

# High Throughput Technologies in the Chemicals Sector

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Brokering and Innovating High Throughput Technologies  
for faster product and process development



*Setting standards  
in analytical science*

# High Throughput Technologies in the Chemicals Sector

- **Where are we now**
  - > what are high throughput technologies
  - > where are they being applied
- **What are the opportunities**
  - > vision and drivers
- **What are the barriers**
  - > what things are stopping us making progress
  - > what can we do about it



# What are High Throughput Technologies (HTT) ?

- **A generic term for a group of technologies incorporating:**
  - > **currently available technologies**
    - automation & robotics
    - screening and analysis
    - informatics & modelling
  - > **new platforms**
    - microsystems (microfluidics, microarrays ...)
    - new approaches to screening, experimental design etc.
  - > **applied almost exclusively in research & development**
- **Technology in which industry is ahead of academia**
- **A disruptive technology**
  - > **need to manage organisational and people impact as well as technological change**



**Where are they  
being applied ?**

**Inorganic Materials  
Nanoparticles  
Specialty Chemicals  
Formulation ....**

**Others**

**Home & Personal  
Care**

**Polymers**

**Catalysts**

**Pharmaceuticals**

1990

1995

2000

2005

2010



# HTT in action



**A drug discovery 'factory'**



**Dispensing robot**



**Microfluidic device**



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# Insight Faraday

- a UK Government funded activity, supported by the Research Councils
- a small team focused on improving innovation through the effective deployment of HTT
  - creating partnerships, particularly industry-academic
  - stimulating research to fill gaps
  - looking for opportunities to transfer
    - technology
    - knowledge
    - people
  - improving the supply of trained scientists and technologists
  - providing services to industry



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# InsightFaraday Purpose

InsightFaraday's aim is to transform the research and development processes in a range of industry sectors in order to

- increase the rate of product & process innovation,
- identify new product options with greater confidence
- reduce time to market and
- improve the competitive position of UK companies.

This will be achieved predominantly by improving R&D output and productivity through the deployment of HTT



## Insight Faraday - basic premise

- a range of high throughput technologies is now available on the back of the drug discovery revolution
- there are huge potential advantages from applying these in other sectors

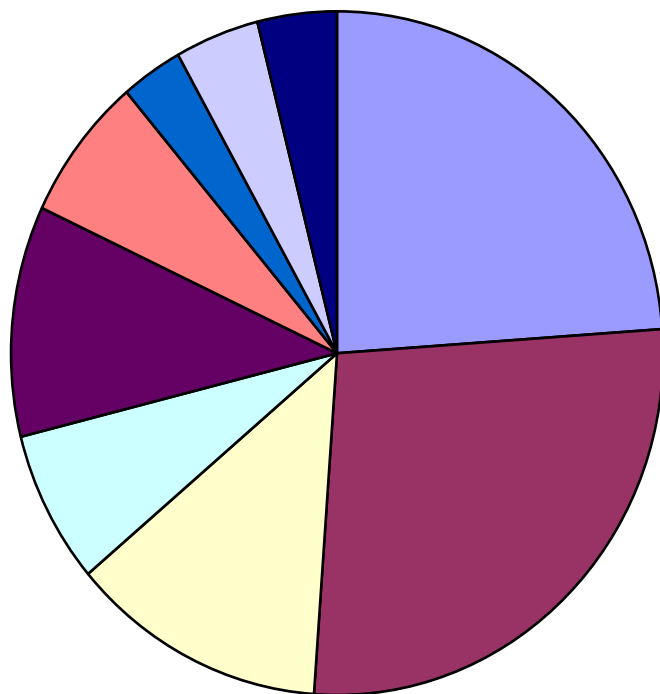
### **BUT**

- there is still more research and development needed
- there is a shortage of skilled practitioners
- technology transfer won't happen on its own





# Insight membership by sector



- Chemicals
- Pharma/Bio
- Materials
- Oil & Gas
- Home & Personal Care
- Catalysts
- Food & Drink
- Healthcare
- Analytical Services



# How has the Pharmaceutical Sector accommodated HTT ?

- **High throughput approach has evolved**
  - > not aiming to make as many compounds as possible
  - > selective through intelligent use of informatics, modelling etc.
- **The complete cycle has been automated, including**
  - > synthesis
  - > assay
  - > purification
  - > analysis / characterisation
- **Systems introduced for managing the process**
  - > experimental design
  - > data handling
  - > scheduling



# The HTT Supply Chain

## Knowledge Base

- academic centres
- UK & international
- large pharma

## HTT Suppliers

- major instruments
- automation & robotics
- novel devices
- integrators
- many SME's

## End Users

- pharma discovery
- chemistry users
- small biotech
- large companies R&D
- little uptake by SME's



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## Drivers for HTT (sector-dependent)

- **Increased R&D productivity**
    - > more new compounds per unit cost
    - > formulations optimised for a particular purpose
    - > faster development of a viable manufacturing process
  - **Increased innovation to revitalise business**
  - **Broader IP coverage**
- **Reduction in time to market**
- **Improved competitive position**



# Barriers to Uptake of HTT

- **Awareness**
  - > what is possible with HTT
  - > where to find it
- **Cost-effective access to technology**
  - > lowering of entry cost
  - > access to facilities and skilled personnel for
    - training
    - evaluation
    - running projects
- **and there are some things we can't do ...**

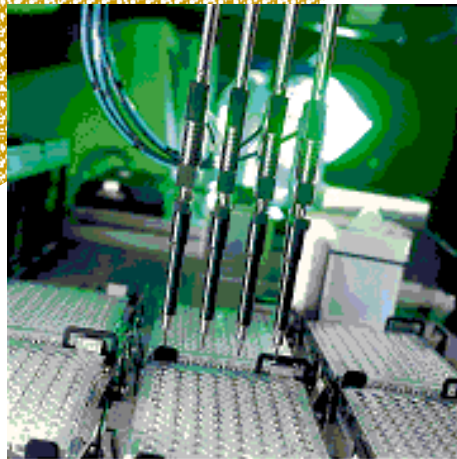


## So what can we do about it ?

- **Help industry gain access to HTT facilities**
- **Influence the UK Government to fund areas of need (DTI, regions ..)**
- **Stimulate new R&D to fill long term gaps**
- **Catalyse technology transfer to address short term issues**
- **Provide guidance on HTT implementation**
- **Provide vehicles for practitioners to share experiences**



# Laboratory Audit Service



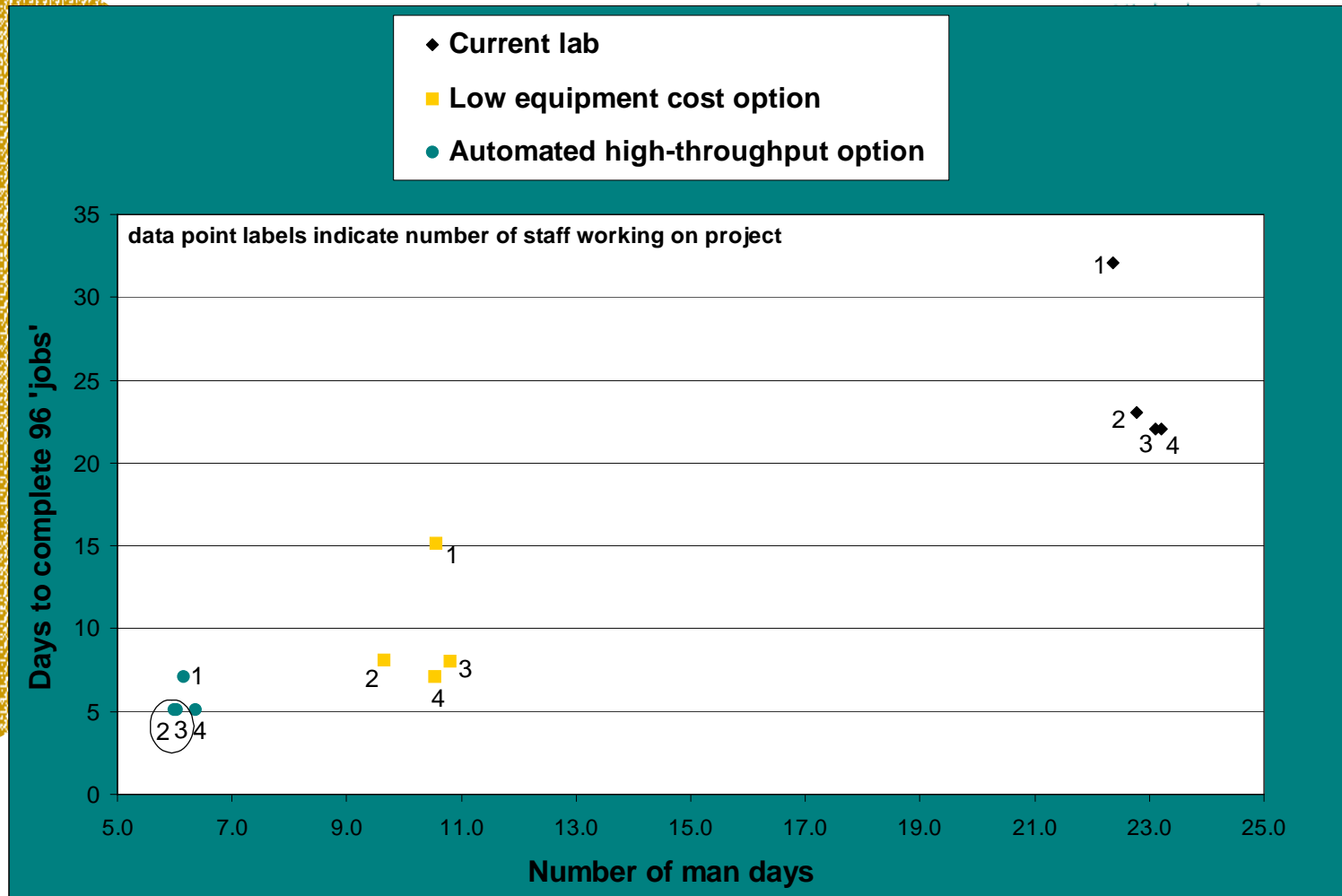
- ▶▶ Quantify the Benefits of HTT
- ▶▶ Maximise Efficiency
- ▶▶ Capitalise on Investment

...boost R&D productivity



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# Case Study: Formulation Laboratory



► **Model predicts a 4-fold increase in throughput**

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# Exploiting HTT in the Chemicals Sector

- **The uptake of HTT is still low**
  - > we can learn from sectors who have solved some of the problems
  - > this meeting will enable you to get information about
    - what others are doing
    - what technologies are available
  - > and InsightFaraday can provide further help and contacts if you need them
- **High Throughput Technologies will be a key enabler to ensure the prosperity of the Speciality Chemicals sector in the 21st century**

