Regional Innovation Impact Assessment of European Universities: design and development of an evidence-based model

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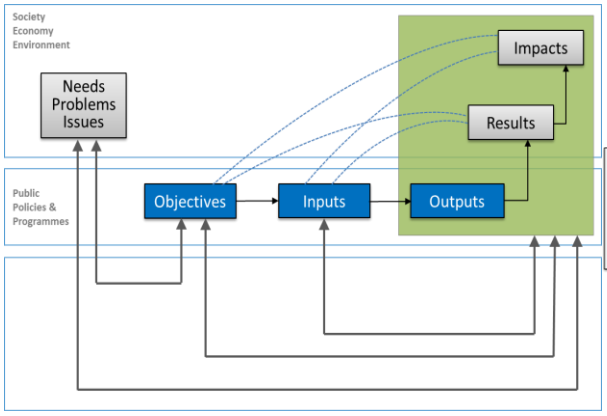
One of the assumptions underlying most regional innovation policies in Europe is that local universities make valuable contributions to economic activity (European Commission, 2011). However, in the EC's renewed agenda for European higher education, an innovation gap is highlighted between universities and their local or sub-national regional economy (European Commission, 2017, p. 4): "Higher education institutions are often not contributing as much as they should to innovation in the wider economy, particularly in their regions. The performance of higher education in innovation varies strongly between EU regions". A recent report of an Independent High Level Group, on maximising the impact of EU Research & Innovation programmes, argues for an additional performance based institutional funding stream, to support institutional modernisation in terms of flexibility, user engagement and openness (Lamy et al., 2017).

To address this gap, we developed a *Regional Innovation Impact Assessment* (RI2A) system (Jonkers et al., 2018) that could set a path for performance based funding to European universities which resonates with the abovementioned Lamy report. The evidence-based RI2A framework may also be used by universities, national or regional governments to assess the contribution of universities to the 'regional innovation system' (Cooke et al., 1997).

The report builds on the three sources of studies: national performance-based funding systems (Jonkers and Zacharewicz, 2016); (b) development of innovation impact assessment systems requested by national and EU policy makers (EUNIVATION, 2017; Molas-Gallart, 2002); (c) broader economic literature on research assessment and the regional economic impact of universities.

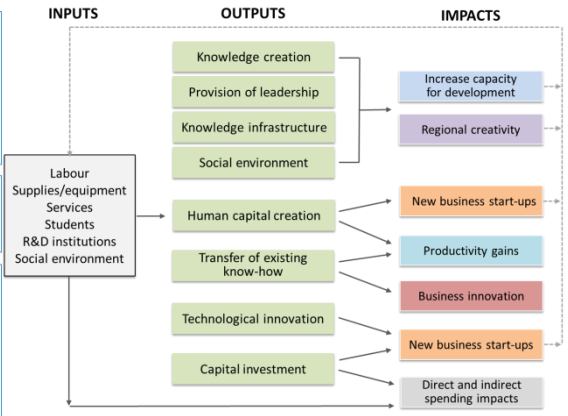
In order to identify economic and innovation impacts, it is crucial to better understand science-innovation systems as a whole, and especially how university-related structural changes to such systems might deliver those impacts. However, the timeline and causality is unclear and impact will often be generated by complex interplays of many sources and (hidden) determinants. Tackling this conceptual and methodological challenge, one of the most commonly used analytical models of such impact generating processes, especially designed for performance evaluation of non-profit programmes, is the 'Logic model' (Weiss, 1972; Kellogg Foundation, 2001).

Figure 1 **Logic model of impact generating processes**



Source: adapted from Technopolis Group (1999)

Figure 2 Contributions of universities to regional economic development



Source: adapted from Goldstein and Renault (2004)

Figure 1 displays a graphical representation of the Logic model, embedded in the broader context of mission-oriented programmes driven by societal needs, economic problems or other issues. There is an implicit time-line in this one-directional 'linear' model. The variant on display clarifies the important distinction between important stages in the process of generating impacts and innovations. While this model implies that 'impacts' may lie further in the future, it also specifies shorter-term 'outputs' and 'results' that provide an indication of progress towards long-term objectives. It often takes many years before an identifiable innovation impact emerges. By then it may prove almost impossible to track its exact provenance and attribute to it a specific university as source of origin.

The UK government for example accepted that it is impractical, if not impossible, to unambiguously measure the socioeconomic impact of university research. This has led to the decision to focus on 'impact pathways'. The UK government opted for a qualitative assessment of knowledge transfer activities and other ways to engage key stakeholders and the general public (Research Councils UK, 2011). Unlike the Research Excellence Framework (REF) in the United Kingdom, the approach taken in this study is to focus solely on the impact of universities on innovation and regional economic development. Most existing innovation impact assessments of universities tend to focus on knowledge exploitation activities and outputs that are better captured under the heading 'innovation potential': notably on the impact of academic research on business sector R&D and technological innovation, or on academic entrepreneurship and university spin-off companies.

However, sophisticated assessment systems could adopt a broader conceptualisation. The 'economic' dimension explicitly includes the component 'education', thus capturing the major impact universities can have on innovation and innovative potential of their local region through the provision of tertiary-level teaching and training. The steady supply of high-quality human resources

from local universities can be a key contributor to regional innovation systems. Universities can also play a role in providing entrepreneurial skills and thus foster the development of new innovative ventures.

We can now tackle the generic concept '*regional innovation impacts*' within the analytical framework of the Logic model. The aggregate-level model is depicted in Figure 2. This dedicated model is one of many possible variants; it mainly serves to illustrate the variety of university outputs and impacts that may contribute to a region's economic development. While some short-term impacts, especially those with obvious 'direct' causal linkages to their university origin, are relatively easy to capture and count (e.g. new business start-ups), most long-term 'indirect' impacts are difficult to unambiguously identify or measure precisely (e.g. productivity gains). In this report this framework is used to assess the innovation impact of university rather than the broader economic impact, although some aspects may be indirectly addressed. Therefore only innovation-related indicators will be considered.

Ideally, one would like to have at least one high-quality quantitative measure for each of the components listed in Figure 2. Unfortunately, the development of performance indicators and metrics of the regional innovation impact of universities is still in its infancy mainly because operationalization and measurement of *'innovation impact*' is fraught with methodological difficulties (similarly to '*economic impact*'). Apart from classifying impacts on the basis of their time horizon (short term, medium term, and long term impact), one can classify (potential) impacts by four general characteristics of a university's activity profile.

On the basis of a review of the strengths and weaknesses of different assessment approaches, the RI^{2}A system will enable universities to choose their own set of preferred performance indicators. However, the self-assessment and selected indicators should cover at least the following four broad categories (RI^{2}A dimensions):

- Education and human capital development;
- Research, technological development, knowledge transfer and commercialisation;
- Entrepreneurship and support to enterprise development;
- Regional orientation, strategic development and knowledge infrastructure.

This categorization and classification system is the backbone of our assessment framework. A pre-selected list of indicators (related from 'Results' or 'Impacts' category as mentioned in Figure 1) are supplied in a separate '*indicator box*' for each dimension. Such a typology also suggests the design of a 'regional impact matrix', where these impact sources are connected to impact categories. Depending on the aim and level of the assessment (city, metropolitan area, sub-national region,) in the actual implementation of the RI^{2}A, specific weights will be attached to each of the impact

categories. In this way universities will be incentivised to deploy relevant activities in these directions and/or be supported in expanding their ongoing activities.

The RI^{2}A system comprises of three main analytical components:

- quantitative, metrics-based indicators to measure innovation impact and monitor its dynamics ('numbers');
- qualitative contextualisation of these indicators potentially supplemented with qualitative evidence of specific impact incidences ('narrative');
- integrated analytical framework that focusses on the geographical dimension of outcomes and impacts produced by universities.

The indicators in the 'RI^{2}A profile' should thus feed into a university level case study, a so-called "narrative with numbers", in which indicators of the innovation performance of universities are contextualised and supported qualitatively. This evidence-base could be supplemented with information on recently observed impacts or descriptions of specific impact pathways. University can also describe "how" they have a positive impact on their regional innovation ecosystem, potentially beyond what is captured by the available performance indicators. The contextual information on the region in which the university operates can be supported with indicators on the regional development level.

Scientific peers are not necessarily good at judging socio-economic impacts (Debackere et al., forthcoming). The fact that key concepts and notions are still in flux, and may not be understood the same by all experts, suggests the application of expert panel reviews, which allows for contesting and conflicting opinions that can be played out and negotiated for consensus seeking (Derrick, 2017). An important implementation challenge is to find sufficient numbers of skilled evaluators to assess the university-level case studies. To this end an EU level pool of experts should be considered.

The further development of a RI^{2}A system will require the buy-in and involvement of key stakeholders. Subsequent step in the development of such an Innovation Performance Based Funding framework and an associated assessment system will be discussed. These steps include an assessment of potential European and National policy instruments through which the system can be implemented (forthcoming) as well as the first steps in a comparative case study based on detailed university level case studies developed by different types of universities from different parts of the European Union following the RI^{2}A framework. The analysis of these cases should serve to highlight some of the strengths and weaknesses of the proposed approach as well as to identify some generalizable lessons regarding the innovation impact of different types of universities on their innovation ecosystem. At present we are involved in discussions and consultations of

methodological as well as policy issues which need to be addressed for the possible adoption and successful implementation of this 'narratives with numbers' model.

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