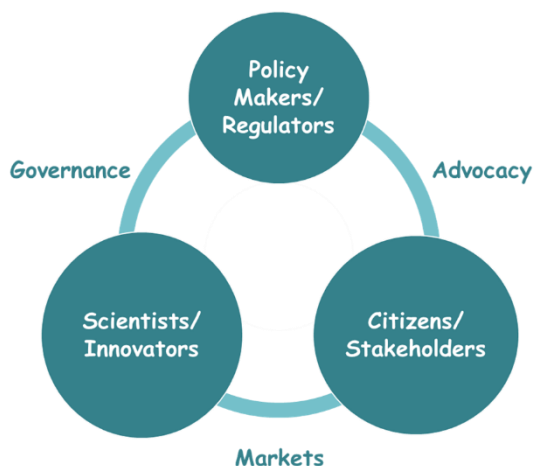




## INNOGEN INSTITUTE

### SUPPORTING THE DEVELOPMENT OF ADVANCED INNOVATIVE TECHNOLOGIES

The Innogen Institute (Institute for Innovation Generation) is the successor to the ESRC Innogen Centre that, from 2002-14, published over 1000 articles (over 500 in peer reviewed academic journals), trained 40 successful PhD students, and gained funding of £12M for over 100 projects, in addition to the £7.7M from the ESRC ([www.innogen.ac.uk](http://www.innogen.ac.uk)). Our ongoing programme of research and translational projects focuses on the interactions between scientists/innovators, policy makers/regulators, and citizens/stakeholders in determining which emerging innovative technology products and processes will succeed in the market place, across a range of innovative technology areas.



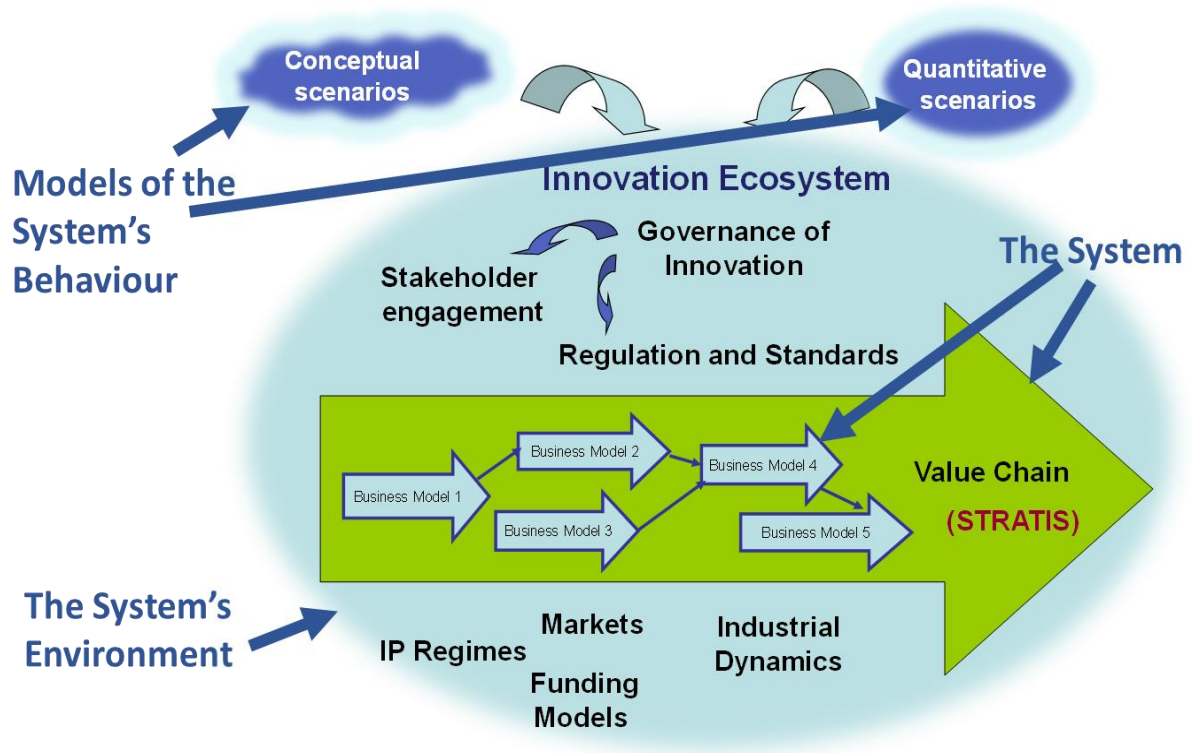
- Pesticides
- Precision agriculture and genetic technologies
- Aquaculture
- Small molecule and bio-based drug development
- Biofuels
- Precision medicine
- Regenerative medicine
- Diagnostic and medical devices
- Genetic databases
- Big data and AI
- Financial technologies
- Robotics
- Energy technologies

Systemic analysis of these interactions enables us:

- To assess which emerging innovative products, processes and services are likely to reach a market place, over what timescale, in which industry sectors, regions or countries, and
- To identify pressure points in the overall innovation ecosystem and understand what actions could enable innovation to take place safely, more rapidly and more efficiently.

This combination of cross-disciplinary and cross-sectoral experience and expertise means that we can support company and policy-related decision making on advanced innovative technologies across a diverse array of sectors.

Our ability to shift perspective from that of the innovator to that of the policy maker or regulator, and/or to those of citizens and stakeholders, and integrate insights across these perspectives, enables us to locate the pressure points within a complex innovation ecosystem where efforts to improve innovation processes can be focused most effectively. This figure shows the overall innovation ecosystem, highlighting the roles of company business models and value chains<sup>1</sup>.



Building on this framework, we have developed practical tools as aids to decision making.

(i) *Strategic Planning for Advanced Technology Innovation Systems (STRATIS)*<sup>2,3</sup> supports analysis and orchestration of business models and value chains by: enabling better decisions on technology development; being adaptive to emerging technology changes; understanding better where convergent innovations can generate or close off business opportunities; planning how to integrate business models along a value chain; and taking account of factors external to the value chain that can act as enablers or constraints on innovation.

<sup>1</sup> Wield, D., Tait, J., Chataway, C., Mitra, J., and Mastroeni, M. (2016) Conceptualising and practising multiple knowledge interactions in the life sciences. *Technological Forecasting and Social Change*. <http://dx.doi.org/10.1016/j.techfore.2016.09.025>.

<sup>2</sup> Mastroeni, M., Mitra, J. and Tait, J. (2012) Methodology for the Analysis of Life Science Innovation Systems and its Application to Three Case Studies. REALISE Project. Innogen Centre Report to Technology Strategy Board. <http://www.innogen.ac.uk/reports/490>.

<sup>3</sup> Mitra, J. and Tait, J. (2012) Analysing Stratified Medicine Business Models and Value Systems: Innovation-Regulation Interactions. *New Biotechnology*, 29(6), 709-719.

(ii) *Proportionate and Adaptive Governance of Innovative Technologies (PAGIT)*<sup>4</sup>, funded by the UK Government Department for Business, Energy and Industrial Strategy (BEIS) and the British Standards Institution (BSI), developed a framework to support more proportionate and adaptive governance of innovation.

(iii) *Constructive Stakeholder Engagement (CSE)*<sup>5</sup> – takes account of a broad range of public views and stakeholder perspectives, including recommendations for responsible engagement as part of the PAGIT Framework.

(iv) *Responsible Innovation (RI)*<sup>6,7</sup> also part of the PAGIT approach, improves on EU and UK initiatives in RI from a company point of view, giving greater consideration to innovation and business-related issues than is currently the case, and extends beyond ethics and stakeholder engagement to develop a broad practice-oriented approach to the concept of responsibility.

Other issues including open source and intellectual property (IP) considerations, the need for more innovative funding models, industrial dynamics, and market related factors are considered where relevant.

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<sup>4</sup> Tait, J., Banda, G. and Watkins, A. (2017) *Proportionate and Adaptive Governance of Innovative Technologies: a framework to guide policy and regulatory decision making*. Innogen Institute Report to the British Standards Institution. <https://www.innogen.ac.uk/reports/1222>

<sup>5</sup> Lyall, C. and Tait, J. (2019) Beyond the Limits to Governance: new rules of engagement for the tentative governance of the life sciences. *Research Policy*. <http://authors.elsevier.com/sd/article/S0048733319300174>

<sup>6</sup> Tait, J., Brown, A., Cabrera Lalinde, I., Barlow, D., Chiles, M. and Mason P. (2021) Responsible Innovation: Its role in an era of technological and regulatory transformation. *Engineering Biology*, 5, 2-9. DOI: 10.1049/enb2.12005

<sup>7</sup> Tait, J. (Technical Author) (2020) *Responsible Innovation – Guide*. British Standards Institution, PAS 440.

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