

Copyright of the paper resides with the author(s). Submission of a paper grants permission to the 8th Triple Helix International Scientific and Organizing Committees to include it in the conference material and to place it on relevant websites. The Scientific Committee may invite papers accepted for the conference to be considered for publication in Special Issues of selected journals.

Difficulties in Integrating the ‘Third Mission’ – Experiences of University Scientists in Hungary

Subtheme: The role of University in the third mission - R&D, intellectual property and technology transfer

Abstract

This paper explores the organizational factors which influence university faculty in Hungary to engage in academic entrepreneurship, and which limit the capacity of Hungarian universities for market orientation and especially for university-industry technology transfer (UITT). The context of the study is the recently accepted Bayh-Dole-type legislation, which intends to place public research organizations in the centre of the national innovation system. On the basis of literature study and a survey among 1,562 faculty members from 14 Hungarian public universities, the author finds that intensifying UITT is not the question of emulating some formal policy measures, but rather changing the fundamentals of the higher education sector.

Keywords: university, entrepreneurship, technology transfer, Bayh-Dole Act

1. Introduction

As the Bayh-Dole Act (1980) permitted higher education institutions in the US to retain title to inventions developed by government grants, American universities established technology transfer offices (TTOs) and administrative procedures to facilitate the “marketization” of university intellectual property (IP). Etzkowitz (2002, p. 115) argues that the Bayh-Dole made “research universities an explicit part of the US innovation system (...) helped create a framework for university-industry-government relations in which each institutional sphere was encouraged to ‘take the role of the other’” (see the Triple Helix model for details in Etzkowitz & Leydesdorff, 1997).

In European policymaking, emphasis on universities as sources of industrially relevant technology increased as a consequence of the lagging competitiveness of the continent and the related innovation paradox, i.e. the unsatisfactory translation of scientific knowledge into wealth-generating innovations (EC, 1994). To speed up the flow of applicable knowledge from the academic sphere to the business sector and to make universities more interested in technological innovation, many European countries have begun to emulate the US innovation policy: they introduce Bayh-Dole-type legislation and subsidize the creation of university-centred innovation clusters. Academic entrepreneurship as a policy tool appears in the EU as part of a broader reform of the higher education sector, which aims to make universities more autonomous, innovative, and market-oriented, similar to the US system. The move away from central state providence requires a more entrepreneurial, opportunity-driven, and stakeholder-oriented state of mind from universities, including faculty and management. Even though this paper defines academic entrepreneurship as the commercialization of faculty’s research results and IP, the entrepreneurial activity of universities expands to education and related services (e.g. fee-paying training programs, campus services, etc.), to the management of real estate, and to the acquisition of government grants in various areas of operation.

The Innovation Act (2004) gave way to similar developments for higher education institutions (HEIs) in Hungary like the Bayh-Dole Act in the US: it obligates HEIs to establish IP management strategies and policies (faculty have to offer applicable IP to the university), and allows them to set up “utilizing enterprises” (spinoffs) as well as to profit from the commercialization of research results. University-industry interactions are incentivised by government grants and at some institutions by the university TTO. The new university-industry technology transfer (UITT) system urges universities to centrally coordinate faculty’s tech transfer activities, in contrast to the old practice, in which academics managed their R&D and inventions individually. Nevertheless, the “institutionalized” model, which has been successfully integrated into the (entrepreneurial) US higher education system, can face several difficulties in Europe, and especially in a post-socialist institutional

framework. Therefore, the main aim of this paper is to scrutinize the factors that can inhibit (or promote) the successful adoption of the Bayh-Dole regime in Hungary, as well as to measure the capacity of universities for UITT. The impediments to UITT are identified by analysing the institutional and organizational characteristics of the Hungarian university system.

2. Capacity of Hungarian universities for academic entrepreneurship: an organizational approach

Since the regime change in 1989, the most significant development in the Hungarian higher education sector has been the sharp (almost threefold) increase in the number of students, coupled with a similar rise in the number of HEIs. Economy of scale and the decrease in real term expenditures on higher education made efficiency and the rational management of public resources an important priority. These trends led to a major shift from elite to mass higher education and turned universities into large-scale factories of knowledge production. Although some institutions were integrated, there are still 70 HEIs today, a rather dispersed structure for a country of less than 10 million inhabitants (Table 1).

Table 1: The number of HEIs in Hungary by ownership

	Universities	Colleges
State	19	10
Church	5	22
Private	2	12
Total	26	44

Source: Ministry of National Resources (2010)

In Hungary, the difficulties of adopting the Bayh-Dole model and enhancing institutions' entrepreneurial activity lie in the special organizational characteristics of HEIs, namely in their *socio-economic environment, governance, management, culture and structure* (Novotny, 2009). First of all, because of historical reasons, the socio-economic environment of entrepreneurship (including entrepreneurial culture in general) is less developed in post-socialist Eastern European countries than in the US or Western Europe. This lag in the macro-environment has far-reaching implications on the capacity of universities and faculty for UITT in Hungary.

The European (continental) governance model of universities can be best described by the strong influence of the central state over the financial decision making of HEIs. While in this model the government ties universities' hands in many ways, it also relieves them of much burden: university management are exempt from the effective management of human and capital resources, market-oriented thinking, and real financial and even academic responsibility (government policies based on New Public Management are intended to put an end to this practice). Strong central government control was lacking in British and US HEIs, which compelled American universities to be more responsive to the market demand and changes of the socio-economic environment (Rosenberg, 1999; Ben-David, 1968; as cited in Mowery & Sampat, 2005). In Hungary, central state power is exercised via indirect political tools (legislation and grant schemes), which made universities engaged in rent-seeking behaviour (Szabó, 2010): innovation is mostly carried out in order to acquire public sources or to avoid rates and taxes. Hrubos et al. (2004) also claim that the running of Hungarian HEIs has only incorporated some managerial elements as a result of decreasing government funding and not because of a real change in the mindset of university managers. Winning research grants has become a matter of life and death for HEIs (Inzelt, 1999).

Traditionally, European universities lack strong and professional top management, instead, various interest groups gathered around senior professors settle on the distribution of resources within the institution. This tradition does not facilitate the entrepreneurial transformation of the institution as a whole, as faculty are prone to maximize their individual wellbeing and not that of the university, while the university management is not motivated to induce real commitment in faculty for customer-orientation. Managers know that rather than meeting the needs of students and other stakeholders, they had better try to influence legislation and government grant schemes in line with their own interests (Szabó, 2010). It is a paradoxical situation that university management in Hungary can exercise ownership rights and managerial power without taking actual responsibility for the successful operation of the institution (Polónyi & Szilágyi, 2008). Based on the features of

higher education government and management, Szabó and Velencei (2009) deem Hungarian universities to be “authoritarian, self-managed, socialist corporations”.

The culture of European (continental) universities is naturally “bureaucratic” and “oligarchic” (Lazzeretti & Tavoletti, 2006) with Humboldtian characteristics, which model is the most resistant to change and the least interested in opening up to the needs of the market and external stakeholders. In a Humboldtian university academics enjoy “the greatest possible autonomy” (Nybon, 2003; cited in Vught, 2004, p. 11) and have a conviction that besides impartial education and research they have no other social obligations (Lepenies, 1992; cited in Vught, 2004, p. 12). Carefully examining university culture, Szabó (2010) identifies the following constraints to innovation within Hungarian HEIs:

- (1) As financial sources for innovation are provided by the central state, HEIs are primarily interested in acquiring grants and much less in their effective and efficient management.
- (2) Employment hierarchy is based on authoritarian principles, which does not support competition and innovation.
- (3) Universities are built on ethical and from the shift towards mass higher education on bureaucratic coordination: while ethical coordination is amateurish and self-governing and only supports innovation that improves the living standards of its members alone, the managers of a bureaucratic organization are merely concerned about regulations and official duties and are intimidated by any innovative ideas that may contravene the established order.

The organization structure of a typical Humboldtian university is fragmented, which on the one hand helps academics to gain title, recognition and prestige, and even to establish *imperia in imperio*, but on the other, it inhibits cooperation between departments and can transform the institution into “a random and ineffective federation of sovereign mini-states that are concerned only with their own interests” (Vught, 2004, p. 14). As certain fields of science (e.g. engineering and biotechnology) have higher UITT potential than others, large differences can develop in the entrepreneurial activity (and wealth) of faculty members. These variations, coupled with the high autonomy of departments and the lack of income redistribution systems within institutions, can give rise to strong inequalities among departments and scientists and eventually deteriorate attitude towards entrepreneurship. As universities are self-managed, those departments and interest groups are allocated the highest amount of resources that can obtain management positions, and not those with the best research or teaching performance or the most innovative ideas (Szabó, 2010).

Albeit neither the governance and management, nor the culture and structure of Hungarian universities support the entrepreneurial transformation of the entire institution, some scientists have managed to establish successful research enterprises outside university structures. According to anecdotal evidence, many of these academic enterprises in Hungary resort to university infrastructure and goodwill without paying adequate or any compensation to the institution. They are also reluctant to become fully independent and detach from the mother institution. They have emerged as a consequence of faculty’s relatively low living standards, inadequate university reward systems, lack of university IP policies, and the absence of (carefully considered) regulations on the distribution of UITT incomes (Inzelt, 2004). Although university IP policies today expect faculty to offer applicable IP to the institution and also regulate the division of revenues from technology transfer, in a basically collegial organization, management is inclined to overlook professors’ working for their own pockets (Novotny, 2008).

3. Method

The findings of this paper rest on a web-based survey among faculty from 14 Hungarian public universities. The survey was conducted in 2009 in order to measure academics’ technology transfer attitude and activity, as well as to identify the factors that may influence both. Although some authors narrow “academic entrepreneurship” down to spinoff creation only, other forms of formal UITT, such as contract research, consulting, patenting, licensing and research consortia, were also incorporated in the survey. I administered the questionnaire to university scientists who could potentially be active in all formal channels (engineers as well as medical, natural, and agrarian scientists), altogether to 7,103 faculty members. After two rounds of e-mails 1,604 scientists answered every question (response rate: 22.6%), however, only 1,562 were actually representatives of the targeted fields, in the following distribution: natural science: 61.5%; engineering: 39.4%; medical science: 19.2%; agrarian science: 13.5%; military science: 7.0%; biotech: 4.6%. I used multivariate statistics to analyse

the relationship of UITT activity with faculty's other characteristics (e.g. research direction, scientific quality, etc.). Respondents were also asked to comment closed questions. The majority of the circa 1,400 remarks received are just a few words long, but several scientists left extensive explanations. The findings are primarily based on these faculty comments.

4. Findings

In spite of the fact that the majority of university scientists have a positive attitude towards the third mission, their activity in the various forms of UITT is relatively low (Figure 1). Statistical analyses indicate that out of the tested variables, research orientation (basic vs. applied) is the strongest predictor of academic entrepreneurship.¹ As research orientation is primarily determined by the field of science, it is little surprise that faculty active in UITT are relatively overrepresented in fields with comparatively high proportions of applied research oriented academics: engineering, biotech and agricultural science. Research orientation shows relatively close relationship to the entrepreneurship of immediate colleagues and managers as well as to the commitment to the third mission, which also indicate the influence of the field of science on UITT attitude and activity.

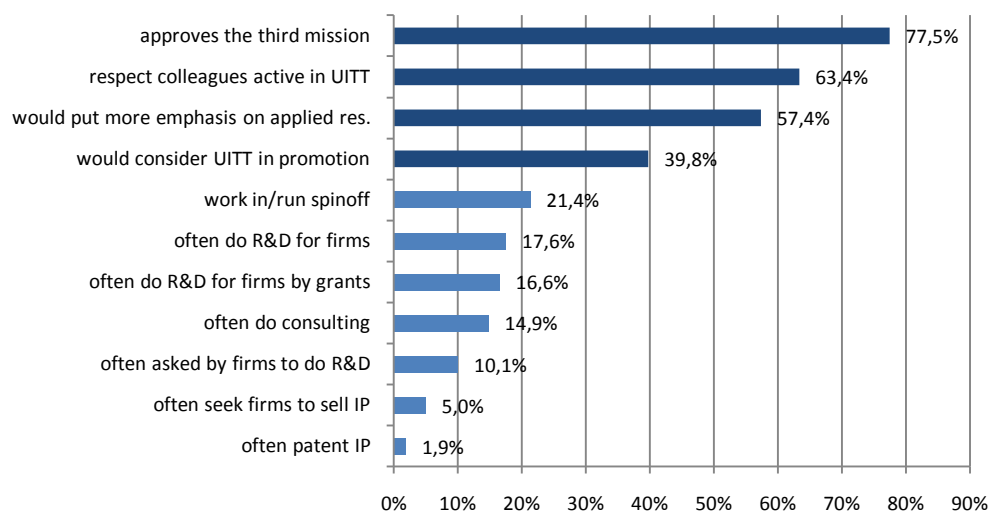


Figure 1: Distribution of faculty (N=1562) by selected scales of UITT activity and attitude

According to statistical tests, there has been a significant shift in the research orientation of scientists towards applied themes in the past 6-8 years. Comments revealed that the majority of respondents feel they are under pressure to pursue applied problems as grant schemes today primarily focus on applied sciences, the (technical, personal, financial and temporal) conditions for basic research are not provided, and grants are also vital to support the basic functions of the university (education and basic research) and even to pay overheads. Notwithstanding, top-down initiatives alone may not achieve the desired results and induce economic development.

“We are ‘more active’ in applied research without an actual change in research direction; pushed by the circumstances, the academic community have learnt how to ‘sell’ their own themes as applied research goals.” – occasionally active in UITT, 61 years old

There is little consensus among faculty regarding increased emphasis on applied research and commercialization. Some believe it is irresponsible behaviour on behalf of the government to forget about the equal importance of basic and applied research. Others conceive that despite government will and university lip service, entrepreneurship is still not supported within the institution, and especially when it comes to rewards

¹ The analysis (N=1562) tested the relationship of tech transfer activity with the following variables: attitude towards academic entrepreneurship/third mission, attitude towards running an own business, research orientation (basic vs. applied), scientific quality (publication activity, foreign conference presentations), linkages with the private sector (social capital), departmental environment (entrepreneurship of direct heads and colleagues), and demography (age and gender).

and promotion: UITT only brings temporary benefits, while merits gained by basic research and publications never fade away.

“University researchers should not be ‘forced’ to make their living by doing applied research. Basic research should be funded as well, because there is no applied research without it!” – occasionally active in UITT, 29 years old

“When the grant period ended I was called upon to account for the basic research results, which had obviously remained in the background while I was collaborating with industry. My academic rank backslid, (...) my respect dropped even more, and my teaching load multiplied. That’s why I’m doing basic research now: to make up for the lost period. Now, as my industry relations are fading and I don’t bring any funds to the department any more just scientific results, respect towards me has started to grow again.” – shifted towards basic research in recent years, 43 years old

When asked about the frequency of their tech transfer activity, faculty were mostly concerned about the difficulties of academic entrepreneurship. The main problems mentioned were scarce resources, such as time, energy, competences, financial resources and relationship capital, all presumed to be essential for successfully contributing to the third mission. Comments pointed to the fact that meeting the needs of the three missions simultaneously is highly demanding, or even impossible.

“To meet the requirements of the three missions, to perform the three activities at the same time is only possible at a mediocre level. An other option is to place more emphasis on one of them alternately, to achieve better quality. Because the other two are neglected every now and then, the result is disparagement [for faculty]. (...) Unfortunately, the three missions are not treated equally at our university: both market-oriented research and education are overshadowed [by basic research and publishing].” – runs a spinoff, 44 years old

One in five academics (21.4%) works for a (spinoff) firm engaged in commercializing research results and IP; about 8% of them are jointly owned by the faculty member and the university. As indicated by the commentaries, the main reason behind spinoff creation is gaining extra income, to supplement for the unfairly low compensation of university employees. Cooperation and contracting with firms is also less cumbersome and costly outside the university in an own firm: bureaucracy and taxes to the institution (both deemed to be high) can be avoided this way. Statistical analyses elucidate that faculty members who work in spinoffs have significantly more negative (or less positive) attitude towards sharing IP and income with the university than their non-entrepreneurial colleagues.

“Policies and administration at the university suffer from so slow processes and such great impotence that cooperation is a failure for sure. My personal experience is losing market share due to extra costs and administrative barriers.” – runs a spinoff, 44 years old

Respondents not working for a spinoff complained of the lack of time and overload why they avoid such activities: they feel that the basic university chores obtain all their energy. Whereas there seems to be some overlap between academic and entrepreneurial traits (e.g. creativeness, need for independence, etc.), some feel that being a businessperson requires a completely different type of mentality than being a university researcher. This mismatch may derive from the higher level of risk aversion of public employees in general.

“(…) because even exploiting my capacity at a rate of 200% I cannot meet my own requirements regarding the quality of teaching and research. (...) Those who take on such work [running a business] besides their academic duties are not taking their profession, for what they are paid, seriously.” –basic research oriented, 51 years old

“I do not have personal talent for being an entrepreneur, so it’d never come to my mind spontaneously to spin off a company. I consider myself a scientist in the classical sense, or I’d like to be one. I think running a business is for those who are trained in it, and if I have an option I will not take part in that.” – inactive in UITT, 33 years old

Ethical considerations may also detain faculty from starting a business: some believe because of their management status at the university it would not be fair from them to spin off a company. Others reason that small businesses in Hungary have to face so many difficulties (high bureaucracy and taxes) that entrepreneurs are forced to acquire unethical forms of behaviour as well to survive, in which they are not willing to take part. Some mentioned colleagues' negative experiences (anti-entrepreneurial institutional framework) why they refrained from entrepreneurial activities.

“I used to run a business, but I not today and will never again. It is a failure for sure, because of circular debt, the morally unreliable market environment. (...) You cannot even earn the minimum wage due to the astonishingly high VAT and honestly paid rates and taxes.” –occasionally does consulting for firms, 49 years old

“I don't think it would be beneficial to me for any reason to be a member/owner of a spinoff enterprise. I talked with some employees of spinoffs to learn why it is good for them. I received only one answer: cost charging [reducing tax base]. (...) That's not enough motivation for me.” –seldom does R&D for firms, 38 years old

Perhaps the most important question considering the adoption of the Bayh-Dole-type UITT system is the attitude of scientists towards the institution. The key momentum of the institutionalized UITT model is when the scientist discloses inventions to the university/TTO, which in exchange attempts to market the applicable IP. In the centre of the process is the TTO-officer, whose personal networks and knowledge of the potential users of the technology are crucial for the success of the model (Siegel & Phan, 2005). In just ten years after the passage of the Bayh-Dole, the number of HEIs with a TTO increased from 25 to 200 in the US (Etzkowitz, 2002). In Hungary, some institutions also established TTO-type university units in response to the Innovation Act (2004). Quantitative analysis disclosed that more than 40% of the faculty relatively active in UITT² or working in a spinoff had not communicated with the TTO. Comments indicate that even if there is some kind of an office or employee with TTO status at the university, in most cases it does not perform actual commercialization, only provide information about ongoing grant schemes.

“Unfortunately, I have negative experiences: they [TTO] cannot provide other than basic information services. But we can obtain news on grant programs for free from other sources too. Current innovation office duties are confined to sending out newsletters and occasionally organizing presentations about grant schemes.” – runs a spinoff, 36 years old

The “pessimists” believe there is no need for an intermediary unit at the university anyway, as it would not be able to perform UITT tasks effectively and would only oversee researchers and deprive them of their income.

“If the university ever established such an organization, it'd probably do because of the feudal intention of taking everything away from ‘renitent’, ‘individual’ freelancers and it'd never come to their mind that they might help us in something...” – runs a spinoff, 60 years old

“...owing to my age, I am aware that unfortunately in our country we do not manage to achieve success with our innovative efforts through these kind of offices anyway (and I don't think it's their fault); they are rather personal relations, perhaps paid collaborations that are the most effective ways of transferring technologies!” –basic research oriented, 56 years old

According to the “neutral camp”, the most important function of the TTO given the present conditions is to draw attention to UITT and help in breaking down bureaucracy at the university. The very few “optimists” have already developed mutually fruitful cooperation with the TTO. Faculty on the whole suggest that considering their current capabilities TTOs could mainly assist them in the official tasks of commercialization, for example in grant application and documentation or in legal services (e.g. writing contracts, protecting IP). These tasks are easier to perform at university level than individually and faculty would be pleased to receive more assistance in time consuming, “supplementary” R&D activities.

² Faculty was divided into two segments on the basis of their level of participation in the various forms of UITT by (two-step) cluster analysis.

“I would appreciate if an office was engaged in those issues that occur in the same way for every researcher, from grant services through contracting to the protection of interests and IP. Unfortunately, it consumes much of our time if these are not taken care by a university office and we have to find out things by ourselves.” –basic research oriented, 27 years old

Respondents agree that TTOs at universities are established by fashion and although their employees are enthusiastic and helpful, they are often devoid of sufficient knowledge of the fields of science they are going to commercialize, so it is no surprise they cannot provide serious assistance to scientists. High internal transactions costs, such as bureaucracy, internal taxes and mistrust in the TTO’s abilities drive faculty, and especially entrepreneurial academics, towards commercializing IP without the university.

“If employees of an office like this wanted to provide substantial assistance for researchers, they would need such professional knowledge of all the R&D projects at the university, which they do not have in my opinion. Experts with a wide intellectual horizon and extensive professional experience are needed for this work, and not office clerks. (...) These kinds of offices only make half measures.” – basic research oriented, 51 years old

On the other hand, university support to faculty would be crucial in all areas of operation and not just with regard to the third mission, as it is quite challenging to meet the three requirements all together, but UITT services are either very limited or not available at most institutions. Furthermore, respondents feel that the university makes their compliance even with the first two missions uneasy sometimes, by poor organization, cumbersome administrative procedures, and inapplicable policies and regulations.

“If you want to do research and also conduct courses the 24 hours of the day is not enough, and not to speak of writing grant proposals, begging for funds, training and developing yourself, preparing for lectures, or grading papers. The university does not help in these tasks, but expects us to carry out all.” –often provides consulting to firms, 35 years old

“A great dilemma today is how an institution can turn into a research university while meeting the needs of mass higher education at the same time.” – runs a spinoff, 60 years old

The scales measuring attitude to technology transfer received nearly three hundred comments. Most of these focused on two major issues: (1) the relationship between the three missions: education, research and entrepreneurship; and (2) the sharing of faculty’s IP and the profit from commercialization with the university. Faculty finds it hard to strike a balance between education and research: even though the primary function of HEIs is education, they are evaluated on the basis of their research activity. Albeit education and research are not incompatible with each other, there appears to be a role conflict in faculty, especially in those who wish to live up to the expectations of both students and the academic community (these two do not always meet as presented earlier).

Not all academics are equally talented in research and education (not to speak of entrepreneurship), so respondents suggest it would be wise to separate teaching and research positions and tasks in order to maintain their quality and effectiveness. The emergence of the third mission has further increased the working load of some faculty, and even if UITT makes education more life-like, it also reduces spare time and time spent on preparing for classes, and eventually it may lower the quality of teaching. On the other hand, the analysis of scales found that the majority of faculty (rather) disagreed with the statement that increased emphasis on commercialization negatively affected the quality of education; they rather agreed with the idea that UITT decreased time and money spent on basic research. Faculty not active in UITT were significantly more concerned about the negative effects of the third mission on education than their entrepreneurial colleagues.

“Concerning promotion, it is publication activity and impact factors that count; academics don’t want to produce results which cannot be published. The quality of teaching *per se* is damaged by the fact that lecturers have to do research (and researchers have to give classes). I don’t see why there are two types of statuses if everyone has to do everything because there are so much educational work and so few positions. It is hypocrisy to think that faculty can do a good job at both areas concurrently. The requirements should be separated for lecturers (who have to excel in lecturing) and researchers (who have to be skilled at research).” – not active in UITT, 30 years old

As publishing is key to gain tenure, promotion and respect within the academic community, while commercialization is a means of gaining wealth (or at least a way to compensate for the relatively low salary of faculty), education might turn into an “annoying activity”, a “necessary nuisance” in the eyes of academics, as *per se* it brings neither respect nor (significant) financial gain for the individual.

“University lecturers are already under pressure to publish, which makes students become the necessary bad things at the university. They are needed as government funding is received after them, but in reality they just take lecturers’ precious time away from research. A lecturer, who takes his/her work seriously, will hardly have any time for research. Therefore the majority of academics (with a few honourable exceptions) neglect students, who notice and mention it increasingly often.” – tries to sell IP very often, 30 years old

A cardinal question of centralizing technology transfer within the institution is whether and under what conditions faculty is willing to cooperate with the university, i.e. share IP, profits, and the tasks of commercialization with the institution. Scientists believe that university’s share in IP rights and UITT revenues should be in line with the service it provides to them. As university support varies from one technology to another, uniform university policies do not really work in UITT. Providing obsolete research infrastructure is not sufficient compensation for offering IP and splitting profits, faculty reckons, and especially not in the rate defined by current regulations (university IP policies in general order around 20-50% of the income from commercialization to be allocated to the institution). Scientists conceive cooperation with the university to be rational and important, but regard the “brotherly” sharing of profits unreal, as it further discourages already overly taxed commercialization.

“The fact that at our university, all IP rights are due to the university definitely hampers UITT. Who would do R&D without having a word in the commercialization of the results? This is simply absurd and it’s hard to believe that, apart from the TTO staff, someone thinks it is correct that one person carries out extra work and another decides on how to capitalize on it. (...) If the distribution was fair regarding IP rights and profits, it would all work out much better. What ‘fair’ means should not be decided by TTO lawyers exclusively, but faculty has to be asked as well about what they consider acceptable, and only then set up a mutually accepted, beneficial, and motivating agreement.” – occasionally consults firms, 38 years old

A smaller proportion of respondents approve university policies induced by the Bayh-Dole-type legislation. Some even emphasize that it can be quite destructive to the higher education sector if faculty can expropriate university and national resources for their own enrichment.

“Intellectual property should be put under university ownership by any means, as they are developed here by using university infrastructure. Many forget this unfortunately, and make their own business by means of university equipment. That’s why higher education goes broke.” – inactive in UITT, 30 years old

A few comments pointed to the reluctance of professors to work in teams. Negative attitude to cooperation derives from the traditional European university culture, which emphasize the self-interest and independence of individual scientists, as described earlier. Inability to turn “little science” into “big science”, i.e. multidisciplinary collaboration and large-scale innovation, can highly limit universities in developing their innovation capacity.

“Faculties and research teams often don’t share even equipment with each other. Research apparatus is lying unutilized. This is not because of the lack of common goals, differences in research projects or competition, but personalities and small-mindedness. We youngsters often don’t understand the problems why professors are unable to cooperate with each other.” – inactive in UITT, 24 years old

The attitude of university managers is also vital. They are not only responsible for the distribution of resources within the university, but can influence organizational culture, structure, and even the timetable of faculty. As management positions are filled internally by scientists, whether entrepreneurship is supported by departmental heads or not is a question of chance alone. Entrepreneurial managers can significantly improve the

attitude of staff towards commercialization: according to the performed statistical tests, subsequent to research orientation, the entrepreneurship of colleagues and departmental heads is the second strongest predictor of faculty's UITT activity regarding the examined factors.

“I manage the department, so I try to shape it line with my own ‘sense of taste’.” – runs a spinoff, active in other forms of tech transfer too, 38 years old

“Universities traditionally rely on scientific quality when appointing managers. Scientific quality on the other hand rarely couples with business sense (and even with management sense), which can lead to conflicts when having to cope with the private sector. For this reason, some university managers try to avoid entrepreneurial activities to hide the fact that the research they do is outdated.” – runs a spinoff, 43 years old

Although it is the exception, there are several small “entrepreneurial islands”, i.e. applied research oriented teams and departments that already obtain a considerable portion of their income via commercialization. As pointed out earlier, these differences in the entrepreneurial potential of fields of science can result in large income inequalities between departments and faculty members. Disparities in the long run can give rise to jealousy and discrimination towards entrepreneurial faculty, and especially if they are believed to neglect other university responsibilities.

“Concerning innovation, the opportunities of scientists and departments change time to time, so they often find it hard to bear if ‘Someone’ has too many opportunities. Of course these opportunities are not distributed by objective measures only: human factors also influence chances... The ones left out rarely realize that They can also be blamed for their lack of opportunities.” – inactive in UITT, 56 years old

“We are one of the best performing departments of the faculty (with a revenue of 80-150 million forints and 90-120 graduates every year). Despite of our large working load, we have time to maintain good relationships with industrial partners. The exploitation of our R&D is in the hands of consigners. We can say that success mainly depends on personal relationships.” –runs a spinoff, 60 years old

Finally, concerning the scientist-department-university relationship triangle, faculty is least satisfied with the entrepreneurship of the university. They do not feel real commitment on the part of the institution: although there is much talk about the significance of UITT, actions do not reflect words.

“I haven’t heard it even once that the university called scientists together to discuss legal conditions [of R&D projects], i.e. what the university can do for researchers and what it expects in return. Or, I’ve *never* heard that someone was praised for doing outstanding applied research. If neither moral nor financial rewards are given for it, but the university can *freely* take inventions away, then it is not in line with scientists’ interest. In these circumstances it is a *lie* to claim that entrepreneurship is supported by the institution. (...) This situation will change, but only if universities will be forced to change, and unfortunately only the industry from outside, together with faculty from inside (if academics are not too coward), will be able to force universities to give up their privileges and set things in order with their own researchers. Everyone will be better off this way...” – occasionally consults firm, 38 years old

5. Conclusion

Increasing the intensity of UITT appears to be of high importance regarding the competitiveness of the Hungarian economy. But without real and overwhelming reforms and only by emulating formal policy instruments of more competitive economies, the outcome will be rather modest. Faculty comments fostered the propositions presented by the theoretical framework: despite the formal commitment, none of the discussed factors (central state paternalism; non-professional, self-governing university management; bureaucratic-authoritarian-oligarchic organizational culture; fragmented-hierarchic organizational structure) foster the market orientation of institutions. Academic entrepreneurship will hardly find any “breeding ground” in the present situation: with a few exceptions, only faculty working in fields with a high potential for UITT or having an entrepreneurial mindset will take to it.

Without real performance constraints and market orientation, public universities are stuck in the state of market socialism. Although the environment of HEIs has changed, the actors have not, and as a result of weak market orientation, universities do not feel real commitment to serve stakeholder needs. Instead, they try to diminish risk factors and conserve (or increase) their privileges. As pointed out by the comments, it is troublesome to integrate profit orientation into a decentralized public institution, which rests on the ethical mode of coordination. By the same token, it is almost impossible to set up a competent TTO or any professional unit within an authoritarian, self-governing organization, where managers are non-professional and non-accountable. So as to actually increase the intensity of UITT in the present institutional framework, two options seem to be possible: one is to make further reforms that force HEIs to true market orientation, and the other is to outsource the commercialization (TTO) function to professional market organizations.

References

- EC (1994). European Commission. The European Report on Science and Technology Indicators 1994. Brussels.
- Etzkowitz, H. (2002). *MIT and the Rise of the Entrepreneurial Science*. London, New York: Routledge.
- Etzkowitz, H., & Leydesdorff, L. (1997). *Universities and the Global Knowledge Economy: A Triple Helix of University-Industry-Government Relations*. London: Cassell.
- Hrubos, I., Polónyi, I., Szentannai, Á., & Veroszta, Z. (2004). *A gazdálkodó egyetem*. Budapest: Új Mandátum.
- Inzelt, A. (1999). Kutatóegyetem a finanszírozás tükrében. *Hungarian Economic Review*, April, 346-361.
- Inzelt, A. (2004). Az egyetemek, a vállalkozások és a kormányzati kapcsolatok fejlődése az átmenet idején. *Hungarian Economic Review*, September, 870-94.
- Lazzeretti, L., & Tavoletti, E. (2006). Governance Shifts in Higher Education: a cross-national comparison. *European Educational Research Journal* 5(1), 18-37.
- Ministry of National Resources (2010). Higher Education Institutions in Hungary. <http://www.nefmi.gov.hu/felsooktatás/felsooktatási-intezmenyek>
- Mowery, D. C. (2005). The Bayh-Dole Act and High-Technology Entrepreneurship in U.S. Universities: Chicken, Egg, or Something Else? In G. D. Libecap, *University Entrepreneurship and Technology Transfer: Process, Design, and Intellectual Property. Advances in the Study of Entrepreneurship, Innovation and Economic Growth*, 39-68. Elsevier (16).
- Novotny, Á. (2009). Academic Entrepreneurship in Hungary: Can the Bayh-Dole Model of University Technology Transfer Work in an Eastern European Context?, *Periodica Polytechnica*, Ser. Soc. Man. Sci., 16(2), 1-10.
- Novotny, Á. (2008). Teething Troubles: The Emergence of New Models of University Technology Transfer in Hungary. IAMOT 2008 Conference Proceedings. Ed. by B. Abu-Hijleh, M. Arif, T. Khalil, Y. Hosni. Dubai: British University of Dubai.
- Polónyi, I., & Szilágyi, E. (2008). Felsőoktatási privatizáció, felsőoktatási vállalat vagy vállalkozó felsőoktatás? *Hungarian Economic Review*, March, 262-77.
- Shattock, M. (2005). European Universities for Entrepreneurship: Their Role in the Europe of Knowledge The Theoretical Context. *Higher Education Management and Policy (Special Issue: Entrepreneurship)*, 13-26.
- Siegel, D. S., & Phan, P. H. (2005). Analysing the Effectiveness of University Technology Transfer: Implications for Entrepreneurship Education. In G. D. Libecap.
- Szabó, T. & Velencei, J. (2009). A honi állami egyetem mint tudásalkotó szervezet egyes szervezeti tulajdonságai. *Budapest Management Review*. June, 43-49.
- Szabó, T. (2010). A felsőoktatási intézmények és oktatóik innovációs teljesítményét befolyásoló szervezetszociológiai, szociológiai, közgazdasági és munkagazdasági tényezők és sajátosságok (BME case study). Project „Felsőoktatási kutatás és a gazdaság. A hazai felsőoktatási innováció sajátosságai és az elmozdulás lehetőségei (FOKTINPI)” (Supervisor: Polónyi István)
- Vught, F. v. (2004). Closing the European knowledge gap? Challenges for the European universities of the 21st century. In L. E. Weber, & J. J. Duderstadt, *Reinventing the research university*. London, Paris, Geneva: Economica.