

## University Knowledge Transfer in Romania: Getting Ready for the U-Multi-rank

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*The aim of this study is to trace Romanian universities' performances in knowledge transfer on the set of indicators advanced by the U-Multi - rank, the new performance - based ranking of European universities, whose first results are expected in 2013. The conclusion is that further developments in knowledge transfer in Romania will be highly influenced by the governmental agenda and its alignment to the European recommendations for IP management and knowledge transfer.*

**Keywords:** *knowledge transfer, U-Multi - rank, Romanian universities, IP and knowledge transfer recommendations, Code of Practice.*

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### Introduction

At the European level, the importance of knowledge transfer between public research organizations, including universities and industry has been increasingly recognised and emphasised. As a result, several policy initiatives and support measures have been advanced at the European level in order to encourage Intellectual Property (IP) management and knowledge transfer. Among them, the U-Multi - rank - the new performance-based ranking system of European universities - is the most recent one and is expected to both encourage higher education institutions to stimulate the transfer of their research results and to clearly make the difference between top performers and universities lagging behind.

Given the increased attention paid to universities' knowledge transfer at the European level, but also the international relevance of the new

ranking system, our study aims to trace Romanian universities' performances on knowledge transfer on the set of indicators advanced by the U-Multi -rank. On the one hand, we make first some inferences into the structure of universities' third party funding, under the assumption of a very low business-funded R&D in higher education (Organisation for Economic Co-operation and Development, 2011). On the other hand, under Ranga's assumption (2011) that Romanian universities' third mission (including knowledge transfer) is in a very incipient stage – we try to benchmark some performances for different outputs (patent applications, co-publications, spin-offs etc.) and to compare them to those of other European countries.

The rationale of this study is thus induced by the emphasis put on this topic at the European level and by the belief that benchmarking exercises are always useful in policy-making at national and institutional level. In order to meet our research aim, we first introduce European Union's (EU) approach to IP management and knowledge transfer (Section 1) and then present the research method (Section 2), research results (Section 3), conclusions and policy implications.

## **The EU approach to IP management and knowledge transfer**

In order to address the 3% of Gross Domestic Product (GDP) objective for research and development (R&D) investment, the European Commission agreed to apply the open method of coordination for policies related to investment in research. As a result, in 2007, the EU Commission Communication on “Improving knowledge transfer between research institutions and industry across Europe: embracing open innovation – Implementing the Lisbon agenda” has set a number of approaches for a common European framework for knowledge transfer. In terms of this communication, knowledge transfer is conceptualized as the process for capturing, collecting and sharing explicit and tacit knowledge, including skills and competence; it includes both commercial and non-commercial activities such as research collaboration, consultancy, licensing, spin-off creation, researcher mobility, publications etc., (European Commission, 2007). At the same time, the Communication is accompanied by a staff working document on “Voluntary guidelines for universities and other research institutions to improve their links with industry across Europe” that is aimed at helping research institutions to develop more effective mechanisms and policies to promote both the dissemination and the use of publicly – funded R&D results (Commission of the European Communities, 2007). Following

the 2007 Commission Communication, a set of Recommendations on the management of Intellectual Property (IP) and knowledge transfer activities was developed in 2008 (Commission of the European Communities, 2008), in order to provide Member States and their regions with policy guidelines for the development or updating of national frameworks. Simultaneously, a Code of Practice for universities and other public research organizations was issued to set principles for internal IP, knowledge transfer and collaborative and contract research.

To review and report on initiatives taken at the national level to implement Commission's Recommendations and the Code of Practice, but also to identify a set of common indicators for measuring progress, the Committee for Scientific and Technical Research (CREST) set up a dedicated Working Group consisting of 33 representatives of Member States and Associated countries. As a result, in 2010, the Working Group assessed the current state of the play and found that the majority of countries had disseminated the IP Recommendations and had taken steps to actively engage stakeholders in various activities such as national debates, dedicated workshops and seminars. Additionally, several countries had used the Recommendations while drafting amendments in national legislation or had integrated the policy measures into broader national knowledge transfer schemes (ERAC Working Group on Knowledge Transfer, 2010).

The Europe 2020 strategy, particularly through its flagship initiative Innovation Union, reiterates the commitment to promote open access to R&D funded results, facilitate effective research and knowledge transfer, develop a European knowledge market and examine the role of competition policy in safeguarding against use of IP rights for anti-competitive purposes (European Commission, 2010). Moreover, linking higher education institutions (HEIs), research and business for excellence and regional development is a key issue in the new agenda for the modernisation of Europe's Higher Education system. Member States and higher education institutions are expected to stimulate the development of entrepreneurial, creative and innovative skills in all disciplines, strengthen the knowledge transfer infrastructure, encourage partnerships and cooperation with business as a core activity through reward structures, incentives for multi-disciplinary and cross-disciplinary cooperation and to promote the systematic involvement in the development of integrated local and regional development plans (European Commission, 2011a).

To improve the possibility for individual public research organizations and Member States to monitor and compare their achievements in knowledge

transfer, CREST/ ERAC Working Group on Knowledge Transfer has established a sub-group dedicated to defining a set of common indicators. Thus, the EC's Expert Group on Knowledge Transfer Indicators has elaborated a proposal for a composite indicator describing three different dimensions of knowledge transfer: through trained people (the mobility of educated or trained in or by the research sector), through institutional co-operation in R&D and through IP transfer, mostly the commercialization of research results. For the fourth proposed dimension – network activities that enable and facilitate knowledge transfer – indicators did not seem feasible for the moment (Finne *et al.*, 2011). Finally, all the efforts to promote knowledge transfer at the EU level are also reflected in the new classification and ranking exercises of European universities, whose first results are expected in 2013 (European Commission, 2011b). In this context, U-Multi - rank is a new performance – based ranking and information tool that would enable users to profile institutions across five dimensions: teaching and learning, research, knowledge transfer, international orientation and regional engagement, each of them described by a number of different other indicators (van Vught and Ziegele, 2011). Given this context, the aim of this study is to trace Romania's universities' performances in knowledge transfer on the proposed U-Multi - rank indicators, while simultaneously advancing some international comparisons and policy implications.

## Research method

In the U-Multi - rank, knowledge transfer is defined in the terms of Holi *et al.* (2008) as “the process by which the knowledge, expertise and intellectually linked assets of HEIs are constructively applied beyond Higher Education for the wider benefit of the economy and society, through two-way engagement with business, the public sector, cultural and community partners” (apud van Vught, Ziegele, 2011, p. 65). The eight indicators describing the knowledge transfer dimension and validated by the U-Multi - rank pilot study are the following: third party funding; university-industry joint publications; patents; size of the Technology/ Knowledge Transfer Office (KTO); continuous professional development (CPD); co-patents; number of spin-offs and incentives for knowledge exchange. To trace Romania's universities' performances on the proposed indicators, our study uses a set of universities' self - reported data that were made publicly available by the Romanian Ministry of Education, Research, Youth and Sports in 2011, following the first National Assessment Exercise for the Classification and Ranking of

Romanian universities and study programs (UEFISCDI, 2011). In total, there were 90 universities that have been subjected to evaluation and considered for this study, of which 56 are public accredited universities and 34 are private universities. As in the HEIs self reported data there is no entry for university – industry joint publications, co-patents and incentives for knowledge exchange, additional evidence will also be brought in from international sources, such as OECD’s and EUROSTAT’s databases.

## Research results

### *Third party funding*

Third party funding is defined as “*the amount of income for cooperative projects that are parts of public programs (e.g. EC Framework programs) plus direct industry income as a proportion of total income*” (van Vught and Ziegele, 2011, p. 68). Table 1 introduces all the R&D income sources for Romanian universities in their average values as % of total income, plus the standard deviations. It should be noted here the fact that the access to public R&D resources in Romania is only offered on a competition basis, so that the amount of public funds allocated to R&D can also be considered a proxy for the capacity to attract R&D resources.

**Table 1:** R&D income sources expressed as percentage in total HEIs income in 2010 (source: UEFISCDI, 2011)

R&D source	Mean	Standard deviation
Public funds from Romania	3,3313	4,51731
Structural funds	10,6183	18,05899
Private funds from Romania	0,3486	1,12119
Framework Programme 7	0,3873	0,82815
Other EU programs	0,4998	1,47584
Public funds from abroad	0,2344	0,80244
Private funds from abroad	0,1452	0,60177
Contract research income*not obtained through competitions	0,9811	2,59526
Commercial income	2,0679	4,71540

In 2010, structural funds were by far the most important source of

external income for Romanian universities that went on average up to 10,6% of HEIs total income, despite a high standard deviation. Public funds distributed according to the Romanian National Plan for R&D and commercial income came second and third, while all the other funding sources went below the 1% in share in universities' total income. When considering the type of the funding source, private funds (from Romanian competitions, from abroad and from contract research) are well behind the public ones; moreover, the funds attracted from abroad (Framework Programme 7, EU programs, public and private funds) are incomparably lower than those attracted from domestic sources.

### *Other knowledge transfer indicators*

According to the U-Multi - rank, the number of patent applications for which the university acts as an applicant, the number of employees in the KTOs, the number of CPD courses and the number of spin-offs created over the last three years should all be reported relative to the FTE academic staff, in order to reduce the bias created by size differences. The Table 2 summarizes the average values for these indicators and points out the maximum values for each of them. It should be noted that patent applications at the Romanian Patent Office (OSIM) and at the European Patent Office (EPO) are reported separately, together with the results that refer to the number of new products and services offered to the market.

**Table 2:** Knowledge transfer indicators per full-time equivalent (FTE) academic staff in 2010

Knowledge Transfer Indicator	Maximum	Mean	Standard Deviation
Patent applications at the Romanian Patent Office (OSIM)	0.08	0.0064	0.01356
Patent applications at the European Patent Office (EPO)	0.01	0.0002	0.00070
New products and services	1.07	0.0287	0.11720
CPD courses	0.42	0.0395	0.06919
Spin offs (2008 - 2010)	0.04	0.0021	0.00736
KTO staff	0.25	0.0232	0.03667

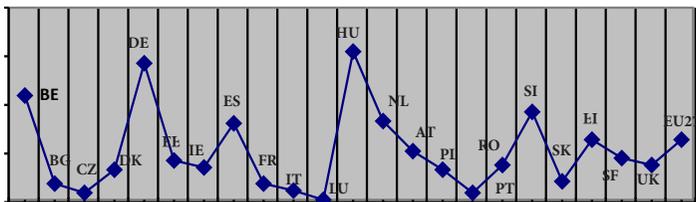
(Source: UEFISCDI, 2011)

The reduced number of R&D outputs per FTE academic staff can be explained by the fact that only one third of the HEIs reported patent applications at the Romanian Patent Office and the introduction of new products and services and only six universities applied for a patent at the European Patent Office in 2010. Similarly, only 14 HEIs reported the creation of at least one spin-off in the last three years. As regarding the number of CPD courses offered, it is on a clear ascending trend and is significantly correlated with the income received from structural funds. The same happens to the number of KTO staff: 55 universities have already employed dedicated staff for knowledge transfer, while almost all of them use to engage teaching staff with such a role.

### *International comparisons*

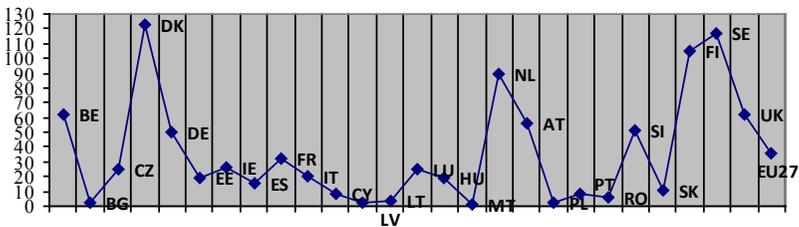
In addition to the HEIs self reported data there are a number of international statistics and surveys that allow comparisons on the proposed indicators.

According to the Organisation for Economic Co-operation and Development (OECD), **business-funded R&D in the higher education (HERD)** in the form of grants, donations and contracts is defined as “*the domestic business enterprise sector’s contribution to intramural R&D expenditures in higher education*” (Organisation for Economic Co-operation and Development, 2011, p. 90) and can serve as a proxy for contractual agreements. With only 3,8% of the HERD being financed by industry, Romania is well below the EU27 average (6,38%), but is better positioned as compared to other Eastern European Countries (e.g. the Czech Republic, Poland, Slovakia) or to other innovation leaders such as Italy or France. For this indicator, Hungary, Germany, Belgium, the Netherlands, Slovenia and Spain can be benchmarked as the best practice cases (Fig. 1).



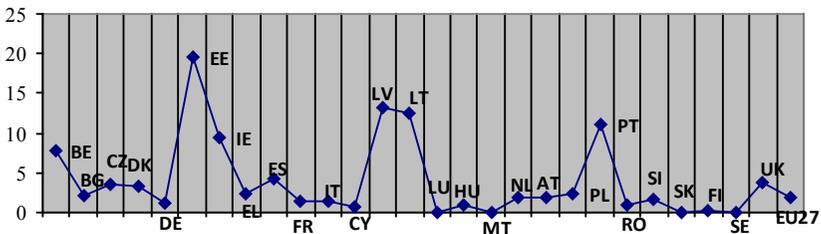
**Figure 1:** The percentage of Higher Education R&D Expenditure financed by industry in 2009 (source: OECD, 2011)

At the EU level, the *Innovation Union Scoreboard* (PRO INNO Europe, 2011) captures data on the **public – private co-publications per million population**, which allows some pertinent comparisons between the EU countries, despite the fact that the data do not exclusively refer to the HEIs, but to all public research organizations. As evidenced by the Fig. 2, there are large differences in co-publication patterns between the EU27 countries, with more than 100 co-publications for Denmark, Finland and Sweden and less than five co-publications in Bulgaria, Latvia, Lithuania, Malta and Poland. On average, 36 co-publications are observed for the EU27, but if we exclude the top three performers, the average decreases to less than 25. Romania stays at the end of the European ranking, with 6,3 co-publications per million population.



**Figure 2:** Public – private co-publications per million population in 2008  
(Source: PRO INNO Europe, 2011)

Fig. 3 presents the EU27 countries' EPO patent applications by HEIs in 2005. The patents applied by for the HEIs represent a very small share of the total number of EPO patents in the EU7 (1,8%), with Baltic countries - Estonia, Latvia and Lithuania – being the top performers. For this indicator, Romania belongs to that group of countries whose applications by the HEIs is less than 1% of the total number of EPO patent applications.



**Figure 3:** EPO patent applications by the HEIs as % in 2005  
(Source: Eurostat 2010)

Some other interesting insights are offered by The Proton Europe Annual Survey of Knowledge Transfer Offices (Piccaluga *et al.*, 2011), but the results are not normalized by the full-time equivalent staff, so the comparisons could be affected by size differences. Similarly, the European Knowledge Transfer Indicators Survey (EKTIS) of 430 European universities and research institutes give standardized performance measures for 2010 per 1000 research personnel (Arundel *et al.*, 2012). In line with EKTIS' results, in 2010, European universities produced on average 8,4 patent applications per 1000 research staff (0,008 per research staff) and established 2,2 start-ups per 1000 research staff (0,002 per research staff). By comparison, Romanian universities produced on average 0,006 patent applications per FTE staff at the Romanian Patent Office, 0,002 patent applications per FTE staff at the European Patent Office and established 0,002 start-ups per FTE staff in the last three years (2008 - 2010). At the European level, license income is highly concentrated, with the top 10% of universities accounting for 86,9% of all license income. Not at least, the European KTOs at universities are, on average, 14 years old and had 12 FTE staff members. By comparison, in Romania, only few universities have consolidated their technology transfer and commercial infrastructure and staff, mostly in leading academic centres in Bucharest, Cluj, Timisoara, Iasi, Brasov etc. (Ranga, 2012).

Finally, the Code of Practice Survey aimed at evaluating the principles and practices of IP management and knowledge transfer used by European universities and research institutions give some insights over the types of incentives for research staff to protect their IP and disclose inventions with commercial potential. Thus, by far the most common incentive among the surveyed organizations is to offer the inventors a percentage of future revenue (84%), while other incentives are used less frequently: awards, publicity, internal and external recognition (47%), and additional funds for R&D (35%), lump sum payments such as an inventor's bonus (31%) or impact on promotion and career decision (23%) (Arundel *et al.*, 2012). As regarding Romania, universities are rewarded through participation in royalties, while the incentives for individual researchers refer to financial incentives, but also to the (indirect) effects on reputation and career advancement (Strenc, Popescu, 2011).

## Conclusions

This paper has traced Romanian universities' performances in

knowledge transfer on the set of indicators advanced by **U-Multi - rank** and available from HEIs self reported data, international statistics databases and surveys. Although there is still much room for discussion to harmonize the reporting procedures – in order to make the data comparable –, our study has drawn a one snapshot profile that leads to some conclusion and policy implications.

First of all, the high funding flows from structural funds – more than 57% in the total third party budget – will undoubtedly bring improvements in HEIs' R&D capacity; however, there is a clear risk of an increasing dependency on these types of funds and any change in targets would affect the long-term agenda. On the contrary, attracting funds from industry is highly advised, both because it reduces the dependency on public funding and because it turns the R&D results into real innovations. Unfortunately, for the moment, less than 5% of the HERD is financed by industry (as compared to 6,38 at the EU27 level) and this topic should be addressed at national and institutional level. Second, as regarding the output-type indicators (patent applications, spin-offs, co-publications), but also the commercial income generated through their exploitation, Romanian universities' performances are much lower as compared to other countries. In addition, the support (infra) structure for **knowledge transfer** in universities is in its only incipient stage.

Further developments in knowledge transfer in Romania will be highly influenced by the governmental agenda and by its alignment to the European recommendations for IP management and knowledge transfer. For the moment, Romania does not require by law that universities cooperate with the private sector in order to improve knowledge circulation, such as in the case of France, the Czech Republic, Denmark, the Netherlands, Belgium, Germany etc., but addresses knowledge transfer to more non legal approaches such as steering dialogues, schemes and national programs. Similarly, Romania does not offer incentives to structural anchor knowledge transfer, but offers incentives to cooperate and network (ERAC Working Group on Knowledge Transfer, 2010). For the future, Romania plans to harmonize the existing practices with the Commission Code in national guidelines and legislation and these changes are expected to improve current performances in knowledge transfer.

## Acknowledgment

This work was co-financed by the European Social Fund through The Sectorial Operational Programme Human Resources Development 2007-

2013, project number POSDRU/1.5/S/59184 „Performance and excellence in postdoctoral research in Romanian economic science domain” and by the Sectoral Operational Programme Human Resources Development 2007-2013 of the Romanian Ministry of Labour, Family and Social Protection through the Financial Agreement POSDRU/107/1.5/S/76903.

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