



Innovative Medicines Initiative

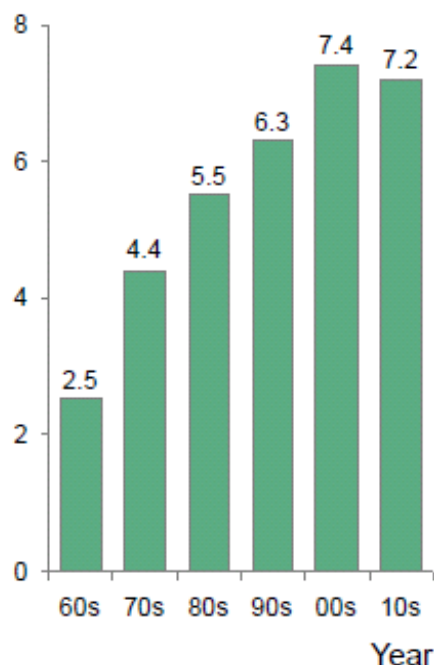
Open innovation: a new paradigm for industry- academia collaboration

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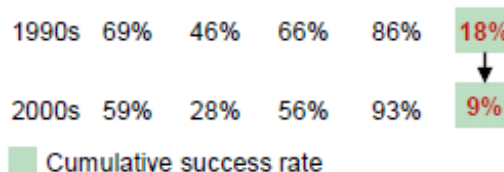
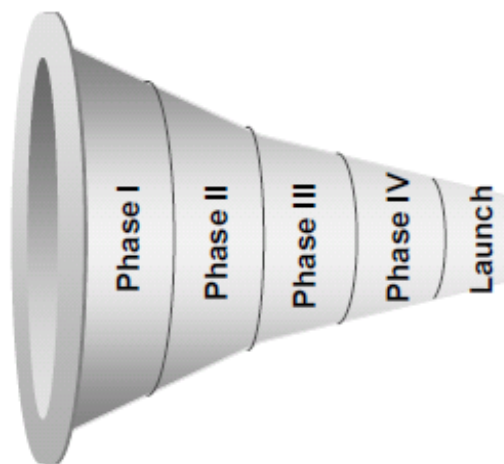
Increasing development time and declining success rates are escalating “value invested”

Expanding clinical timelines

Mean development time in years

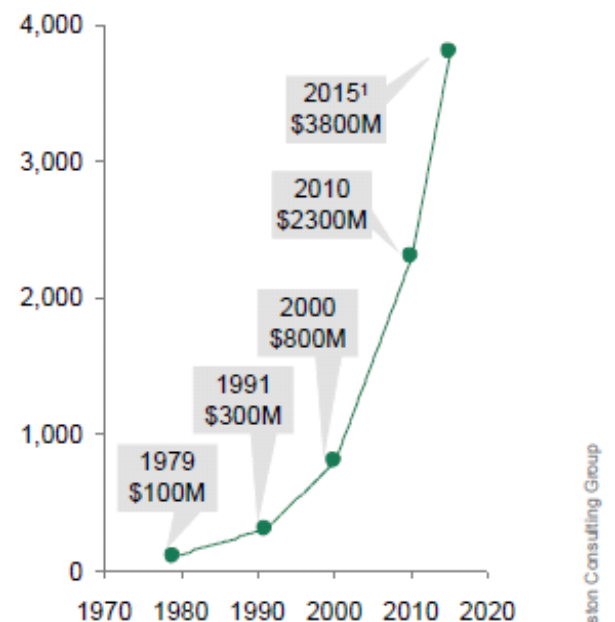


Deteriorating success rates



Rising R&D costs

Cost per molecule (incl. cost of failure) (\$M)



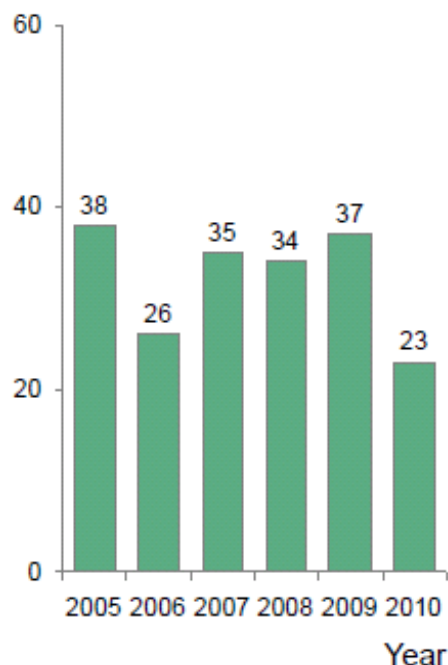
1. Theoretical extrapolation at historical CAGR of 10.6%

Source: Tufts CSDD; Perixel Bio/Pharmaceutical R&D statistical sourcebooks; CMR; BCG analysis

Lower innovation, higher regulatory hurdles and reduced sales realization are driving lower “value generated”

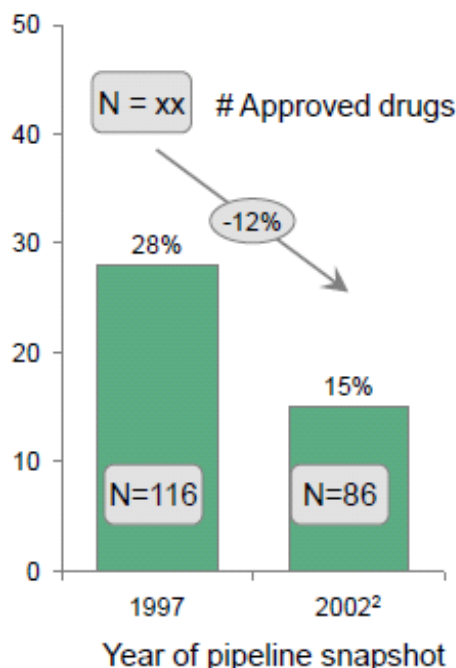
Drugs submitted for approval has been flat

NME¹ applications submitted



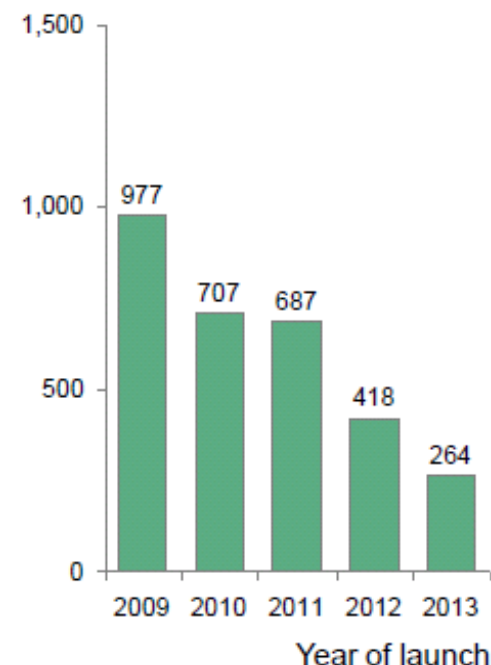
Declining approvals for new chemical entities

Pipeline approved till 2007 (%)



Downward trend forecasted in peak sales

Average peak sales (\$M)



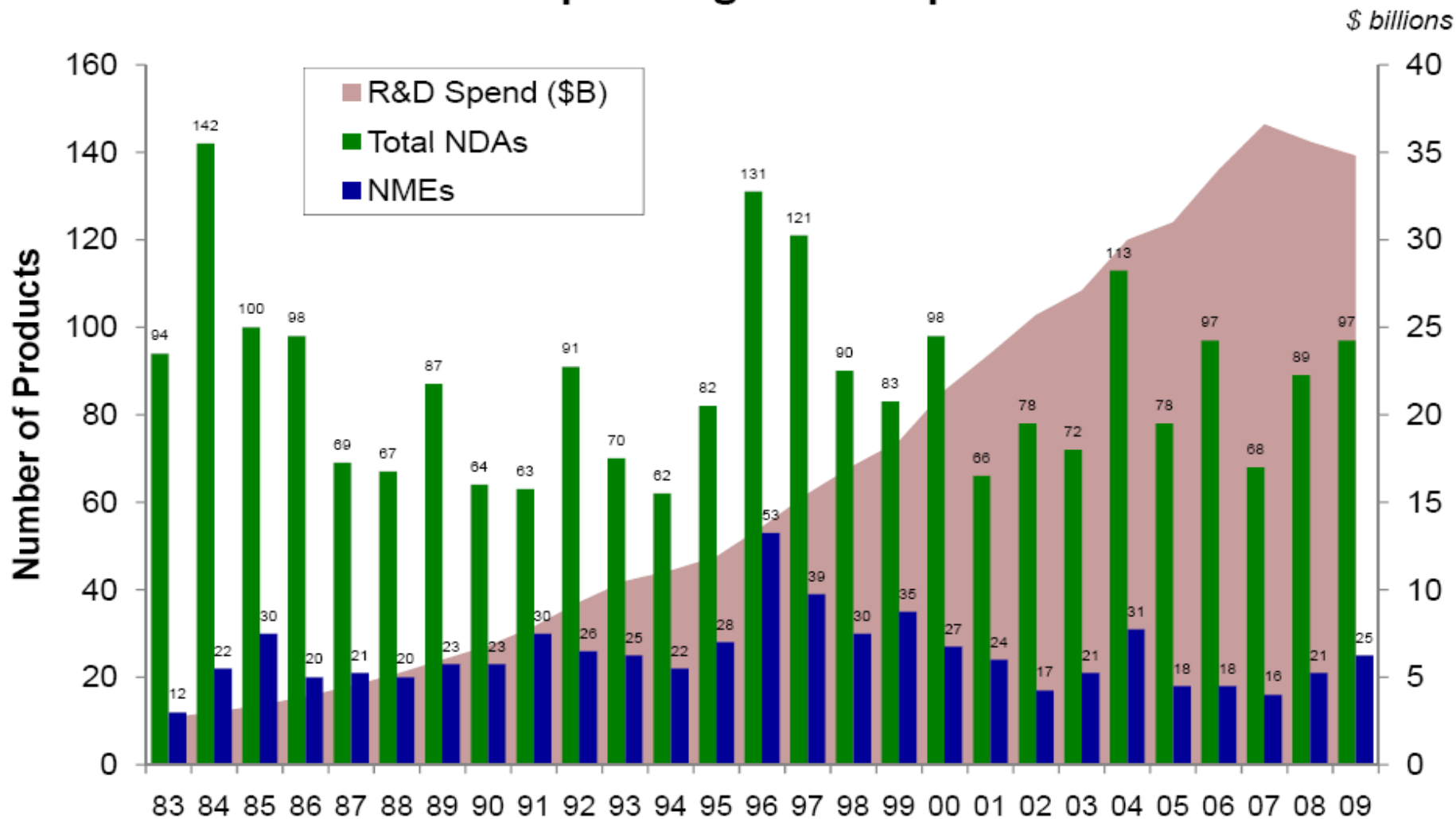
1. NME – New Molecular Entity (includes NDAs and BLAs) 2. Full pipeline lifecycle data required hence the age of the sample.

Note: Analysis includes chemical new molecular entities that were in Phase II to pre-registration pipeline in 1997 and 2002 respectively. Approval till 2007 has been considered for both 1997 and 2002 pipelines. Does not include biologics.

Source: CDER - FDA, Parexel Bio/Pharmaceutical R&D statistical sourcebook 2010/11, Evaluate Pharma, BCG Analysis

Two decades of struggle*

R&D Spending and Output



* Parexel; Defined Health analysis; FDA website; Phrma.org website; Includes Pharma Domestic Spend

R&D Strategy - continuously improving quality, novelty and cost-efficiency

Focus on the best science

Re-personalise R&D

Diversify through externalisation

Focus on return on investment



Bridging the gap – academia/ industry

A different pharma model

Open Innovation



Sharing risk



R&D leverages internal and external engines

41 Discovery Performance Units



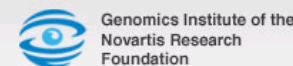
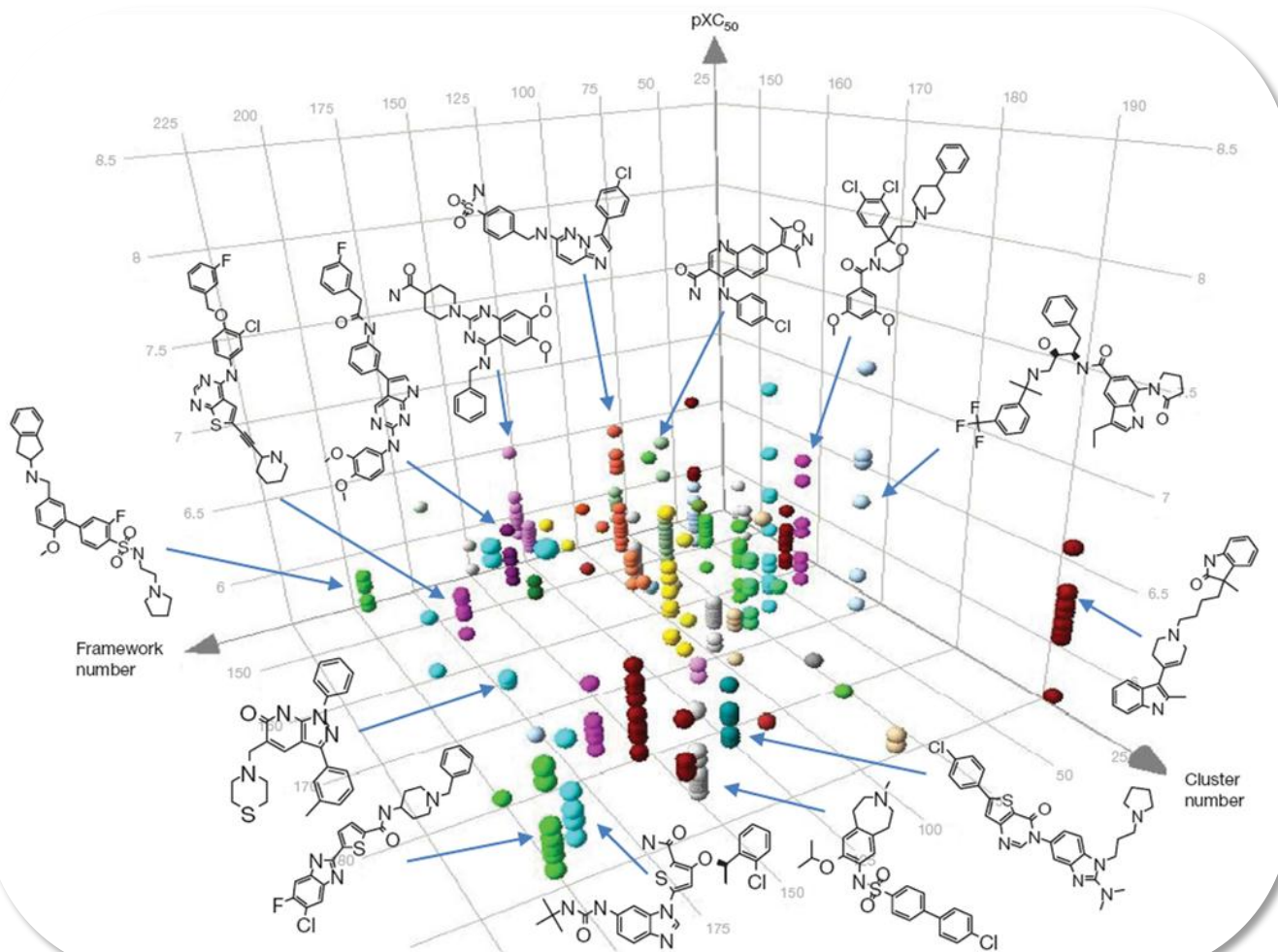
50 External innovation engines



External innovation engines are defined as: Partnerships of greater than £10m in value but focused on assets that are currently Pre-POC. List includes: In-licenses, option collaborations, technology deals which enable producing new molecules, and academic collaborations ultimately focused on producing new molecules

Open innovation: Collaborative research indicates a new way of working

Three-dimensional plot of some of the novel chemical diversity present in the Tres Cantos Anti-Malarial Set (TCAMS)



“Innovation is not a sausage machine”

*You get **innovation** when great universities, leading-edge science, world-class companies and entrepreneurial start-ups **come together***

*Where they **cluster** together you get some of the most **exciting** places on the **planet***

*That is where you find the **creative ferment** which drives a **modern dynamic economy***

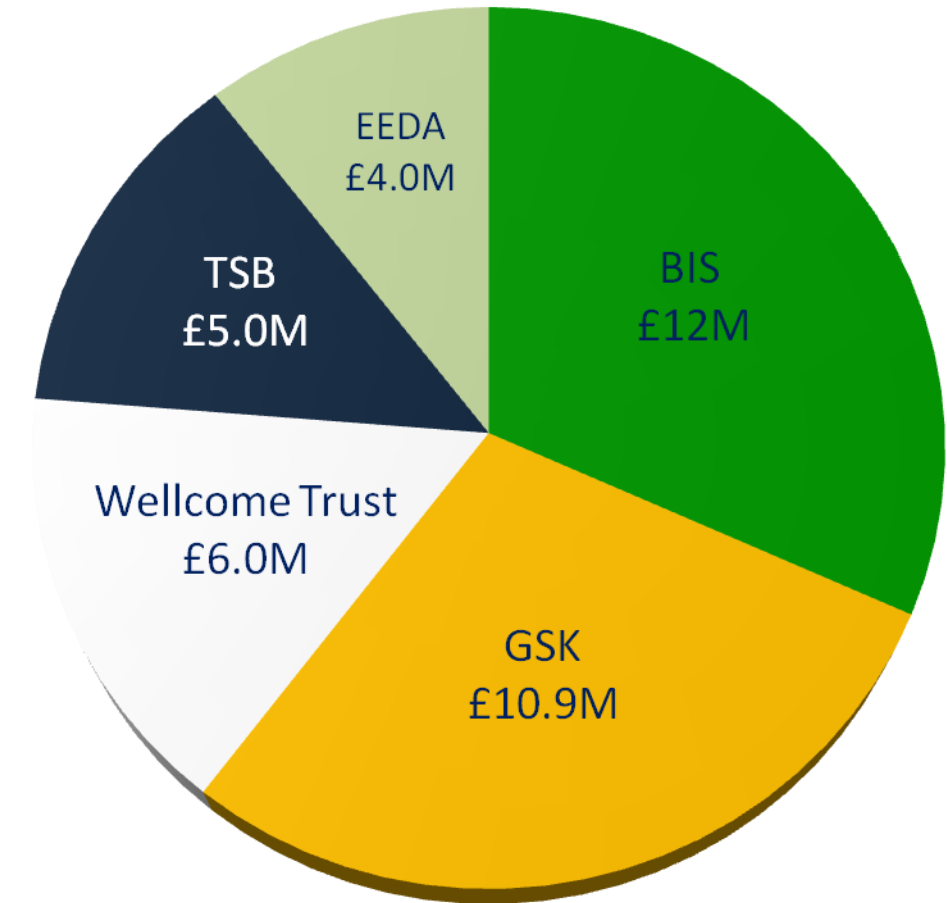
George Osborne,
Chancellor of the Exchequer,
Speech to the Royal Society, November 9, 2012

Open innovation: a new paradigm

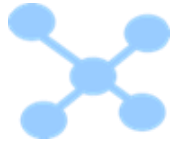


What is the Stevenage Bioscience Catalyst?

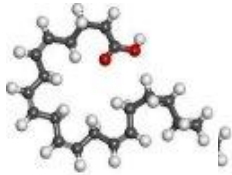
- **Purpose-built Open Innovation campus**
 - Support for “start-up” companies
 - Convenient location
 - Catalyst for innovation
- **Once complete – Phases 1 to 3:**
 - Up to 25 companies, including 5 new ventures
 - Over 1,500 additional jobs
- Initial funding of c.£38million for Phase 1:
 - Government’s Strategic Investment Fund (BIS)
 - Technology Strategy Board (TSB)
 - Wellcome Trust (WT)
 - East of England Development Agency (EEDA)
 - GSK (investment plus land)



Our Tenants:



Awridian



Arachos Pharma



UNIVERSITY OF CAMBRIDGE



Hodgson
Pharma
Consulting



SHYDEN
Harnessing nature's flexibility



Pharmidex

Promexus



TRN VIRTUAL
BIOINCUBATOR TRNX



Imago
Image Management and QA



Public-Private Partnerships



Nonclinical-Clinical Translational Research

– Cardiac Safety Research Consortium



– IMI SAFE-T translational safety biomarkers



– US FDA Critical Path Initiative on predictive safety biomarkers



– International Life Sciences Institute: Imaging, Cardiac Safety, Immunotoxicology, Nephrotoxicity



– Top Institute PK-PD modeling of CV effects



– Hamner Drug Induced Liver Injury Simulation Consortium



Predictive Safety

– Stem Cells for Safer Medicines



– preDiCT: Computational Prediction of Cardiac Toxicity



– IMI eTox in silico (SAR) prediction of toxicity



– US Tox21 (Toxcast) In silico and in vitro assay predictors of toxicity





Open innovation in
public-private consortia

Non-competitive collaboration
between large pharma companies

A new ecosystem for sustainable healthcare
across Europe, involving all stakeholders



New Biomedical PPP to be funded under H2020



- <http://efpia.eu/documents/48/63/SRA-PUBLIC-CONSULTATION>



Open innovation: a new paradigm for industry- academia collaboration



*Moving translational immunology forward through
public-private partnership – 26 August 2013, Milan*

