

Impact case study (REF3b)

Institution: Imperial College London
Unit of Assessment: 19 Business and management studies
Title of case study: Identifying and eliminating bottlenecks to entrepreneurship and development
1. Summary of the impact (indicative maximum 100 words)

The Global Entrepreneurship and Development Index (GEDI) developed by Professor Autio and colleagues has been designed to address the shortcoming that policy makers lack robust measures for effective guidance for national entrepreneurship policy analysis, design and implementation. GEDI profiles National Systems of Entrepreneurship. The main impact has been as follows:

- Scottish Enterprise used GEDI analysis to re-think its entrepreneurship policy [A];
- UNCTAD adopted GEDI in its Entrepreneurship Policy Framework [B, C];
- In 2013, EU decided to include GEDI data in the 2014 EU Cohesion Report. This will determine the allocation of EU Structural Funds (€320 Billion) [D].

The ultimate beneficiaries of more effective policies are the businesses, taxpayers, and populations of these countries.

2. Underpinning research (indicative maximum 500 words)
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Professor Autio’s research, culminating in the GEDI index, started in 1997, when he helped launch (as a founding team member) the Global Entrepreneurship Monitor (GEM), the world’s largest social-science research consortium that has had a considerable global impact on entrepreneurship policy and research in its own right. As a fundamental basis for this exercise, Professor Autio developed the theoretical framework that guides the collection of GEM data - the major data source used in GEDI, as presented in [1]. Drawing on GEM, Professor Autio then conducted an extensive research programme on comparative entrepreneurship and economic development that formed the basis for subsequent work on developing and refining the GEDI index which started at Imperial in 2008 in partnership with US professor Zoltan Acs of George Mason University and Laszlo Szerb of University of Pécs. The 2013 version of the GEDI index covers 120 countries. The index uses GEM for individual-level data and World Bank, IMF and other sources for institutional-level data.

With little previous theory to link entrepreneurship to macro-economic outcomes, Autio and colleagues developed a theory of National Systems of Entrepreneurship (NSEs; see [2] below). The theory portrays entrepreneurship as a trial-and-error resource allocation process, driven by individuals and regulated by country-specific institutions. Entrepreneurial opportunities can only be validated by testing them; this requires resource mobilisation. This trial-and-error process drives a country’s Total Factor Productivity (TFP), because good guesses allocate resources to productive uses, and failed entrepreneurial attempts release resources to alternative uses. Preliminary analysis shows that the GEDI index predicts TFP with a two-year time lag, as predicted by their theory.

According to NSE theory:

- Components of the NSE co-produce system performance;
- NSE performance may therefore be held back by bottlenecks;
- Entrepreneurship policy needs to alleviate systemic bottlenecks.

The GEDI index operationalizes this theory:

- It measures 15 constituent pillars of NSEs;
- Each pillar combines individual-level data with institutional-level weights;
- Penalty for Bottleneck algorithm captures bottleneck effects.

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Traditional indices are summative: different components are added together. In contrast, the GEDI method 'penalises' well-performing index pillars if accompanied by poorly performing pillars, simulating systemic bottlenecks. Contextual weighting captures context-specific constraints and regulators. Importantly, unlike other indices, the GEDI index takes into account the quality of the activity, as well as the quality of the country's framework conditions.

Further papers have helped refine the dimensions of NSE theory as follows:

Culture: [3] provides basic underpinning research on that part of NSE theory that emphasises the contextual influence on entrepreneurial action exercised by culture.

Institutional conditions: [4] provides underpinning research exploring the effect of general institutional conditions on entrepreneurial processes in countries, while article [5] provides underpinning research exploring the effect of institutional conditions on entrepreneurial processes in countries -- with a focus on IP protection.

Opportunity recognition: [6] explores contextual influences on opportunity perception and pursuit by individuals, with a focus on informational influences.

Staff:

Professor Erkkö Autio, Chair in Technology Transfer and Entrepreneurship, 2006-present;

Dr Linus Dahlander, Research Associate, 2006-08;

Dr Lars Frederiksen, Assistant Professor, 2007-10;

Dr Karl Wennberg, Research Associate, 2009-10;

Professor Zoltan Acs, Visiting Professor, 2008-.

<h3>3. References to the research (indicative maximum of six references)</h3>

- [1] Levie, J. D., & Autio, E. (2008): ['A Theoretical Grounding and Test of the GEM Model'](#), *Small Business Economics*, 31(3), 235–263;
- [2] Acs, Autio, & Szerb (2013): ['National Systems of Entrepreneurship: Measurement issues and policy implications'](#), *Research Policy* (available online);
- [3] Autio, E., Pathak, S., & Wennberg, K. (2013): ['Consequences of cultural practices for entrepreneurial behaviors'](#), *Journal of International Business Studies*, 44(4), 334–362;
- [4] Levie, J., & Autio, E. (2011): ['Regulatory burden, rule of law, and entry of strategic entrepreneurs: An international panel study'](#), *Journal of Management Studies*, 48(6), 1392–1419;
- [5] Autio, E., & Acs, Z. (2010): ['Intellectual property protection and the formation of entrepreneurial growth aspirations'](#), *Strategic Entrepreneurship Journal*, 4(3), 234–251;
- [6] Autio, E., Frederiksen, L., & Dahlander, L. (2013): ['Information exposure, opportunity evaluation and entrepreneurial action: An empirical investigation of an online user community'](#), *Academy of Management Journal*, 56 (5):1348-1371.

Grants and related funding

- [7] Erkkö Autio, EPSRC / QinetiQ Chair in Technology Transfer, 01/11/2006 – 31/10/2011, £1.04M;
- [8] Erkkö Autio and Karl Wennberg, 'Contextual Influences on High-Potential Entrepreneurship in Europe', Vetenskapsrådet (Swedish Research Council), 01/03/2010 – 31/03/2013, £67K.

Quality of research

This is attested by the numerous publications in leading international journals, including *Academy of Management Journal*, *Research Policy*, *Small Business Economics*, *Strategic Entrepreneurship Journal*, and *Journal of Management Studies*.

4. Details of the impact (indicative maximum 750 words)

Governments increasingly emphasise the role of entrepreneurship as a tool of economic policy in unlocking the growth potential of countries. While metrics to track innovation are well established due to the long-standing focus of economic policy on innovation, measures to track entrepreneurship in countries lag behind. Indices of entrepreneurship in countries are too underdeveloped to provide effective guidance for national entrepreneurship policy analysis, design and implementation. The Global Entrepreneurship and Development Index (GEDI) has been designed to address this shortcoming and has had the following impact.

Scottish Enterprise commissioned a GEDI analysis of Scotland in 2012 to provide the basis for a wide-ranging review of entrepreneurship policy in Scotland. During January - May 2013, several stakeholder engagement workshops were conducted by Scottish Enterprise around the GEDI platform, debating its findings and digging deeper into the bottleneck areas identified, unearthing a wide range of system bottlenecks that had not been previously recognised and developing an action plan to deal with these. By May 2013, stakeholder workshops had distilled five priority themes for the Scottish entrepreneurship ecosystem: “Financing for Growth”; “Effective Connections”; “Skills for Growth”; “Role of Universities”, and “Role Models and Positive Messages”. High-level Task Groups were created, charged with developing solutions to each of the five themes. As an example, the GEDI index identified finance as a bottleneck impeding Scottish entrepreneurship. Stakeholder workshops confirmed this bottleneck and pinpointed insufficient exit opportunities as the real system constraint. As a result, policy is being amended to facilitate exit opportunities for angel investors – thereby encouraging them into the sector - and to improve access to institutional investors in Scotland. Scottish Enterprise’s Manager of Collaborative Funding has attested:

“The GEDI analysis you conducted with Professor Jonathan Levie of the University of Strathclyde has provided key entrepreneurship stakeholders in Scotland with a robust methodology for benchmarking Scotland’s entrepreneurial performance against leading innovation based nations. This contribution has provided:

1. An evidence base for Government strategy development *and*
2. An effective tool for stakeholder engagement which has facilitated wider community-based strategy development.

Without the GEDI platform, I believe progress in addressing bottlenecks in the Scottish entrepreneurship ecosystem would have been considerably less effective.” [A]

UNCTAD (United Nations Conference on Trade and Development) Entrepreneurship Policy Framework guides entrepreneurship policy design and implementation in developing countries [B]. Autio’s notion of systemic bottlenecks was adopted as a key element of the framework, now affecting many emerging market economies. The Officer-in-charge of UNCTAD’s Division on Investment and Enterprise provides confirmation of this:

“Your contributions, such as underscoring the notion of bottlenecks, have enhanced our Entrepreneurship Policy Framework and Implementation Guidance. ...Published in 2012, the Entrepreneurship Policy and Implementation Guidance have already contributed to the discussions, design and implementation of entrepreneurship policies in Brazil, Ghana, The Gambia, Nigeria, Panama and Zimbabwe.” [C]

The EU In 2012, the EU DG Regional & Urban Policy commissioned a GEDI analysis of EU NUTS II regions (all 125 of them). Since the focus was on regions and not countries, a new version of GEDI (the Regional Entrepreneurship and Development Index - REDI) was developed. Following an EU decision in 2013, Index data (now complete) will be included in the 2014 EU Cohesion Report, and will inform policy design across the EU. The Cohesion Report, read by thousands of policy-makers, politicians and regional policy stakeholders in European regions, will provide a benchmark reference of the entrepreneurial competitiveness of different European regions and inform the allocation of EU Structural Funds (€278bn, 2007–13) and EU Cohesion Funds (€70bn,

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2007-13). The Deputy Head of the Economic Analysis Unit for the Directorate-General has described the usefulness of the GEDI and REDI analysis in:

“...highlight[ing] trends in regional entrepreneurship ecosystems, thereby supporting the design of policies to enhance economic and social cohesion...Importantly, the GEDI/REDI data goes beyond simple new firm counts and provides a systemic perspective towards entrepreneurship policies in EU regions. This systemic aspect greatly enhances the utility of the GEDI/REDI data in policy analysis and design.” [D]

A particularly salient impact materialises through GEDI’s influence on Smart Specialisation Strategies, which are required by the EU Horizon 2020 strategy as a precondition for the allocation of EU Structural and Cohesion Funds. This is a material impact because more effective promotion of entrepreneurship is key to sustainable growth, both in advanced economies and in emerging market economies. The regional version of GEDI directly informs Smart Specialisation. Overall, the GEDI index has reach because it has already affected and continues to affect policies of the EU and among developing countries through UNCTAD, and thus a host of individual countries in Europe and beyond. As examples, the government of Estonia is currently conducting a GEDI exercise, and Spain’s 17 NUTS II regions are planning to conduct a GEDI exercise in 2014. Further, a non-profit organisation, the Global Entrepreneurship and Development Institute has been established in Washington, D.C., to advance policy impact. As one example, the GEDI institute (of which Autio is Research Director) launched a version of GEDI that focuses on Women Entrepreneurship under the sponsorship of Dell [E]. GEDI has also been prominently featured in The Economist [F].

5. Sources to corroborate the impact (indicative maximum of 10 references)

- [A] Letter of support from Manager of Collaborative Funding, Scottish Enterprise, available on request;
- [B] [UNCTAD Entrepreneurship Policy Framework](#) (archived link available [here](#));
- [C] Letter of support from Officer-in-charge, Enterprise Branch, Division on Investment and Enterprise, UNCTAD, available on request;
- [D] Letter of support from Deputy Head of the Economic Analysis Unit, European Commission Directorate-General Regional and Economic Policy, available on request;
- [E] <http://women2.com/which-countries-are-best-for-female-entrepreneurs-infographic/> (archived link available [here](#));
- [F] The Economist Schumpeter Column 24 Feb 2011: ‘[Uncorking Enterprise](#)’ (archived link available [here](#)).