

# How do universities and non-profit inventions contribute to gross output?

Reflections based on the AUTM Report:

"The Economic Contribution of University/Non-profit Inventions in the United States: 1996-2017"

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By Prof. Dr. Koenraad Debackere<sup>1</sup>

[The Association of University Technology Managers \(AUTM\)](#) and [Biotechnology Innovation Organization \(BIO\)](#) recently published a report “The Economic Contribution of University/Non-profit Inventions in the United States: 1996-2017” (“the report”) which finds that U.S. academic licensors to have significant economic impacts.

This is a highly relevant endeavour as policy makers in different countries often wonder what are the economic contributions of university and other non-profit sector inventions. Various schemes have been created around the world, for example, the US Bayh-Dole and Stevenson-Wydler Acts in 1980 followed by various European countries in the 1990s. These schemes assign intellectual property rights on publicly funded research to the universities conducting the research (and non-profit sector research organisations executing the research) on the condition that these organisations assume the task to commercially exploit the results obtained. The advent of such Acts has led universities and non-profit organisations to pay increased attention to any intellectual property that stems from their research, ensuring that these were professionally managed, as well as legally and operationally organising the transfer of research results and insights to the business sector, whether via incumbent companies or via new start-ups and spin-offs. Professional Technology Transfer Organisations (or TTO’s) have emerged to take on that economic task (Debackere & Veugelers 2005; Debackere 2012). Various reports and studies have attempted to list and understand the critical success factors of those operations and organisations. Success does not only depend on the legal context in which such intellectual property is assigned and mobilised, but also on both the strategy and dedicated organisation of the respective institutions towards technology transfer and commercialisation of research output (Weckowska et al. 2018).

Although such studies have contributed many useful insights to the success of academic and non-profit technology transfer activities, a macro-level impact study was lacking. In other words, there was a gap in understanding what the actual macro-economic contribution was on growth and job creation of licensing academic inventions. Do they have a measurable and sizeable impact on the economic performance of a country? This is the gap that is now filled, for the first time, by the report. Given the complexity of collecting and validating the relevant, longitudinal data set and turn the data into a meaningful analysis and interpretations the study was a Herculean task. AUTM succeeded in this task and provides a solid impact analysis of academic and non-profit invention licensing in the U.S.

In more detail, the report finds that the total contribution of U.S. academic licensors to industry gross output between 1996 and 2017 ranges from \$723 billion to \$1.7 trillion (in 2012 USD) and the contributions to gross domestic product (GDP) range from \$374 billion to \$865 billion (in 2012

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USD). In addition, the report estimates that the total number of person years of employment supported by the academic licensors' licensed-product sales range from 2.676 million to 5.883 million during the 22-year period.

### **Need for empirical studies to promote evidence-based policy making**

Existing empirical evidence indicates that universities can have very significant, positive impacts on innovation and economic growth (e.g. Valero & van Reenen 2019; Toivanen & Väänänen 2016). The report adds to this evidence by focusing on the macro-economic contribution of academic licensors. The report focuses on research done at U.S. academic institutions and at other non-profits, subsequently licensed to the private sector, and its ensuing visible economic contribution to U.S. GDP, gross output, and employment. An important motive for developing the input-output model used in the report is to demonstrate the benefits of research expenditures to stakeholders and to show how taxpayer-funded research contributes to the economic well being of citizens.

### **Calculation methods and modelling assumptions**

The quantification of the economic contributions of universities and research organisations is a challenging task. The authors use a set of different input-output models to quantitatively estimate the impact of academic licensors. The input-output models use the annual AUTM survey respondents' license and earned royalty income data and, in combination with empirically documented patterns of transactions in the U.S. economy, estimate AUTM Survey respondents' and their licensees' contribution to the U.S. economy using standard economic metrics: gross domestic product (GDP), gross output and jobs. The report includes detailed descriptions of the underlying data, calculation methods and related assumptions and limitations. The calculations are based on an input-output model that was first published and applied in an earlier 2009 report (Roessner et al. 2009). Subsequently, the description and results of that model were also published in the world's leading innovation studies journal, *Research Policy* (Roessner et al. 2013).

### **Academic licensor's economic impact is considerable**

Universities and other non-profit academic research organisations contribute to the economy in multiple ways as demonstrated by a myriad of case-based as well as micro-economic analyses (Terroir & Debackere, 2019). The present report provides important empirical evidence that the cumulative economic impact of U.S. academic and non-profit licensors is considerable. How US policy makers factor this report into their thinking remains to be seen but the report provides clear evidence that changing the intellectual property rights regime, technology transfer and licensing will affect a very significant net contributor to the innovation economy. It will also be interesting to see replications in other countries exploring the macro-economic contributions of universities and non-profit research organisations across the globe. Thus validating and demonstrating the economic significance of technology transfer activities and operations.

## References

Debackere, K. & Veugelers, R. 2005. The Role of Academic Technology Transfer Organizations in improving Industry Science Links. *Research Policy* 34(3), 321-342.

<https://doi.org/10.1016/j.respol.2004.12.003>

Debackere, K. 2012. The TTO. A University Engine Transforming Science into Innovation. LERU Advice Paper. <https://www.leru.org/publications/the-tto-a-university-engine-transforming-science-into-innovation>

Pressman, L., Planting, M., Bond, J., Yuskavage, R. & Moylan, C. 2019. The Economic Contribution of University/Non-profit Inventions in the United States: 1996-2017. A report prepared for the Biotechnology Innovation Organization (BIO) and AUTM. [https://autm.net/AUTM/media/About-Tech-Transfer/Documents/Economic\\_Contribution\\_Report\\_BIO\\_AUTM\\_JUN2019\\_web.pdf](https://autm.net/AUTM/media/About-Tech-Transfer/Documents/Economic_Contribution_Report_BIO_AUTM_JUN2019_web.pdf)

Roessner, D., Bond, J., Okubo, S. & Planting, M. 2013. The Economic Impact of Licensed Commercialized Inventions Originating in University Research. *Research Policy* 42(1), 23-34.

<https://doi.org/10.1016/j.respol.2012.04.015>

Roessner, D., Bond, J., Okubo, S. & Planting, M. 2009. The Economic Impact of Licensed Commercialized Inventions Originating in University Research, 1996-2007. Final Report to the Biotechnology Industry Organization.

[https://www.bio.org/sites/default/files/files/BIO\\_final\\_report\\_9\\_3\\_09\\_rev\\_2\\_0.pdf](https://www.bio.org/sites/default/files/files/BIO_final_report_9_3_09_rev_2_0.pdf)

Terroir, P. & Debackere, K. (eds) 2019. Knowledge Transfer and IP: The New Challenges. *LES Nouvelles* LIV(2). <https://www.lesi.org/login/?ReturnURL=%2fdocs%2fdefault-source%2fln%2flnjune2019%2fles-nouvelles---june-2019---full-issue.pdf%3fsfvrsn%3d4>

Toivanen, O. & Väänänen, L. 2016. Education and Invention. *Review of Economics and Statistics* 98(2), 382-396. [https://doi.org/10.1162/REST\\_a\\_00520](https://doi.org/10.1162/REST_a_00520)

Valero, A. & van Reenen, J. 2019. The economic impact of universities: Evidence from across the globe. *Economics of Education Review* 68, 53-67.

<https://doi.org/10.1016/j.econedurev.2018.09.001>

Weckowska, D., Twigg, D., Libaers, D., Meyer, M. & Debackere, K. (2015, on line; 2018, paper). University Patenting and Technology Commercialization – Legal Frameworks and the Importance of Local Practice, *R&D Management* 48(1), 88-108. <https://doi.org/10.1111/radm.12123>