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# How to Measure the Local Economic Impact of the Universities' Third Mission Activities?

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## Abstract

*Nowadays it is more and more important to know that how certain units of regional economy (enterprises, higher education institutions, other units) affect local economy. The economic impact analysis of higher education institutions is more complex than the impact analysis of enterprises, since the complexity of multiple direct and indirect transmissions and effects. The economic effects of higher education institutions (HEIs) are easy to access and easy to systematize using the classification of first, second and third generation universities. The traditional activities of universities have broadened. Beyond the high-quality of education (first generation universities) high-quality research is also necessary (second generation universities), furthermore it is also important that the scientific results should be adapted by the local economy (third generation universities). Generally, there are four substantial problems. First, the definition of impact, second, measuring and estimating first-round expenditures and avoiding double-counting, third, estimating the correct value of the multiplier, fourth, the quantification of third mission activities. The purpose of our study is to reveal the methodology of the quantification of third mission universities regarding the economic impact of universities. We attempt to fully systematize the fundamental challenges of measuring the third mission activities of universities.*

**Key words:** Urban, rural and regional analysis, innovation and invention, regional economic activity, higher education

**JEL Classification:** O18, O31, R11, I23

## 1 Introduction

Nowadays, we live in an era of a knowledge-based society. It is apparent that this involves the revaluation of certain values regarding mainly human and intangible assets (Lundvall, 2004). In this mentioned era, universities have a main role in the local improvement of society and economy. They are institutions of education and research, however, today we also discuss the increased significance of the so called „third mission” of universities (Wright et al 2008; Etzkowitz, 2002). It is an exciting topic, if we can separate the amount of impact regarding each mission of universities.

Due to some determining changes in the environment of universities, these institutions started developing strategies that can contribute to the acquisition of additional income. According to Wissema (2009), we can distinguish three main generations of universities, each generation contributing with an additional mission compared to the previous one (Table 1).

**Tab. 1 Characteristics of first, second and third generation universities**

Aspect	First generation universities	Second generation universities	Third generation universities
Goal	Education	Education and research	Education, research and utilization of knowledge
Role	Protection of truth	The cognition of nature	Creation of added value
Output	Professionals	Professionals and scientists	Professionals, scientists and entrepreneurs
Language	Latin	National	English
Management	Chancellor	Part-time scientists	Professional management

Source: Wissema (2009)

This typology clearly indicates that the second big transition phase of universities is currently ongoing nowadays, as third generation universities emerge worldwide. We can see that in this phase, not only professionals and scientists, but professionals, scientists and entrepreneurs are the aggregated output of HEIs (Lukovics – Zuti 2013).

The first mission of universities include all activities regarding the education aspect (e. g. BA/BSc, MA/MSc, PhD programmes, contents of the programme portfolio, student mobility programmes), this is “*the dissemination and diffusion of knowledge via tertiary education*” (Jaeger – Kopper 2013, pp. 3). The second mission of universities cover all research-focused activities (e. g. basic research, researcher mobility programmes), which mean the “*the generation and accumulation of knowledge*” (Jaeger – Kopper 2013, pp. 3.). While the third mission of universities include “*all activities concerned with the generation, use, application and exploitation of knowledge and other university capabilities outside academic environments*” (Molas-Gallart – Castro-Martínez 2006, pp. 2.). Third mission activities can be recognised as means of additional income, activities concerning the optimal utilization of university resources and a tool for accomplishing certain social endeavours (Molas-Gallart – Castro-Martínez 2006).

However it is worth to mention a broadened aspect regarding the generations of universities. Besides the typology of Wissema, a novel approach emerged in literature that discusses the fourth generation of universities. This generation of universities is incipiently discussed, and their characteristics did not have consensus yet. According to Pawlowski (2009), an important difference regarding these types of universities is that they have emerged into a state of continuous and proactive strategic planning. We must point out that this is a concept and its existence has not yet been proved scientifically, however there are some initiatives for expanding this topic (see Lukovics – Zuti 2013).

From the aspect of regional development the measuring of the local economic impact of universities becomes more and more important. This is a topic that gathered significant amount of attention in the past decades. Some universities are deeply embedded in local economies and play a crucial role from the dimensions of economy, society and culture (Arbo – Benneworth 2007).

Universities and also some research centres have a certain effect on local development, thus influence the competitiveness of a local area. To achieve this, it is fundamental that the business

solutions, patents, knowledge created by the university are locally utilized, so they are a part of the circulation of the local economy (Bajmócy 2011).

As we can see, universities are able to highly contribute to the enhancement of local economies, if they comply with certain requirements. Besides activities regarding education and research, they are able to generate added value to economy. This is why the measuring of the economic impact of HEIs bears increased significance. According to a previous study of Kotosz (2013), many studies have dealt with the measure of this impact (e. g. Armstrong 1993, Beck et al 1995, Dusek 2003, Bridge 2005). Based on the study of Beck et al (1995, pp. 246), we use the following definition regarding the meaning of economic impact: *“the difference between existing economic activity in a region given the presence of the institution and the level that would have been present if the institution did not exist”*.

We can distinguish many dimensions of the impact of universities (Florax 1992, Garrido-Iserte – Gallo-Rivera 1995), but in this study we focus solely on the economic impact of universities. Pallenbarg (2005) indicates that there are certain impacts that can be highlighted regarding this matter including activities from all three missions of the university (Table 2).

**Tab. 2 Regional and local economic impacts of universities**

<b>Economic impacts of a university</b>	<b>Example</b>
Employment at the university	Number of university jobs and related institutions
University income	State contributions, fees, benefits arising from entrepreneur activity, etc.
University expenditure	Purchase of goods and services by the university
Income and expenditures of the university employees	Wages and salaries, social security costs
Effects on the job market	Qualified job provision effect upon productivity; flexible working supply of the students
Generation of business	Companies created by university students and employees, with or without employment knowledge and technology
Knowledge marketing	The sale of knowledge in a variety of ways: from ideas, courses and patents

Source: Kotosz (2013) based on Pallenbarg (2005)

As we can see, universities tend to fulfill several needs of knowledge-based society. Through many dimensions, they have an impact in their local area and they are attached to the economy through a dense system of networks.

As universities, besides the education of students and contributing to research activities, have several challenges to face, it is expected that they actively participate in external (non-university) partnerships with companies and other institutions trying to accomplish the purpose of improving the region (Goddard – Puukka 2008).

According to the study of Goddard and Pukka (2008), universities can generate advancement and added value to local economy through four separable dimensions. First, they are able to contribute to the development of the local business sector mainly through the creation of new, spin-off enterprises. Second, they can also endorse the appeal of the region to attract firms from all over the world. Universities can achieve this by creating a regional identity and by making

high-quality research opportunities available for non-university companies. Third, they can also foster the diversification of current businesses. Fourth, they can directly advance the industry through the improvement of accessible business solutions.

## 2 Methodological Aspects

The methodological background regarding the measuring of economic impact of first and second mission activities is given and tested in practise (Dusek 2003, Kotosz 2012, Kotosz 2013). As in the mentioned studies, we used the same method in connection with the quantification of the multiplication effect. We must point out that in this study too, the Keynesian model was barely modified in two points. First, we used and applied local consuming habits and local marginal propensity to consume. Second, the primary production and consumption effect was calculated with a two-step method (Kotosz 2013).

The multiplication effect can be calculated by creating a function using the following factors:

- Personal income tax rate (average rate) [t]
- Value added tax (average rate) [n]
- Marginal propensity to consume [c]
- Local consumption proportion of students [d]
- Local consumption proportion of employees [e]
- Local consumption proportion of the college [b]

We used the following formula:

$$\frac{1}{1-e \cdot c \cdot (1-t) \cdot (1-n)}$$

The impact of the first and second mission can be measured practically without difficulty. Regarding the first mission, the impact can be measured with the help of paper-based questionnaires addressed to full-time students of the university and with the help of profit and loss statements regarding university teachers. With this survey we got a precise estimated value regarding the amount of spendings of full-time students of the university.

The statistical population was considered all full-time students of the University of Szeged. We made inquiries about their spendings and income and the estimated percentage of their local consumption. The goal was to have a sample of 10% of all full-time students, this was achieved on university level.

The impact of the second mission activities is much more challenging to measure in Hungary, as there can be overlaps regarding second and third mission impacts. The wages of Hungarian university staff cannot be divided among first, second and third mission activities. In universities, where this can be clearly defined, the challenges regarding the research problem can be simply retraceable.

As we mentioned earlier, the identification of first generation activities is the most simple, as the characteristics of education can be easily defined.

A greater challenge is to grasp the research activity, as research executed by university staff in exchange for income can be sorted to the second mission, while the same research, originating from an externally financed (e. g. company, tender) order of service can be sorted to third mission activities.

Of course not only externally financed research projects build up the only quantifiable part of the third mission activity of universities. We can sort all activities here that generates income to the university (e. g. services, property-lease).

In connection with the second mission of universities, we used data regarding the income of university researchers gathered from public university documents (e. g. profit and loss statements). We must also highlight that in this aspect we are interested in research activities that are only internal (basic research in general), so they can not be connected with research services ordered by companies outside the university. In point of fact the most important is the aggregated amount of wage generated by the university. The source of these wages (e. g. ministry funds, enterprises, tenders) is irrelevant in this case. The only purpose is to attempt to separate impact of all three missions to examine, which university mission contributes the most to the local economic impact. Separating the first mission impact is the most simple. Regarding second mission we must first examine the purpose of the research. If a researcher contributes to a research activity that has no external connections with firm-oriented service orders (basic research in general), we can sort this example to the second mission pillar. Researchers must only contribute to research activities without educational activities.

We can sort research activities that are launched by external companies to the third mission impact (applied research and experimental development). It is challenging to measure the impact of third mission activities of universities mainly due to the lack of necessary data in Hungary. By this we mean that the wages of university staff that serve as a base of economic impact studies cannot be simply connected to first, second and third mission activities, so we are not able to separate the rates regarding these dimensions. There may be available data, however it is possible that these are irrelevant in the case of measuring the economic impact of third mission activities.

The third mission activity of universities can be unraveled and in the end we are able to quantify it, however to achieve this, a necessary but not sufficient requirement is the presence of an accounting information system that can separate the wages among first, second and third mission activities.

### **3 Conclusions**

In our article we unravelled the present importance of measuring the local economic impact of universities. In case of universities, the economic impact is a challenge, as their impacts affect several dimensions besides economy (e. g. politics, demography, culture, education) (Kotosz 2013).

Beforehand we collected four main problems in case of measuring the economic impact of universities. Finding a proper definition regarding the economic impact was done. With certain methods used in literature, the correct estimation of first-round expenditures and the multiplier can also be solved. We discussed that the first and second mission of universities can be quite precisely measured by applying the appropriate methodologies. However difficulties can emerge due to overlaps between the first and second, plus the second and third mission of universities.

Further practical testing and the adequate framework of measuring should be determined and implemented regarding the calculation of the entirely complete economic impact of universities.

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