UNIVERSITY OF EDINBURGH
Business School

Building Science-Business Partnership Workshop

Enterprising Scientists!

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MARIE CURIE ALUMNI ASSOCIATION
ANNUAL CONFERENCE

Enterprising Scientists!

Summary

- Who I am and what I do in my day job.
- ***Being Enterprising***…..making things happen!
- Some insights from the European project - **HEKATE**
- ***Impacts of collaborative doctoral students -*** Working collaboratively between science and business – some research findings
- ***Mobility and Enterprising Scientists in Europe and beyond***

Some contexts we are in…..

- Across Europe one in ten doctoral graduates go on to become

‘self-employed’ (Auriol, 2010).

- almost 15% of all employed people in the UK are ‘self-employed’ (2014)
- Lord Young (2014) “enterprising attitude is important amongst all people”
- “Small Business Charter” – linking Business Schools and SMEs
- 60-70% of doctoral graduates work outside the academia (UK Vitae figure)

Being Enterprising… making things happen

Enterprising Scientists		
Academic entrepreneur – building enterprising academic career at the University e.g. University spin-offs; industry collaborations	***Scientific/Tech entrepreneur*** – starting-up firms; working in industry, sometime between the university and industry	***Intrapreneur –*** working in R&D/innovation within corporate organisations Corporate spin-outs

Being Enterprising… making things happen

- Choose your mission
- Make sure you understand:
  - the opportunity
  - the route to market/business
  - what success should look like
- Decide what resources, expertise and help you need to succeed
- Balance boldness/caution
- Identify when the job is done – move on?

HEKATE project (2013-2015)

hekate.tutech.eu/project/

Enterprising Scientists

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MANCHESTER 1824
The University of Manchester

HEKATE

Lifelong Learning Programme

HEKATE workshops

- Our target was **PhD and Early career Post-doctoral researchers** in STEM subjects
- Our aim was to inspire and excite the workshop participants to be "**enterprising scientists**" in their careers, be that in a university, a global multi-national enterprise (MNE), small and medium enterprise (SME), or as the founder of a start-up/spin-out.
- Collaborating with a variety of external industry organisations (university start-ups, EIRMA members, venture capital…) and internal academics, who provided "**role models**"

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Technische Universität Hamburg-Harburg

HEKATE

Lifelong Learning Programme

Day 1
The Enterprising Scientist - Experiences from academia, a large corporation and a high-tech SME - The Entrepreneurial Commercialisation of Knowledge - Views from practitioners
Day 2
Enterprise in Career, Contexts and Practice - **Special Panel Session: The Enterprising Scientist** – making a career with enterprise - **From Idea to Reality – industrial case studies** (EIRMA contribution); **Idea pitch** - Stakeholder Management

HEKATE workshops
EIRMA session contributors

Thierry Piret - Head of Solvay Ventures

- *Corporate venturing - case studies/group exercise*

October 2014

Kevin De Caluwé – Global Innovation manager, Bekaert

- *Innovation portfolio management – idea development/group exercise*

March 2015

The Enterprising Scientist – Making a career with enterprise in Manchester

- **Dr Farid Khan** – Med tech entrepreneur; Chief Scientific Officer, Protein Technologies
- **Dr Curtis Dobson** - Academic entrepreneur; University of Manchester/Founder, Ai2
- **Dr Veronica Sanchez Romaguera** – Enterprise lecturer; formerly senior researcher at Omic; Nanoco technologies.

HEKATE outcomes….
Connections and Mentoring between universities and industry

Nurturing *Enterprising Culture* is important

- Enterprising aspirations among scientists differ due to variations in salient "informal institutions" (Erikson et al., 2015)

- the relationships between scientific excellence and enterprising activities (Larsen, 2011; Wigren-Kristoferson et al 2011)

- prior (non-academic) experience is important for enterprising endeavours in academia – but, complex implications for recruitment, reward/recognition and promotion.

University-industry collaboration and human mobility

As Perkmann and Walsh argue (2007, p.263):

- *Relationships will often occur in conjunction with **human mobility**: for example, when companies sponsor Ph.D. studentships. In fact, in many cases, mobility can be intrinsic to relationships if it occurs within the context of specific collaborative projects.*

It is also acknowledged that understanding on the **educational impact of university-business collaboration** is limited (Healey et al., 2014).

Collaborative doctoral students - Embedded Knowledge Exchange Mobility

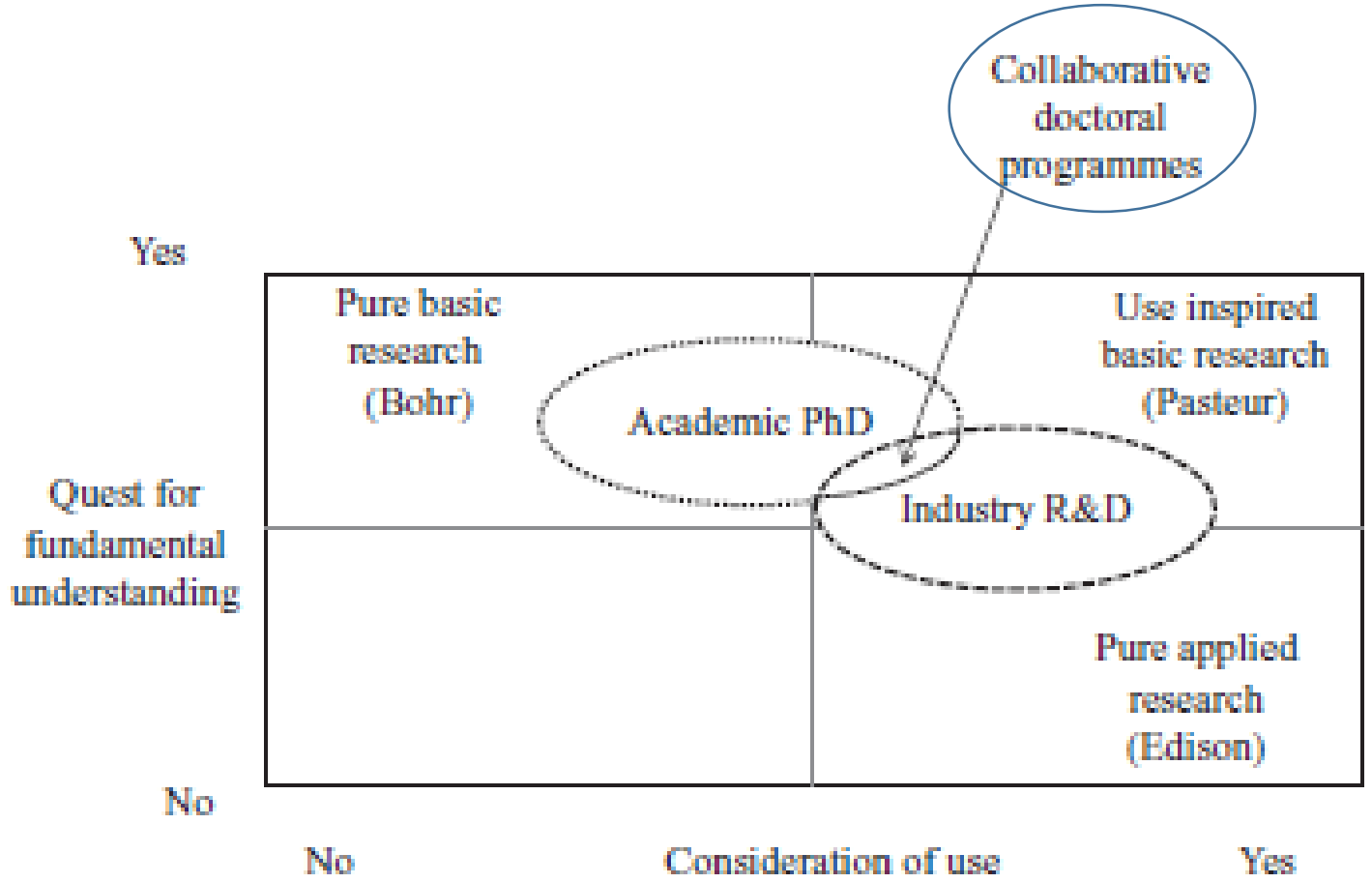


Figure 1 Positioning collaborative doctoral programmes in Stokes' (1997) quadrant

(Kitagawa 2014)

Four routes to impacts of Doctoral students working with industry

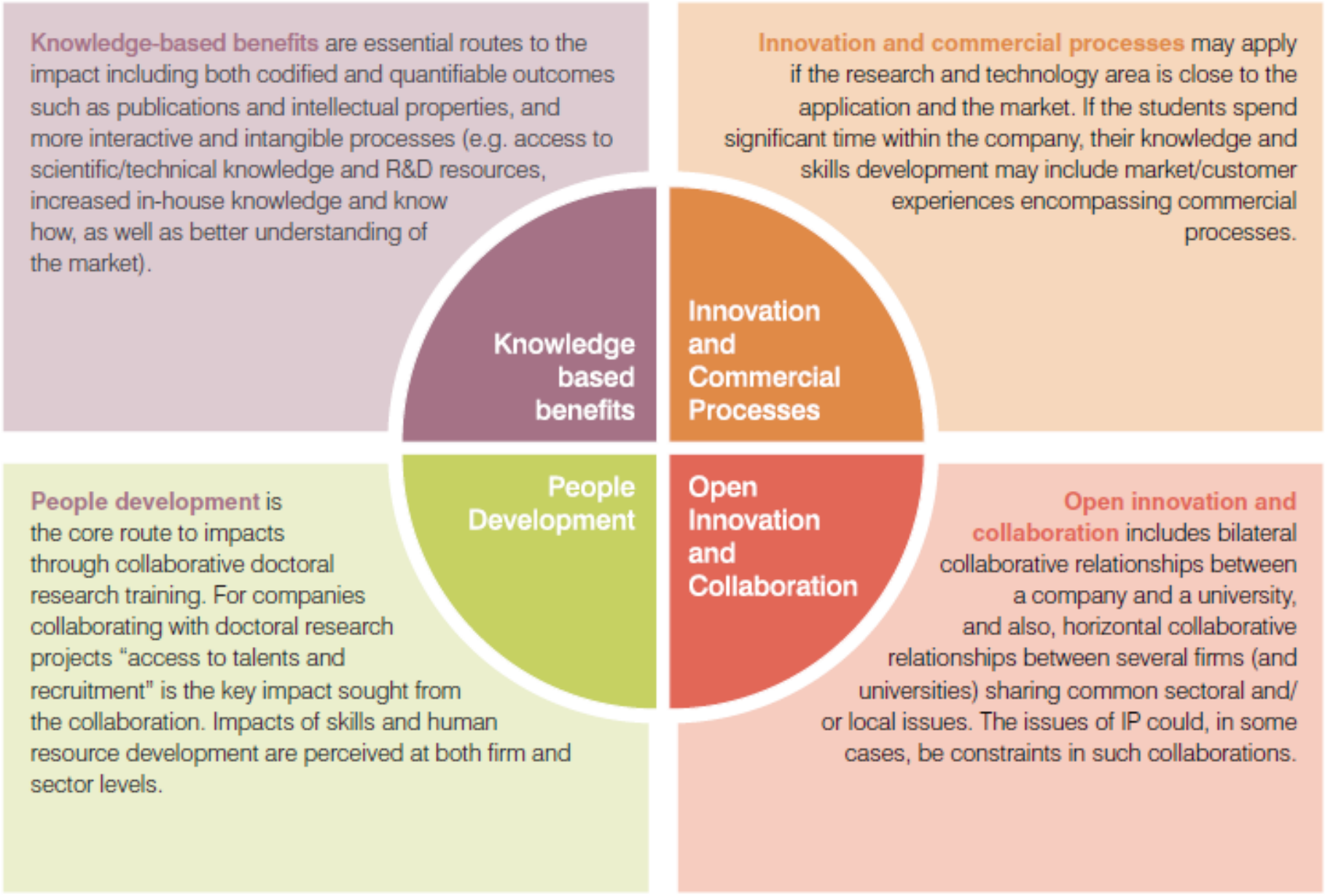
http://www.business-school.ed.ac.uk/research-report/four-routes-to-impacts

Asked sponsoring companies about EngD/IDC impact in relation to CASE PhD, KTP etc

- Most of the collaborative doctoral research training would have **“Knowledge-based benefits”** and **“People development”**.
- “**Open innovation and collaboration**” - Sector specificity plus centre strategies
- “**Innovation and commercial processes**” – close contact to the market – IDC uniqueness

Most of the companies collaborating with doctoral research projects state that **“Access to talents and recruitment”** is the key impact sought from the collaboration.

What industry says - Four Routes to Impacts



Knowledge based benefits

Access to scientific/technical knowledge and R&D resources

- Access to expertise (e.g. university professors; researchers)
- Access to and use of university research infrastructures
- Access to cutting-edge R&D activities at the university
- Deeper understanding of strategic research areas

Increased in-house knowledge, know-how and R&D resources

- New data, techniques, technology, methods, and process
- Development of new devices and equipment as a result of collaboration

Knowledge returning back to academia from industry collaboration

- Improvement of teaching methods and curricula
- Increased knowledge on commercialisation opportunities and skills

Codified knowledge

- Publications
- *No. of scientific papers and conference papers by the doctoral students*
- *No. of co-authored scientific papers and conference papers*
- Patents, licenses
- *No. of patents filed*
- Doctoral theses defended
- *No. of theses defended*

Better understanding of the market and customers

- Identification and understanding of new markets
- Identification of customers
- *No of training courses in business, accounting and finance, or marketing attended*

Innovation and Commercial Processes

Innovation

Technological innovation

- *No. of new or improved technologies*
- *Increase in Technology Readiness Levels (TRL)*

Exploitation of intellectual properties

- *No. of patents granted*
- *No. of licence deals*
- *No. of spin-outs/new ventures created*

Product innovation

- *No. of prototypes*
- *No. of new or improved products launched*
- Service innovation
- *No. of new or improved services launched*

Business innovation

Process innovation

- *No. of new or improved processes developed*
- Organisational/management innovation
- *No. of new units and systems developed*

Production innovation

- *No. of new or improved production systems developed*

Marketing innovation

- *New sales approach and financial arrangements*
- New business model

Business impact

- *Cost saving*
- *Time saving*
- Reduced time to the market
- *Return on Investment (ROI)*
- Increased competitiveness in the industry

Market impact

- *Growth of market share*
- Access to existing and new markets (national and international)
- *No. of new customers*
- *Increase in sales*
- *Increase in turnover*
- Creation of new markets

People Development

Access to talents/recruitment

- Reach bright students
- Potential future employees
- *No. of doctoral graduate recruitments after the programme at the sponsoring company*

Access to business training both by doctoral students and existing staff

- *No. of technical training courses attended*
- *No of training courses in business, accounting and finance, or marketing attended*
- *No. of CPDs for employers' staff*

Work-based training and learning (for company employees)

- Experiences of supervising R&D projects for the industry supervisor
- Development and retention of existing employees enrolled on doctoral programmes
- *No. of staff promoted to R&D manager*
- *No. of staff on professional development courses and their retention*

Subsidised R&D workforce and cost saving

- Extra capability with reduced cost, depth of core technology area and short term delivery ability
- Reduced cost of training/recruitment
- R&D personnel development with market/customer experiences

Sector level human resources and future leadership

- Talented people/future leaders attracted to the sector, especially in the competitive labour market
- *No. of post-programme doctoral graduate recruitments in the sector*
- *Routes to the Chartered status developed through doctoral training*
- Networks/social capital developed among doctoral students trained on the same programme

Open Innovation and Collaboration

Enhanced collaboration with academia

- Relationships with academic supervisors developed throughout the doctoral project
- Further utilisation of academic expertise beyond the doctoral project
- *No. of co-authored scientific papers and conference papers*
- Use of the university equipment and facilities beyond the doctoral project
- New relationships developed with other units in the university (e.g.TTO and other research groups)
- Organisational changes implemented to better adapt to collaborative research
- *Contact person appointed for academic collaboration*

Research networks, R&D capabilities and collaborations

- Networks developed with academic communities through doctoral projects/doctoral centres
- *No. of new collaborative projects with academia*
- *No. of new collaborative projects including those involving students (MSc, PhD, EngD, KTP etc) and post-doc researchers*
- *No. of applications to new research grants*
- *R&D investment generated*
- *Expectation at the outset of the collaboration*
- *Current and future positions*

Collaboration and networks in the sector(s)/technology areas

- Networks with other firms developed through doctoral projects/doctoral centres
- *Contacts and networks with other businesses*
- *No. of events and conferences attended*
- *Co-funding of R&D projects between industry partners*
- Supply chain innovation
- Demonstrating and developing clusters of companies for R&D collaboration
- Technology platforms

Local and regional development

- Collaborative relationships developed with a local university/ research organisations
- Collaborative R&D relationships developed with firms in the local area
- *No. of local cluster memberships, and links to local SMEs/ intermediaries*
- Local supply chain development/ local technology platform

Standard, Visions

- Strategic visions for the sector developed (e.g. skills gap, technology roadmap)
- Influencing stakeholders with new knowledge, standards, and regulations

Mobility and Enterprising Scientists in Europe and beyond

- the ***mobility*** of scientific researchers at various stages of their careers

- Geographical mobility; cross-sectoral (Science-Business) mobility

- Implications for recruitment, reward and promotion.

- How do we capture ***long term impacts of mobility***? (e.g. career trajectories, scientific excellence and enterprising/innovation activities)

- How can Science-Business partnership ***build capacity*** for the future?

- Mentoring, role models, use of social media…..?

Thanks for listening!

Additional information -

- http://www.aengd.org.uk/news/news-releases/engineering-doctorate-benefits-uk-plc-identified/
- http://www.business-school.ed.ac.uk/research-report/four-routes-to-impacts

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