

# Measuring regional capabilities: A novel approach to determining Irish high-technology growth and innovation<sup>1</sup>

Paul Ryan<sup>1</sup>, Öner Tulum<sup>2</sup>, Satyasiba Das<sup>3</sup>

Centre for Innovation and Structural Change (CISC)  
National University of Ireland Galway (NUIG), Galway, Ireland

Phone: +353 (0) 9149 5456

Email<sup>1</sup>: [paul.a.ryan@nuigalway.ie](mailto:paul.a.ryan@nuigalway.ie)

Email<sup>2</sup>: [oner.tulum@nuigalway.ie](mailto:oner.tulum@nuigalway.ie) (corresponding author)

E-mail<sup>3</sup>: [satyasiba.das@nuigalway.ie](mailto:satyasiba.das@nuigalway.ie)

## **EXTENDED ABSTRACT**

Technology and knowledge-driven innovations are critical to wealth creation and overall economic vibrancy in our New Economy. As emerging technologies play a key role in determining economic winners and losers, economic activities become more knowledge-based and those regions with leading clusters of these technologies experience greater economic growth. This study offers an understanding to the development and future sustenance of such high-tech regions using a novel methodology for the case of Ireland. In particular, the project aims to examine the critical underpinnings and embedders of innovation in Irish high-technology regions. Essentially, this project utilises a datamining technique where firms in the database are observed and measured over a number of years and their annual records are then linked to the emerging technological capability of the region. With this methodology we created a virtual laboratory of high-tech companies that operate in a defined area and utilized a set of complementary research tools that are designed to analyze regional industrial specialisation, growth, decline and reinvention. Doing this, we identified the sources of industrial development and enriched the concept of regional innovation systems. The core dataset is developed by collecting business demographics on companies that are active in high-technology fields (medical technology, information and communication technology (ICT) etc...). The data also includes business information such as location, number of employees, year of founding, country of ownership and product profiles that are defined by a finely granulated technology classification system.

The logic we establish here is that a company's product profile, mediated by a technology taxonomy system can serve as a proxy for capability. Because firms and the portfolio of products they develop over time are observable and measurable, a company's underlying technological capabilities can be inferred, interpreted and mapped from their product profiles. Furthermore, by grouping firms within a region into similar technology product codes, there is a tool to characterize specialized technological capabilities that underlie regional competitive advantage. Developing the historical database is critical to the task of empirically validating and enriching the concept of dynamic technological capabilities at both the enterprise and regional levels. Firms are primarily investigated because they are the developers and carriers of distinctive technological capabilities. The method is to generate evidence in the form of historical trails left by firms and by sequential product iterations of enterprises in related technology domains. These trails, based on the finely granulated technology taxonomy, are a manifestation of the progression of hidden specialized technological capabilities that enable and persist through various product

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<sup>1</sup> This research is funded by the EU under Marie Curie *Transfer of Knowledge* (TOK) program. The authors would like to acknowledge Dr. Michael Best for his valuable expertise and inputs to this project.

iterations over time. The datamining methodology will be complemented by more traditional methods of industry surveys and multiple case studies. This integration of macro-, meso- and micro- methodologies will facilitate multiple insights into the nature of regional competitive advantage, innovation systems, industrial competitiveness, clustering and churn and technological capability.

Our preliminary results indicate that through the application of capital, technology and a range of skills, foreign investments in Ireland have created an environment that has led indigenous firms to adopt innovative business practices with more R&D input to remain competitive against newly emerging “low-cost” economies. Our study also illustrates the different approaches high-technology industries in Ireland take in their production, innovation and business strategies. Our conclusion indicates that the indigenous companies are close to the local side of the local-global corridor in term of getting inputs for innovation and capital formation. On the other hand, foreign-owned companies are close to the global side of the local-global corridor with strong links to suppliers.