

*ISSN: 2065-0175**ECONOMICA***Business Administration and Economics****Overview on University Third Mission Assessment.
Case Study in Romania****Maria Popescu¹, Lidia Mandru²**

Abstract: This work paper is focused on the evaluation of university engagement in innovation (the third mission of university), and aims to establish the main directions for improving the current systems used to evaluate this university function in Romanian Higher Education. In the first part of the paper a general overview on models and indicators for evaluation of university third mission is presented. The second part briefly describes how university participation in innovation is assessed in Romania. Final conclusions summarize the previous analysis, and point out some recommendations of improvement. The novelty of the study consists in the complex analysis of the models used for the assessment of university third mission. The overview is based on methodologies presented in official publications and other studies related to the assessment of the universities' engagement in innovation.

Keywords: university participation in innovation; Technology Transfer/Knowledge Transfer; assessment models

JEL Classification: O30; O32

1. Introduction

Nowadays, within a society characterized by fierce competition and high pace of change, the participation of universities in innovation has become increasingly important for the socio-economic development. This engagement is associated to a new role of modern university, namely the "third mission" of the university, which is adding to education (first mission) and research (the second mission) (Trencher et al, 2014; Piirainen et al, 2016). In essence, the third function of the university refers to the university's involvement in innovation, and includes activities aiming to exploit knowledge and other academic capacities outside the academic environment. This new thesis related to the university third mission was formally introduced in Higher Education (HE) policies in many countries especially after 2000, and underlines that universities are demanded not only to play an active role in education

¹ Professor, PhD, Transilvania University, Romania, Address: 1 Colina Universitatii Street, Building A, Brasov, Romania, Tel: +40 268 419304, Corresponding author: mariapopescu@unitbv.ro.

² Lecturer, PhD, Transilvania University, Romania, Address: 1 Colina Universitatii Street, Building A, Brasov, Romania, Tel: +40 268 419304, E-mail: lidia.mandru@unitbv.ro.

and research, but also to increasingly transfer their knowledge to society (Sánchez-Barrionuengo, 2014; Veugelers & Del Rey, 2014; Fornasari et al, 2016; Rubens et al, 2017).

The topics of university third mission are complex and represent the subject of numerous studies. Present work paper is focused on the assessment of university engagement in innovation and aims to establish the main directions of action for improving the current evaluation systems applied in Romanian HE. The specific objectives of the study are: 1) general presentation of the key aspects of the evaluation of universities' third mission activities, models and indicators used in various countries; 2) brief description of the evaluation models used in Romania. Finally, a summary of the main ideas is presented, accompanied by recommendations for improvement.

Study below is based on applied or proposed methodologies presented in official publications, reports and other documents related to the assessment of the universities' participation in innovation, considering technologic transfer, knowledge transfer and entrepreneurial activities.

2. General Overview on Models and Indicators for University Third Mission Assessment

Evaluation of the universities' participation in innovation is done at several levels: institutional, national and regional. The purpose of these actions is to obtain information for measuring the degree of university commitment in innovation, comparing it with other universities in the country and abroad, and substantiating the decisions to improve universities' performances. At the university level, the results of the evaluation are the basis of their own strategies and policies, which create the framework for improving the university's third mission related activities and performances. National governments can also strengthen the innovation-related activities and economic impact of universities through the development of national infrastructure of innovation, inclusion of innovation performance parameters in performance based funding systems, and other specific regulations.

Involvement of universities in innovation was initially linked to the indirect transfer of knowledge through scientific publications and the skills of graduates. Peer review was generally considered as the main instrument for research evaluation, and also metrics such as journals' impact as well as other bibliometric indices based on citations. Subsequently, the direct transfer of the results from academic research into the economy and society, known as technology transfer (TT), was emphasized. New TT evaluation indicators were introduced, concerning: contract-based projects and joint projects with companies, commercialization of intellectual property titles,

creation of new companies for valorization of research results, consulting and other services related to introducing the new into society.

USA was the first country that surveyed and published annual data on university TT through the Association of University Technology Managers (AUTM) starting in 1993 (Pressman et al, 2017). The AUTM mainly focuses on technology commercialization activities, addressed to about 200 research universities, and aims a better allocation of federal research & development funds. Statistics Canada has also surveyed the intellectual property commercialization in HE sector since 1998, from all the members of Association of Universities and Colleges of Canada, as well as university-affiliated research hospitals (Langford, 2002). Starting with the late 1990s, the AUTM's survey on licensing activities in Canadian research institutions has been performed, focusing on Canada's 15 largest intensive research universities and also upon a number of less prominent universities. Similar systems of university TT indicators are used more or less systematically in other countries, e.g.: Norway - from 1998, France - 2000, Denmark - 2000, Spain - 2003 etc. (European Commission, 2009).

According to Langford (2002), the TT based approach of university engagement in innovation appears to be "the linear model of innovation" and nowadays is unsatisfactory. In the last two decades, the evolution was in the sense of expanding areas of activities through which universities interact with society, and cohesive, expanding associated indicators. As Molas-Gallart et al (2002) show, university innovation activities are not limited to commercial activities and their measuring needs a broader approach that examines the main channels that connect universities with the rest of society. Thereat, the collocation of knowledge transfer (KT) is increasingly used, and it better reflects the essence of university third function.

Several studies have focused on the measurement of university KT activities, most important being those elaborated by organizations like SPRU (Science Policy Research Unit – an informal grouping of UK universities), UNICO (University Companies Association – a TT association of UK universities), KCA (Knowledge Commercialization Australasia – a non-profit organization for technology/knowledge transfer/exchange practitioners in Australia and New Zealand), and JRC (Joint Research Centre - European Commission hub that supports EU policies). The reports developed by these specialised organizations present the assessment models of universities' Third Mission activity. The synthesis in Table 1 shows that these patterns are different in terms of the activities under consideration, the evaluation criteria and the indicators. For example, the report of SPRU identified 65 potential indicators grouped in 12 different classes (Molas-Gallart et al, 2002); UNICO Report proposes a KT evaluation model with nine areas, of which six specific to TT, and the rest related to human capital (Holi et al, 2008). The same model is recommended by KCA (Jenson et al, 2009).

Table 1. Models for Measuring Third Stream/Mission Activities of Universities

Name	Dimensions/No of activity types/No of indicators
SPRU Report: Final Report to the Russel Grup of Universities	5 Dimensions: 12 types of activities/65 indicators 1) Knowledge capabilities: Technology commercialization; Entrepreneurial activities; Advisory work and contracts; 2) Facilities: Commercialization of facilities 3) Research: Contract research; collaboration in research; staff flow 4) Teaching: Student placement; learning activities; curriculum alignment 5) Communication: Social networking; nonacademic dissemination
UNICO Report: Metrics for the Evaluation of Knowledge Transfer Activities at Universities	9 types of activities Networks; Continuing Professional Development; Consultancy; Collaboration in Research; Contract Research; Licensing; Spin- Outs; Teaching; Other measures.
JRC Report: Assessment of Regional Innovation Impact for Universities	4 Dimensions 1) Education and human capital development; 2) Research, technological development, KT and commercialization; 3) Entrepreneurship and support for enterprise development; 4) Regional orientation, strategic development and knowledge infrastructure.

Although they are different, all models mentioned above include as distinct domain the direct transfer of academic research results, but also internal and external educational activities that directly support the development of human capital involved in innovation processes. As a novelty aspect, in the JRC model an extended assessment is achieved, considering “Regional orientation, strategic development and knowledge infrastructure” (Jonkers et al, 2018). In this classification, entrepreneurship is also defined as a distinct category, which refers to creating new companies, respectively consulting and other support activities for the new businesses developed by specific TT structures. These activities are found in the other evaluation models too, but without being defined as distinct category.

An aspect to be stressed is the close link between indicators on university engagement in innovation and education and research activities. The complex relationships between the three functions of the university require that their assessment be harmonized to avoid confusion and redundancy. In this regard, the following examples are suggestive: as a rule, the number of publications made by members of the academic community is included in the research evaluation, but the dissemination of new ideas also contributes to economic and social development; life-long learning and entrepreneurial programs unrolled in universities are typically included in the evaluation of educational activity, but they also represent actions to increase the innovation potential of society through the development of human capital.

The emergence of the models for university KT assessment is related to the programs launched in UK Higher Education to develop funding mechanisms based on engagement in innovation performance. According to Watson & Hall (2015), UK universities, especially research-intensive universities members of Russell Group, are reviewing their mission to embrace and elevate third stream activities in order to gain competitive advantages. This trend has resulted in some universities whose performance is recognized through evaluations performed by accredited bodies. The Russell Group's first report on the impact of research upon economy (2012) explores the broader impacts of world-class research, including impacts on society, health, environment, policy and culture. A similar model was adopted in Australia (Jensen et al, 2009). In European Union countries, there are not generally implemented national tools for university KT evaluation. A methodology, known as E3M, was developed within a project funded by the European Commission during 2009-2012, but it was only experimentally applied during that project (Carrión et al, 2012; Green paper, 2018). More recently, the model for assessment of regional innovation impact for universities (JRC model) has been developed under the aegis of the European Commission. As its authors state, "this model may be used by universities, national or regional governments to assess the contribution of universities to the innovation performance of the system in which they operate" (Jonkers et al, 2018). In USA, KT and regional impact of innovation are topics of interest to many research universities that carry out impact assessment with the support of nationally recognized consulting organizations (e.g.: University of Washington, 2014, Boston University, 2015; University of Missouri, 2017 etc.), but there is no unique methodology.

Discussions on assessment models for the university third mission were focused not only on the activities taken into account, but also on the establishment of the key performance indicators. The evaluation models of innovation include indicators that generally are grouped into four categories: input, process, output and outcome (impact) indicators. The scheme shown in Fig. 1 (adaptation from Tabas et al, 2012), without being complete, details the four categories of indicators for universities' Third Mission.

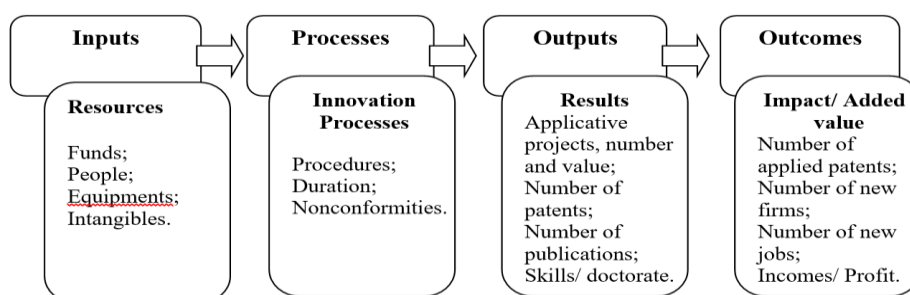


Figure 1. Typology of Innovation Measurement Indicators

From the perspective of the indicators used, an important change in evaluation models was the measurement of the university's impact on society using outcome indicators. According to Langford (2002), a framework for assessment developed on the basis of outcomes is the most useful to appreciate the role of universities in the innovation system. In this regard, Luoma et al (Seppo & Lille, 2011) state that the innovation impact should be measured in the areas of economic, knowledge, education and culture, environment, and well-being.

Another change related to the indicators' system of university Third Mission is the introduction of qualitative indicators. Significant from this point of view are the proposals made for the tool to measure the engagement in innovation of UK universities, which includes specific metrics to assess both the quantity and the quality of nine different facets of KT (Holi et al., 2008). For instance, in licensing - one of the key mechanisms of university KT, the number of licenses and the income generated from these licenses are quantitative indicators; in addition, qualitative indicators, such customer feedback, case studies (licensing success stories) and repeat business have been proposed. Similarly qualitative indicators are included in the JRC model (Jonkers et al, 2018).

Generally, the models presented above make it possible to measure university participation in innovation through systems of indicators, without aggregating them into a single indicator. Composite indicators are commonly used in university hierarchy models. In EU, 33 countries have some form of ranking system, operated by government and accreditation agencies, HE, research and commercial organizations, or media (European Commission, 2010).

According to Vernon et al (2018), global rankings focus mainly on research intensity, other aspects of HE, such as teaching and learning, community engagement and innovation being ignored. The authors appreciate that current indicators are inadequate to accurately evaluate research outcomes and suggest that future research evaluate three dimensions of research outcomes: scientific impact, economic outcomes, and public health impact for evaluating research performance within an academic institutional environment. In response to the various global rankings, a new U-Multirank model was introduced by the European Commission in 2014, to easily compare universities' performance according to five dimensions: research performance, teaching and learning, KT, international orientation, and regional engagement. This model uses more than 35 indicators on the basis of which universities are graded on five levels (European Commission, 2017).

In addition to global evaluation based on university hierarchy models, aggregate indicators specific to assessing university performance on Third Mission are less used. The best known are presented below. The Thomson-Reuters utilizes a specific set of criteria for ranking universities' engagement in innovation, based on data compiled by several of its research platforms, focusing on academic papers and

patents (Reuters, 2018). In USA, University TT and Commercialization Index is systematically used at national level, in order to support adoption of policies that should incentivize the implementation of commercialization best practices in public universities. The Index is measured using four-year averages for four key indicators of TT success: patents issued, licenses issued, licensing income, and start-ups formed (DeVol et al, 2017). Another model was adopted in Turkey, country where a systematic evaluation based on Entrepreneurial and Innovative University Index is performed and announced to the public every year since 2012 (Aslan, 2016). This assessment model is based on data related to: number of firms established by academicians; number of firms established by students/graduated students; employment in those firms; TTO activities; patents; licenses; R&D and innovation projects; entrepreneurship, innovation lessons/trainings.

Among the new approaches to the evaluation of universities participation in innovation, there are also assessment models centered on the innovation management system. A comprehensive model of assessing university-business enterprise cooperation was proposed by European University Association (EUA) (Damian et al, 2014). This model encompasses a wide range of factors that manifest in different stages of university-business research collaborations, being organized in four main areas: strategic approaches; structural factors; facilitating aspects for successful university-business collaborative research; goals, outcomes and benefits of university-business collaborative research. Applied at institutional level, this holistic approach addresses both the outcomes of university-business collaboration and the factors that determine them. Another wide model, entitled “Guiding Framework for Entrepreneurial Universities”, was elaborated under the aegis of the European Commission in collaboration with the OECD (2012). As the Guide’s authors’ state, it represents a self-assessment tool, helping universities to evaluate their current situation on entrepreneurship and to identify potential areas of improvement. The model includes seven areas: Leadership and Governance; Organizational Capacity, People and Incentives; Entrepreneurial Development through Teaching and Learning; Pathways for Entrepreneurs; Business or External Relationships for Knowledge Exchange; Internationalization; Measuring the Impact of the Entrepreneurial University. There are set analysis criteria for each area, evaluation being done on a scale of 1 to 10. It is to note the extension of this model application in the European countries and in other parts of the globe (<https://heinnovate.eu>).

From the previous analysis of the way in which the university third mission assessment is carried out over the world, the following conclusions are drawn:

- The increasing awareness about the university innovation and TT has led to many different answers in Europe and beyond. Elaboration of regular reports on innovation both at university and national level, and the open access to the data as a

basis for permanent monitoring of the innovation performance are of major importance;

- In the world, the systematic evaluation of university participation in innovation is integrated into the ranking processes of universities, but there is a growing emphasis on the distinct assessment of university TT, KT and entrepreneurship, on the basis of specific models. None of these assessments have unique models;
- Regarding the specific models for these evaluations, the most widespread is the US' evaluation model, focused on the measurement of TT results, but more complete is the model used in UK, which involves a more complex system of indicators, quantitative and qualitative. Differences between the structures involved in this process also exist. Few countries make a systematic assessment of engagement in innovation performance of universities using composite indicators;
- As specialists state, it cannot be a single model of evaluation, but a system of different evaluations in relation to the aimed level and purpose (official reporting, HR individual results and stimulation, regional impact, etc.). In this regard, the specialists consider that the coexistence of different models to assess university research and engagement in innovation is not only inevitable, but healthy (Guthrie et al, 2017).

3. Current State of University Third Mission Assessment in Romania

Currently, in Romania there is no systematic evaluation of the TT/KT and entrepreneurship in universities at national level. The evaluation of these activities is found in specific forms in more complex assessment processes, whose objectives and methodologies are briefly presented below.

Actions in this regard are primarily related to funding mechanisms, which are considered important tools in shaping the quantity and quality of HE outcomes and promoting competition. The funding methodology of the Romanian universities provides a basic financing and, in addition, allocation of supplementary funds, aiming to stimulate the excellence of institutions and study programs, both within public and private universities. The allocation of additional funds is based on quality criteria and standards set by the National Higher Education Financing Council (CNFIS) and approved by the Romanian Ministry of Education (RME). These tools are continuously adjusted. Nowadays, according to the current Ministry order (RME, 2018), additional funds represent at least 30% of the national allocation to public universities as basic funding. 40% of additional funding is granted in relation to the performance of scientific research/ artistic creation/ sport performance. The evaluation of performances is based on a complex algorithm, taking into account

several indicators: the Hirsch index and the publication of ISI, ERIH indexed articles/papers, patents and artistic creation projects; the sum of funds gained from research projects; events, festivals and competitions organized at national and international level specific to each artistic field.

The development of the financing mechanisms is in connection with the movement for quality in education, of which beginning in Romania can be considered the year 2005, when was developed the legislative framework of the systematic approach of the quality in education (the Law on the quality in education) and there were created national structures for co-ordination of quality assurance and evaluation in education (e.g. the Romanian Agency for Quality Assurance in Higher Education, ARACIS). ARACIS has developed the methodologies for quality assessment which defines the criteria, standards and performance indicators for the quality assurance and accreditation of HE institutions and program studies. Quality standards are formulated in terms of rules, criteria and outcomes, and define the minimum mandatory level of performance of the activity to which they refer. One of the criteria concerns the scientific research activity and it is evaluated by indicators that reflect not only the results, but also the research related processes and resources (ARACIS Methodology). The assessment of institutional quality in HE is done periodically (internal evaluation is done annually, and external evaluation at 5 years), and aims at verifying the fulfillment of minimum requirements and standards, but it does not serve to the measurement of performances and the ranking of universities.

A more rigorous evaluation of performance in academic research and innovation is foreseen in the ranking methodology of Romanian universities. The first official hierarchy of universities was conducted in 2011 under RME, but the results were not validated. Currently, a ranking methodology is being developed for a periodic evaluation of universities at each 5 years, according to the provisions of the National Education Law (World Bank Group of Romania, 2018). The proposed methodology is structured on three levels. The first level aims at grouping units on nine different "types": Humboldt universities; art and vocational colleges; complex universities; polytechnic universities; universities of medicine and pharmacy; universities of agronomy and veterinary medicine; military universities; economics and administration universities; universities of theology. The second level differentiates these types of universities into "classes" depending on their orientation towards education (A), education and research and/ or artistic creation (B), research (C). Within the third level, these different types of universities are classified according to six dimensions based on their respective indicators. The six dimensions are the following: education, research, internationalization, regional and social involvement, knowledge transfer, and student profile. Aspects related to the so-called "third university mission"- on information sharing and productive interactions with business, public sector organizations and the community in general - are presented here in three different dimensions for clearer identification of its

components. For each of these dimensions specific indicators are defined. For instance, indicators corresponding to the KT dimension include: patents/ total number of teachers; new start-ups and spin-offs/total number of teachers; university revenue generated from patents, licenses, copyrights, new businesses and consulting work; expenditure on KT activities as a percentage of total university expenditure; the presence in the traditional media and social media of information on the knowledge generated by the institution and on the transfer process between university and society.

Finally, it can be noted the Romania's enrollment in the HEInnovate exercise initiated by the OECD and the European Commission, under the coordination of RME. The program started in 2018 and is based on the Guiding Framework for Entrepreneurial Universities (EC&OECD, 2012), which involves the systematic evaluation of the potential and outcomes of university KT and entrepreneurship.

It is also to note that, at the university level, there is information related on participation in innovation on their own websites: analytical results from innovation are published on research-related page or distinct, respectively on the various mandatory synthesis reports (Rector Report, Research Report, and Reports of Institutional Quality).

The previous analysis of the way in which the university third mission assessment is carried out in Romania shows that the systematic assessment of university engagement in innovation is performed in order to provide information for the evaluation of institutional quality and for the allocation of funds from the budget, but the tools used do not provide relevant information for substantiating the strategic decisions on innovation at national and institutional level.

4. Conclusions

The previous presentation shows that nowadays there is no unique system for assessing the universities performance on engagement in innovation. Evaluation systems in various countries are different not only in terms of the model used, but also in the frequency of evaluation and the structures involved. This diversity makes it difficult to compare the third mission related performance of universities in different countries, being necessary to harmonize the models. But harmonization does not mean uniformity. Specialists underline the need to design flexible and multidimensional methodologies that will adapt to the diverse and complex nature of research, disciplines and other particularities of universities.

In Romania, the current evaluation methodologies do not end by synthesis situations at national level regarding the universities performances on third function. Universities are sharing information about their engagement in innovation on their

own websites, but the published documents do not highlight the competitive position and the dynamics of innovation performance, and in many cases they are incomplete.

Given this situation, it is necessary to implement in Romania distinctive evaluation systems that will allow the assessment of the competitive position and performance dynamics of KT and entrepreneurship in universities. It is a commendable decision the implementation in Romanian HE of the Guiding Framework for Entrepreneurial Universities, but also the model proposed by the EUA for assessing university-business cooperation could be a benchmark. These models provide a framework for a holistic approach considering both the outcomes of university engagement in innovation and the factors that determine them.

Systematical assessing of university Third Mission in Romania based on specific models does not exclude the implementation of the MEN's procedure for universities' ranking. The ranking of universities allows the establishment of different innovation indicators adapted to the particularities of the types and classes of universities. The indicator system must be also continually adapted to the strategies and policies adopted by the governors and university management.

Elaboration of regular reports on the engagement in innovation, both at university and national level, and the open access to the data as a basis for permanent monitoring of the innovation performance are of major importance.

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