, contributing significantly to the quantity of the usable resources. Other national and foreign resources can be found besides these two dominant actors (Figure 2).

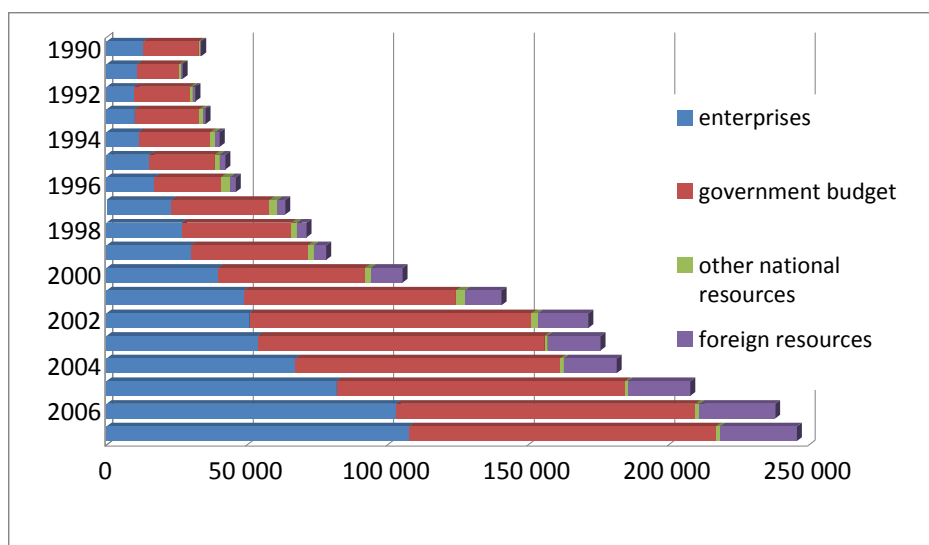
This indicates that firms more actively deal with the acquisition of new knowledge and perhaps also with the utilization of this knowledge. This is partly due to the multinational companies in Hungary, which are relocating processes of increasingly higher knowledge content here. (Némethné, 2010)

Innovation plays a crucial role in the convergence of the Hungarian economy and the indispensable improvement of competitiveness. One of the most essential

questions is how innovation willingness and competence can be incited and developed at a national economy level and in the sphere of enterprises. The notion of innovation has become more prevalent than it was a decade ago, partly because it is discussed in the media almost on a daily basis. On the other hand, there is still some uncertainty and sometimes even some misconceptions about the definition of innovation. In many cases, even the data vendors involved do not interpret precisely the definition from the Oslo handbook published by OECD, which is accepted internationally in the methodology of surveys. It reads “the innovation is the implementation of a new or a significantly upgraded product (good or service) or process, a new marketing method or a new organizational method in business practices, workplace organizations or external relations” (OECD, 2005. 46. p.)

Figure 2

Financial resources of research-development expenditures (million HUF)



Source: HCSO, 2009

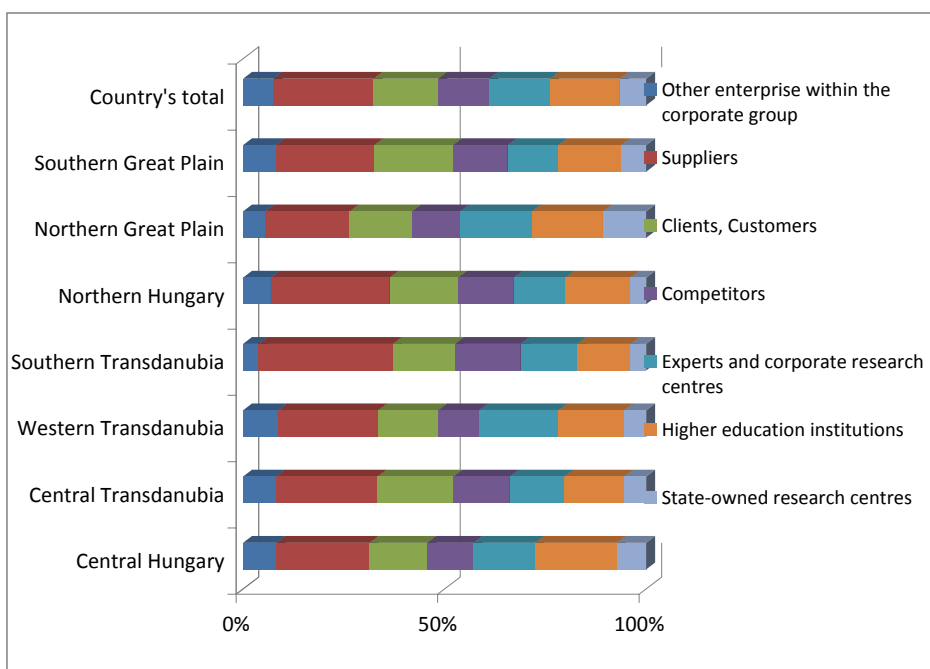
On average, 37.8% of the organizations conducting modernization processes have established partnerships in order to implement their developments successfully. Every fourth innovative enterprise cooperated with its own suppliers during the implementation of developments and their role was crucial in all regions. The second most important partners were the higher educational institutions. Firms, however, collaborated more intensively in those regions where mostly economic and technical trainings and research were conducted (Figure 3).

When the situation of innovations in Hungary is observed, it can be concluded that innovation is one of the weakest points of Hungarian small enterprises (Szerb, 2008); however, favorable, not yet ideal, environmental opportunities seem to be emerging for the development of this competitive factor: bases of technology transfer, which are still

not utilized completely, are encouraging (the proportion of people employed in high-tech and medium-tech sectors is high and the rate of governmental financing and corporate R&D is increasing). Even though R&D expenditures are increasing dynamically, they are still not sufficient, and in addition, the financing structure is far from being ideal. A further factor hindering the spread of innovation is the lack of qualified labour force; consequently, companies opt for the naturalization of intellectual products instead of relying on innovations. In Hungary, a mere 8% of holders of Hungarian and European patents in force in Hungary were Hungarian in 2009. 92% of the holders were from abroad, with 26% German and 14% American holders at the top (Figure 4).

Figure 3

Distribution of innovative cooperations by partner types, 2004–2006



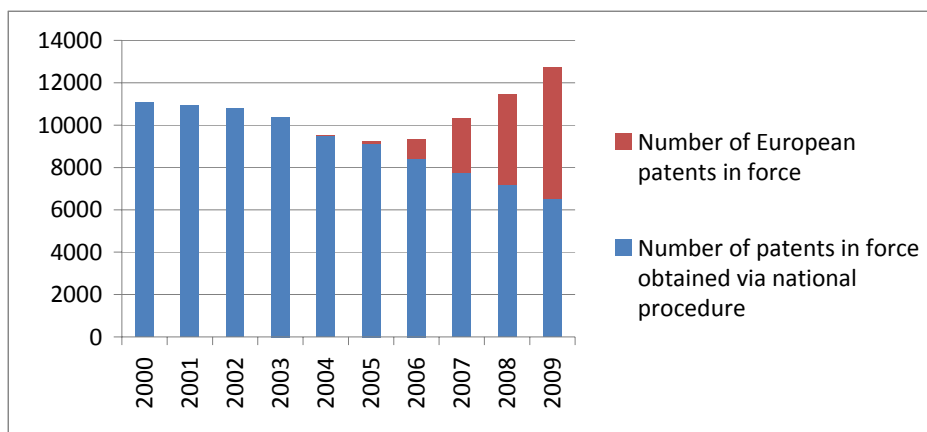
Source: HCSO, 2009

INNOVATION POTENTIAL IN DOCTORAL TRAINING

Doctoral training cannot be considered a traditional training form. The point of such training is to prepare and assist research and productive work. The three-year-long training is normally followed by a phase of more active research and productive processes. Ideally, the basis of a final dissertation is either an intellectual product or an objective one, which can offer certain academic novelty and can be adapted and utilized in the society. Therefore, in an ideal case, the staff and the trainees conduct innovative activities in doctoral schools.

Figure 4

Number of patents in force in Hungary (2000–2009)



Source: *Annual Report of the Hungarian Intellectual Property Office, 2009*

Doctoral training is often criticized for conveying mostly theoretical extra knowledge which is not utilizable in practice. These opinions could be altered through the communication processes of higher educational institutions. Communication processes and opportunities for collaboration deriving from the communication should be intensified mainly with respect to corporations and other research-development institutions.

COMMUNICATION BETWEEN HIGHER EDUCATION AND CORPORATIONS

Measuring innovation willingness is complicated since several “soft” elements such as knowledge, accumulated know-how, intellectual property and patent rights and last but not least management competence are involved. Besides these, market conditions typical of the given country and region such as the intensity of competition and different economy structures, etc. should also be taken into account.

On the other hand, growth and innovation capacity of the economy and enterprises do not only depend on the offer of the “knowledge industry”, namely the research-development sector, but also on its faculty how it can apply and distribute the results of the knowledge industry and the new technological processes. (*Báger, 2005*)

Communication via technology and knowledge centres

During focus group interviews³ conducted with enterprises and heads of technology and knowledge transfer centres of the university, representatives of the

³ The opinion is based on four focus group discussions conducted with innovative enterprises in 2010 and 2011 (ed.)

university revealed their expectations that it was entrepreneurs who should contact the university in the course of technology transfer processes, possibly with a concrete idea, task and commission or with a request for the solution to a given problem. According to corporations, even in these cases, universities do not act or think as profit-oriented organizations offering services and forget that when they provide corporate services they do not represent a non-profit organization in the knowledge market. In order to compete with profit-oriented enterprises and research centres providing R&D services as well as with the development units of enterprises, universities should have proper offers, references and successful projects, which can be used as references.

On the other hand, in many cases, it is not enough to exploit the demand for services but it should also be generated, because the majority of the enterprises – mostly small size enterprises – are not aware of what can be the solution to their problems, they cannot define their requirements precisely and they cannot suppose – mostly corporate executives who were socialized on the former Humboldt university model - that universities themselves are capable of producing and conveying knowledge, which can be useful for the economy and the society. These entrepreneurs consider universities too distant, “frightening” and complicated and they, the “small” ones, do not dare to approach them. That is why, it is the task of universities to generate marketable service offers and acquire partners.

In terms of communication, there are two important expectations universities are required to meet:

- to increase their reputation and to create a favourable image of universities (with references and PR) so that the university can emerge as a suitable solution tool and cooperative partner whenever a new problem arises in a given – e.g. technical, economic or other – special field;
- to intensify customer acquisition via marketing function: large corporations expect universities to approach them first; however, small enterprises should be acquainted with the new university functions

Knowledge is conveyed from universities towards corporations typically through Technology Transfer Offices or Centres. The organizational unit at universities supporting technology transfer is not a Hungarian specialty; however, their objectives and operation have special characteristics in Hungary.

First of all, it should be defined what technology and knowledge transfers are and how they differ.

Definitions are devised by researchers working at universities and it is a rather interesting situation that these definitions refer to their own activities so they can be accused of being subjective while they are creating notions. Several experts deal with the definition of knowledge; however, only a few experts have tried to define technology transfer (*Balogh, 2006*). According to Wittamore’s definition, technology transfer is “the transfer of new knowledge, products or processes from one organization to another *with business benefits*” (*Wittamore et al., 1998. 2. p.*) On the basis of Decter’s terminology, the organization where the transfer proceeds from is called supplier, whereas the organization that receives the transferred knowledge, product or process is called acquirer. (*Decter et al., 2006. 1-2. p.*) Etzkowitz interprets

the technology transfer as a two-way process between the university and the industry. (Etzkowitz, 1998)

Wittamore suggests that the object, the actors and the purpose of the transfer should be clarified for the definition. On the basis of the definitions devised so far, the object of technology transfer can be new knowledge, products or processes (Wittamore, 1998), tools (Bozeman, 2000. 2. p.), knowledge produced in an academic institution, technology, academic or technical know-how, technology-based ideas or research results (Prodan et al., 2006) and the application of knowledge utilized in practice (Tornatzky, 1998).

The purpose of the transfer is the utilization of knowledge with profit maximization: utilizing knowledge (Etzkowitz, 1998), economic development (Lee, 1996), transforming university research results into marketable products (Powers and McDougall, 2005) and business benefits (Wittamore et al., 1998).

It was surprising to realize that while universities try to take part in technology transfer processes in accordance with definitions provided by researchers, companies follow a different line of thoughts. In Hungary, the National Development Plan, the New Hungary Development Plan and the New Széchenyi Plan emphasize the importance of the knowledge industry. That is why, several calls for tender have been aimed at establishing transfer organizations in higher educational institutions since 2008⁴.

Owing to this, organizational units, which try to meet the requirements of tenders and contribute to the economic development of regions with their knowledge transfer functions, have been established at large universities and also at a few smaller colleges.

According to companies, knowledge and technology transfer processes should be separated. In addition, they do not regard the technology of a special field (e.g. technical or medical technology) and the knowledge flow related to it as technology transfers. They identify technology transfer with those supplementary services that accompany the knowledge transfer, that is, they consider it an administrative process, which is, however, indispensable for the successful implementation of knowledge transfer.

Knowledge centres

A university knowledge centre concentrates exclusively on professional fields and research-development and it provides the professional and knowledge content of the transfer either explicitly or tacitly. Its task, therefore, is to create and have competence. So-called research centres, which solely concentrate on a single

⁴ Between 2008 and 2010, 16 higher educational institutions were granted subsidies through three tenders to develop technology transfer processes:

- TÁMOP 4.2.1-08/1 Developing tools and conditions to contribute to knowledge utilization and knowledge transfer
- TÁMOP 4.2.1-09/1 Supporting research and technology transfer services and improving research conditions at higher educational institutions
- TÁMOP 4.2.1.B-10/2 Improving the quality of higher education through the development of research-development-innovation-education

academic field, can be established within knowledge centres. Optimally, these can collaborate to solve certain development problems within a knowledge centre. Certain research teams, which work in fields of great importance for the university (strategic functions), have priorities and can serve as the basis on which a knowledge centre can be built (e.g. pharmaceutical research at a medical school). Other teams perform only supplementary functions; however, they can generate income (e.g. economic and return on investment research related to pharmaceutical research), so they should not be terminated, but they remain at a research team level.

Technology transfer centre

A technology transfer centre is a background service organization, which ensures infrastructure, collects and offers the competences available at a university and administers tasks related to intellectual property rights. The task of a technology transfer centre is to understand what a company would like and translate these claims into the language of researchers; that is, it markets researchers' competences and the services developed on the basis of these.⁵ It should also take the organizational interests of the university into consideration and represent them. (For example, it determines how much a given development or patent can be sold for.) The tasks of the technology transfer are as follows:

- interface function
- financing
- marketing function
- project generation and project management functions
- supporting ideas and talents
- handling of intellectual properties

In terms of communication, the third factor is internal communication besides image building and personal acquisition based on PR. The central task of the technology transfer centre is to determine and inform the staff about what competence they have within the university and what kind of intellectual properties they are allowed to convey to enterprises.

This raises the question whether technology transfer centres deteriorates the competitiveness of universities, because if several organizational levels can be found above a research team, it makes the operation significantly more expensive due to operational costs. According to estimates, this can result in a 35% price premium in Hungary. This is the reason why researchers very often undertake research commissions as heads of private companies or private entrepreneurs, leaving out their university and making bids lower than the university prices – causing ethical

⁵ A spin-off company should be defined as a separate notion. According to the Act on Innovation (Act CXXXIV of 2004 on Research-development and technological innovation.), a utilizable enterprise is a company which is established by a budgetary research centre and operated with the contribution of the centre to exploit business benefits of the intellectual properties produced in such a research centre. Therefore, the purpose of spin-off companies is to market given and concrete development results and services. On the other hand, spin-offs in Hungary fulfill technology transfer functions, and the reason for this is the fact that universities can obtain tender resources only for the establishment of spin-off companies.

and financing damage – while they use the infrastructure of their university. Handling of all these is an internal communication and regulation task and belongs to quality assurance. However, technology transfer centres are required because there should be an organization, which can take on the marketing and communication tasks and expenses of university research and services as well as the administration in order that researchers should meet just the professional expectations of clients.

If these are university level marketing activities, a further question arises whether it is necessary to run two marketing organizations simultaneously. Should a technology transfer centre as a marketing organization communicating with companies be separated from the university marketing organization? In Hungary, in many cases, centres are required not to reveal that they are university organizations. An argument against this separation is that according to enterprises, good reputation of universities is one of the main reasons why enterprises entrust universities with R&D projects. If a technology transfer centre proves not to be an integrated part of the university, the university is judged less valuable due to the lack of an R&D organization since it cannot present reference projects and the centre loses its secure university background (it does not appear in the market as an organization but as a single start-up enterprise) and the number of commissions for the centre decreases. These effects generate a negative self-generation process, which is unfavorable for both universities and centres and also causes uncertainty within the corporate sphere.

The solution can be the establishment of a strong university marketing or rather utilizing organization which can cope with the following tasks of a university: marketing, transfer (as utilizing knowledge), technostart (service for start-up and small-sized enterprises), technopark (production and infrastructure management) and cooperative (alumni and corporate relations) tasks.

Technology transfer on the Internet

The websites of 16 technology transfer centres were analyzed in our research.⁶ Over 80% of these works as independent websites and quite often they cannot be accessed from the university websites (*Figure 5*).

The greatest deficiency of the websites is that they lack almost every kind of marketing approach whereas it is these organizations which communicate with corporations. Every site includes the objectives of the organization (this is also a prerequisite for tenders); however, the objectives, which are just enumerated, are definitions copied from founder documents, which represent the interests of universities instead of those of target groups. Lists of objectives, which are almost always identical, are displayed on static pages of 56.25% of the websites. (e.g.):

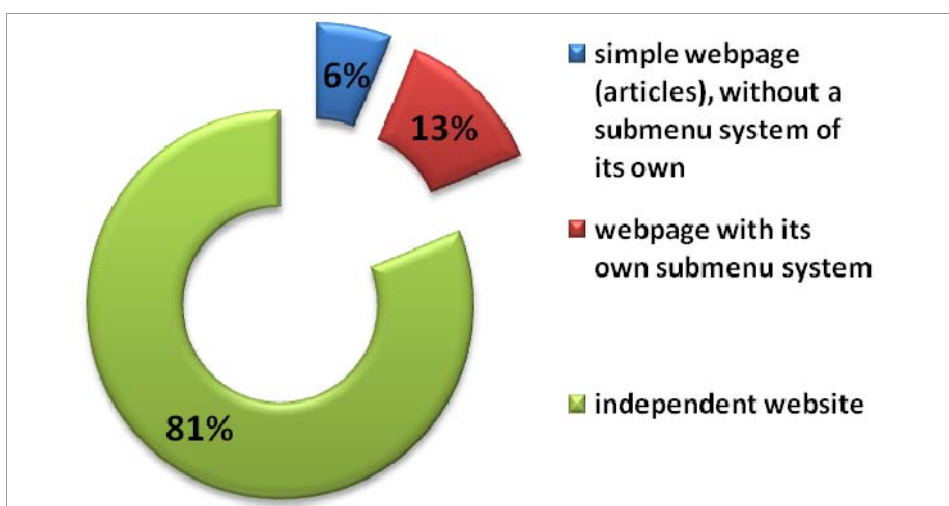
- the activities of the centre should help the knowledge centres of the university to take part in as many industrial research as possible

⁶ The websites of organizational units, which function as technology transfer centres established by those 16 higher educational institutions that won subsidies with the above-mentioned TÁMOP tenders between 2008 and 2010, were analyzed.

- the centre should increase the number of intellectual products created by the university
- R&D activities of regional enterprises should develop and their competitiveness should increase
- the number of start-up and spin-off companies should be increased
- the accumulated information and experience should be integrated in education whereby contributing to a better labour market potential of students
- *the intellectual properties created during the work of the centre's students, researchers and teachers financed with public money should be registered and utilized(!)*

Figure 5

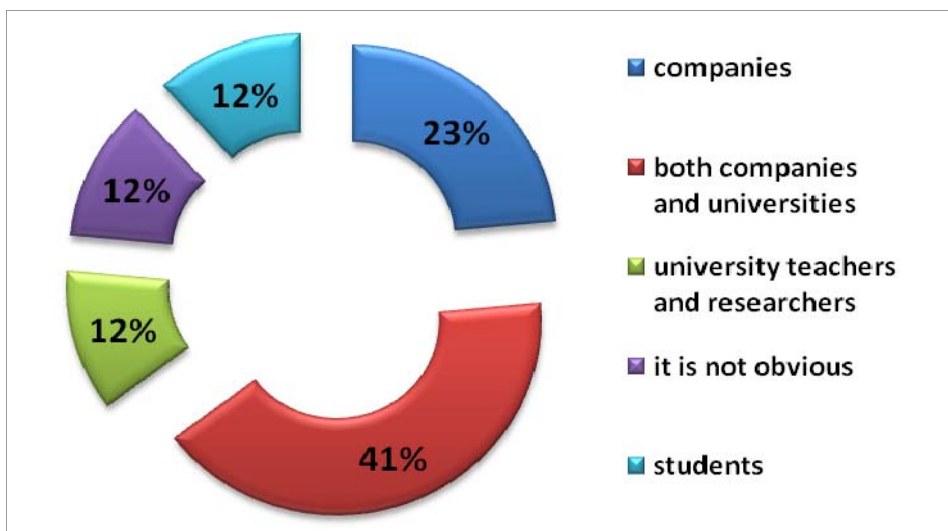
Appearance of the analyzed websites compared to the main university websites



The question is unavoidable: what is the purpose of the centres? Is it to meet tender requirements? To ensure extra work and extra income for the university staff, which cannot be financed from the university budget? To increase university receipts? To involve the university in the innovation processes and restore the prestige of university innovations? To increase the competitiveness of the region? Or to offer R&D&I services for companies, which they will be satisfied with, they will develop and due to this, the competitiveness of the region will also improve? The answer is simple: all of these are purposes. However, as profit-oriented companies in competitive markets do not communicate in their marketing approach to their customers that their primary aim is to maximize their profits or increase the dividends of the owners but they claim their purpose is to solve their customers' problems, centres should not set objectives to increase their own receipts in the messages of their external communication. This is also underpinned by the fact that according to the websites of centres, 64% of their target groups are companies. (Figure 6).

Figure 6

Who is the target audience of the websites?



The web tools of communication are represented by the traditional and almost out-of-date ones on the pages: e-mails and registration (without the functions of sending automated newsletters or offering downloadable brochures) (*Figure 7* and *Figure 8*).

Figure 7

Communication tools used by websites to reach their target audience

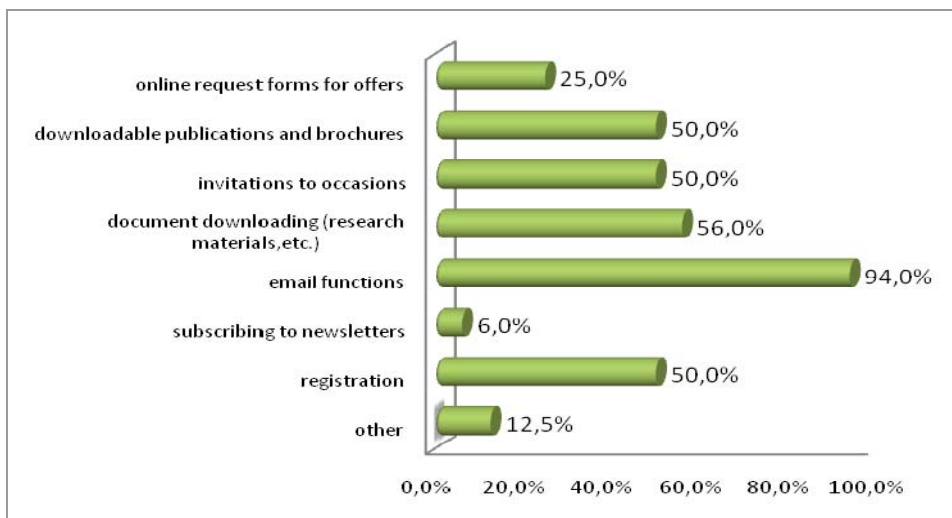
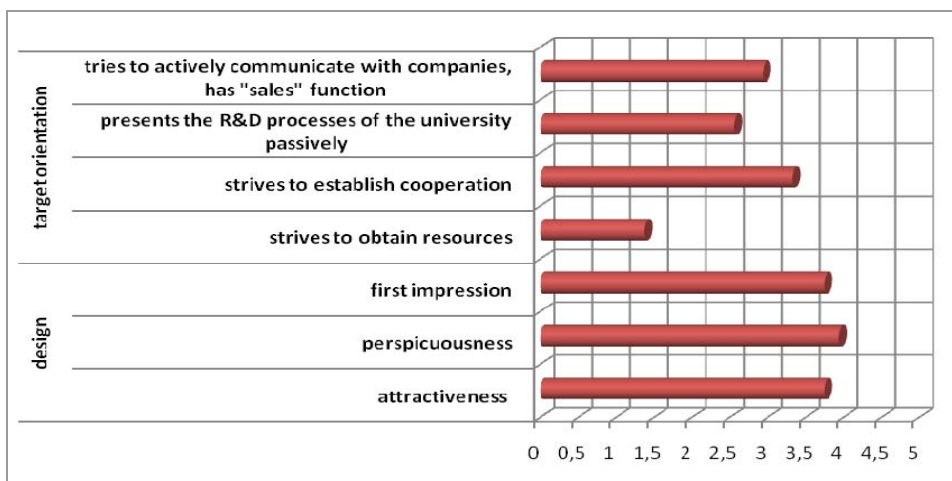


Figure 8

The overall impression of the analyzed website (on a scale of 1-5)



CONCLUSIONS

In conclusion, technology transfer organizations at universities in Hungary are trying to make knowledge utilizable and transfer it to enterprises and the society. This role, however, is often distorted because universities have financing difficulties and the expenses of these organizations are transferred to operational costs. Universities have competences; however, university thinking still has not altered to become completely market oriented.

REFERENCES

- Báger, Gy. (ed) (2005): Kutatástól az innovációig – a K+F tevékenység helyzete, néhány hatékonysági, finanszírozási összefüggése Magyarországon (In Hung). Állami Számvevőszék Fejlesztési és Módszertani Intézet, Budapest
- Balogh, J. (2006): A technológia transzfer fogalmának meghatározása. Debreceni Egyetem Közgazdaságtudományi Kar Doktori Iskola
- Bozeman, B. (2000): Technology Transfer and Public Policy: a Review of Research and Theory. In: Research Policy 29. 627-655. p.
- Central Statistical Office (2009): Hungarian research and development in numbers, facts and trends. Budapest
- Decter, M., Bennett, D., Leseure, M. (2006): University to business technology transfer—UK and USA comparisons, Elsevier Science
- Deés, Sz. (2010): Egyetem kontra vállalkozás: innováció-elfogadás és vállalkozói magatartás a felsőoktatási kínálat tükrében, Regionális munkaerőpiaci kutatás eredményei (2010) (In Hung.). In Regionális Politika és Gazdaságtan Doktori Iskola Évkönyv 2010/2, University of Pécs

- Etzkowitz, H. (1998): The norms of entrepreneurial science: cognitive effects of the new university–industry linkages. In: *Research Policy* 27. 823-833. p.
- Hungarian Intellectual Property Office (2009): *Annual Report 2009*. Budapest
- Lee, Y. (1996): 'Technology transfer' and the research university: a search for the boundaries of university-industry collaboration. In: *Research Policy* 25. 843-863. p.
- Némethné, P.K. (2010): *Innovációs tevékenység mérése a magyar vállalatoknál* (In Hung.) Corvinus University. Budapest
- OECD (2005): *Oslo Manual*.
- OECD (2010): *Science, Technology and Industry Outlook 2010*. OECD
- Powers, J.B., McDougall, P. (2005): University start-up formation and technology licensing with firms that go public: a resource-based view of academic entrepreneurship. In: *Journal of Business Venturing*, 20, 3. Elsevier Science. 291-311. p.
- Prodan, I., Drnovsek, M., Ulijn, J. (2006): A conceptual framework for studying a technology transfer from academia to new firms. HTSF 2006. Papers, Universiteit Tente. 2
- Tornatzky, L. Fleischer, M., Grey, D. (1998): *Knowledge and Technology Transfer in Cooperative Research Settings*. Ch 9. 217-240. p.
- Wittamore, K., Bahns, R., Brown, A., Carter, P., Clements, G., Young, C. (2006): *International technology transfer—a developing empirical model, management of technology, sustainable development and ecoefficiency*. 1998. In: Decter, M., Bennett, D., Leseure, M.: *University to business technology transfer—UK and USA comparisons*, Elsevier Science