

If Used It Must Be Cited



New developments in the movement of ideas: from technology transfer to knowledge exchange

Michael Kitson
Judge Business School, University of Cambridge and UK-Innovation Research Centre

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Imperial College
London



The evolution of university-business links

- Mode 1: the 'laissez faire' model
 - Importance of chance, luck and serendipity
- Mode 2: technology transfer - the entrepreneurial university
 - Focus on a narrow range of technology **transfer** mechanisms
- Mode 3: knowledge exchange - the connected university
 - Focus on a wide range of interactions
 - **Exchange** rather than transfer

Mode 1: the laissez faire model

- Universities focussed on two missions – research and education
- Example: the ‘Cambridge Phenomenon’ initially developed when the University took little active interest in business engagement. In the past:
 - University largely ignored IP issue
 - Adopted a liberal attitude to what academics did
 - Industrial liaison merely acted as ‘window’ on what the university did – little exchange or dialogue



Survey of
22,000
Academics

Survey of
2,500
Businesses

Mode 2: technology transfer - the entrepreneurial university

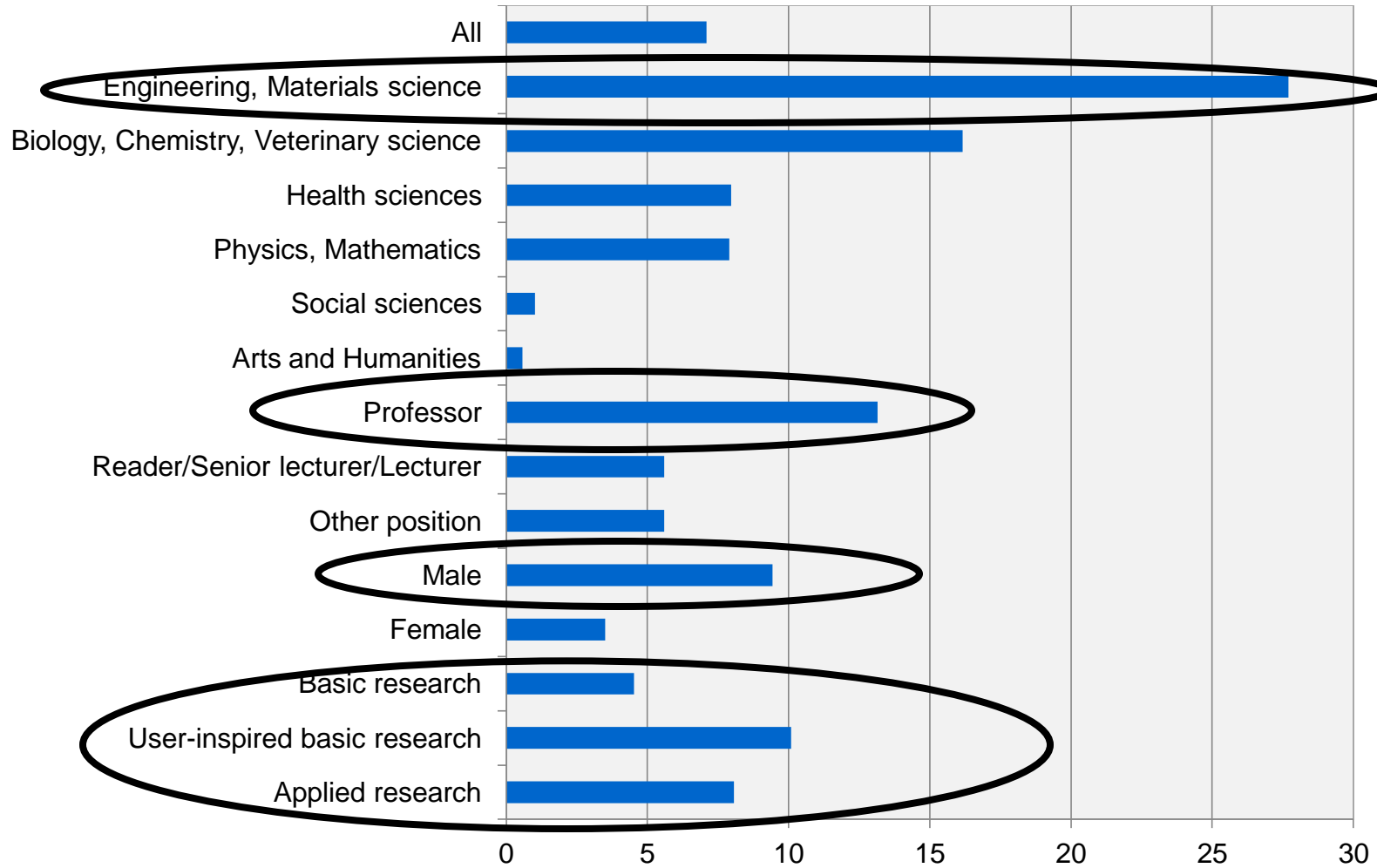
- Focus on Technology Transfer
- Mechanisms: Patents, Licenses, Spin-outs



Technology Transfer in the UK: Commercialisation Activities by Academics in the previous 3 years

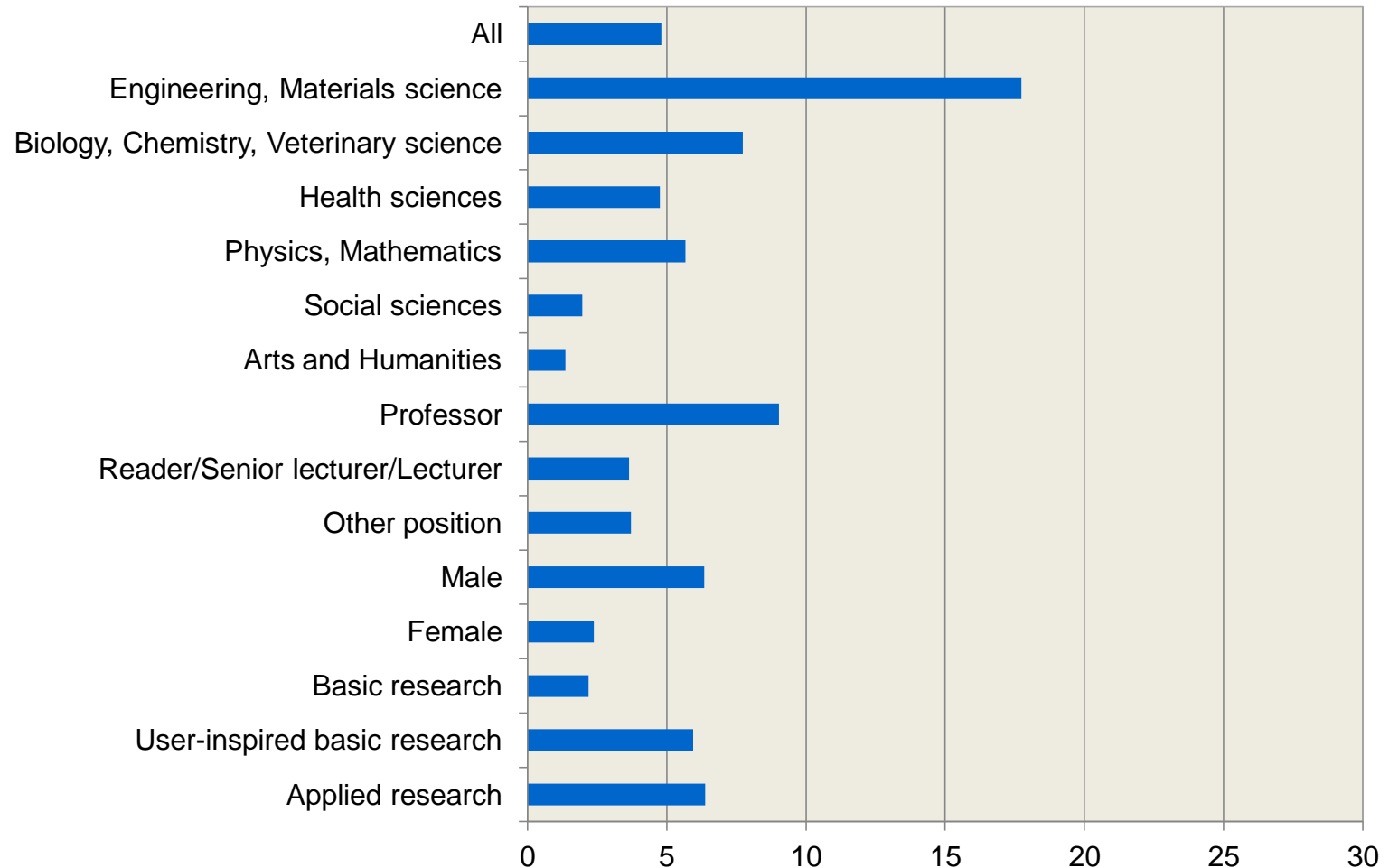
- Patents (7% of academics)
- Licenses (5% of academics)
- Spin- outs (4% of academics)

Taken out a patent in the last 3 years (% of respondents)



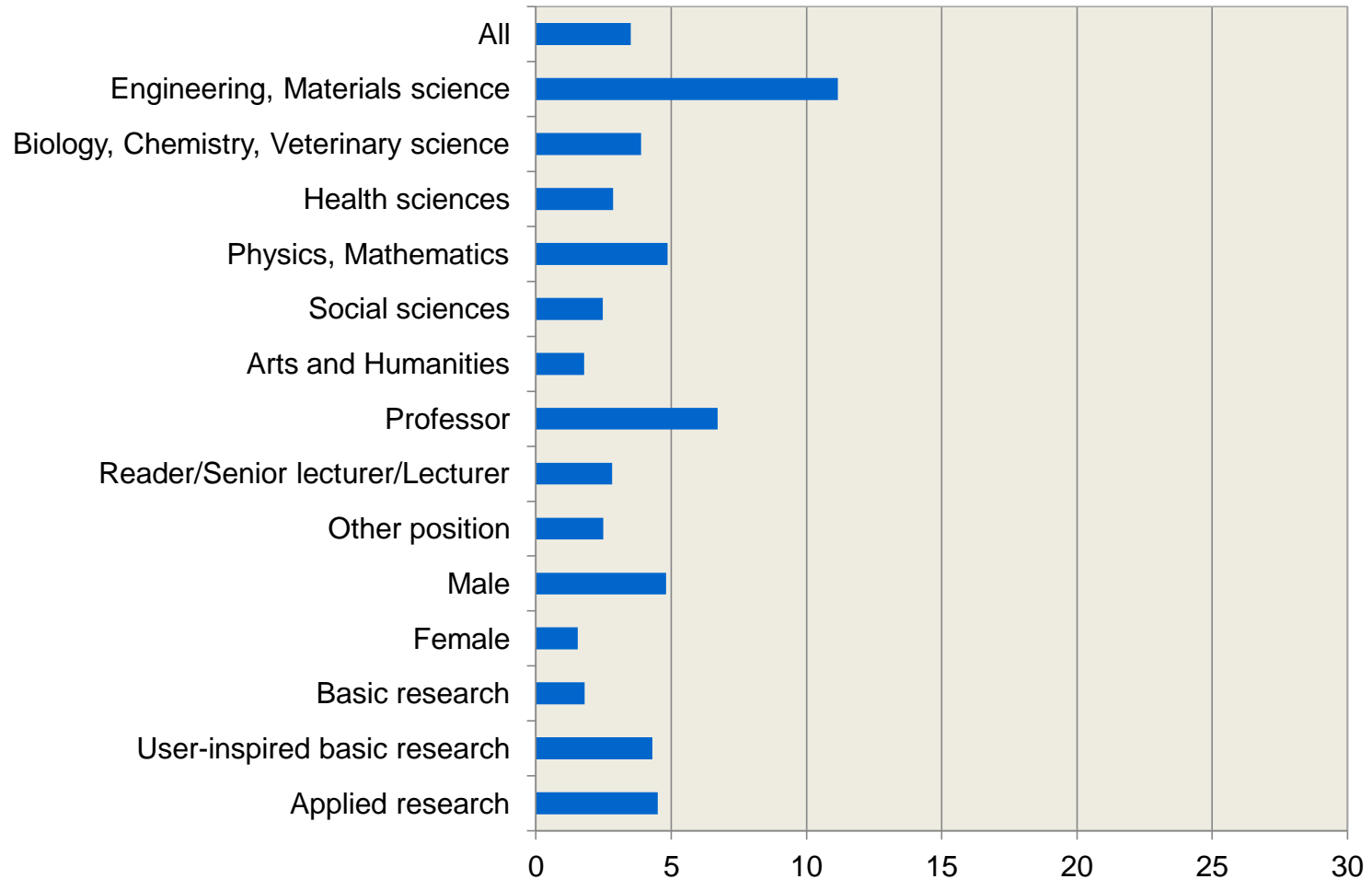
Source: Cambridge Centre for Business Research Survey of Knowledge Exchange Activity by UK Academics (Hughes, A., Kitson, M., Abreu, M., Grinevich, V., Bullock, A. and Milner, I.) UK Data Archive Study Number 6462.

Licensed research outputs to a company in the last 3 years (% of respondents)



Source: Cambridge Centre for Business Research Survey of Knowledge Exchange Activity by UK Academics (Hughes, A., Kitson, M., Abreu, M., Grinevich, V., Bullock, A. and Milner, I.) UK Data Archive Study Number 6462.

Formed a spin out company in the last 3 years (% of respondents)



Source: Cambridge Centre for Business Research Survey of Knowledge Exchange Activity by UK Academics (Hughes, A., Kitson, M., Abreu, M., Grinevich, V., Bullock, A. and Milner, I.) UK Data Archive Study Number 6462.

Limitations of the entrepreneurial university

- Significant economic and social returns but financial and private returns were frequently over-estimated
- Metrics distorting behaviour (Goodhart's Law: any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes)
- Model is incomplete

STANFORD
UNIVERSITY

Google™

Stanford Office of Technology Licensing

- 65% of licensing earnings came from just 3 of the 8000 inventions which have passed through the doors of the OTL at Stanford
 - Google's improved hypertext searching: \$337 million
 - DNA cloning: \$255 million
 - Functional antibodies: \$229 million
- Stanford struggled to put a value on Google and opted for 2% of equity, and immediately cashed out post-IPO

(Source: Katherine Ku, Director of Stanford University's Office of Technology Licensing)

\$150 million. Royalties received by the University of Florida from sales of Gatorade developed by inventor Dr. Robert Cade





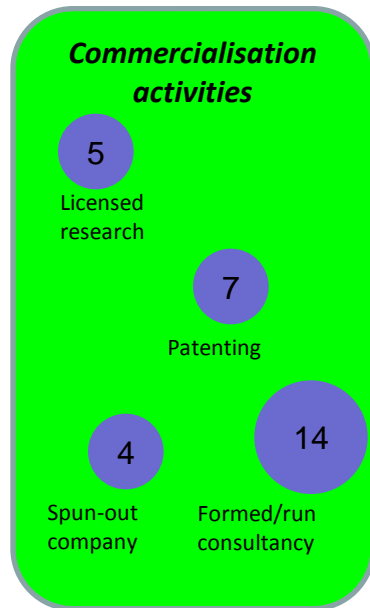
Mode 3: knowledge exchange - the connected university

- Multiple knowledge exchange mechanisms
- Role of many disciplines (not just STEM)
- Interactions with public and third sectors as well as with business
- Public space functions (**Universities do not move!**)
 - Relatively neglected, but distinctive
 - Includes networking, social interaction, meetings, conferences etc
- Focus on ‘exchange’ not simply ‘transfer’

Other types of interactions beyond technology transfer

- People based activities
 - Training, networks, conferences etc
- Problem-solving activities
 - Contract research, joint publications, informal advice etc
- Community based activities
 - Lectures for the community, exhibitions, school projects

Commercialisation Activities in the UK

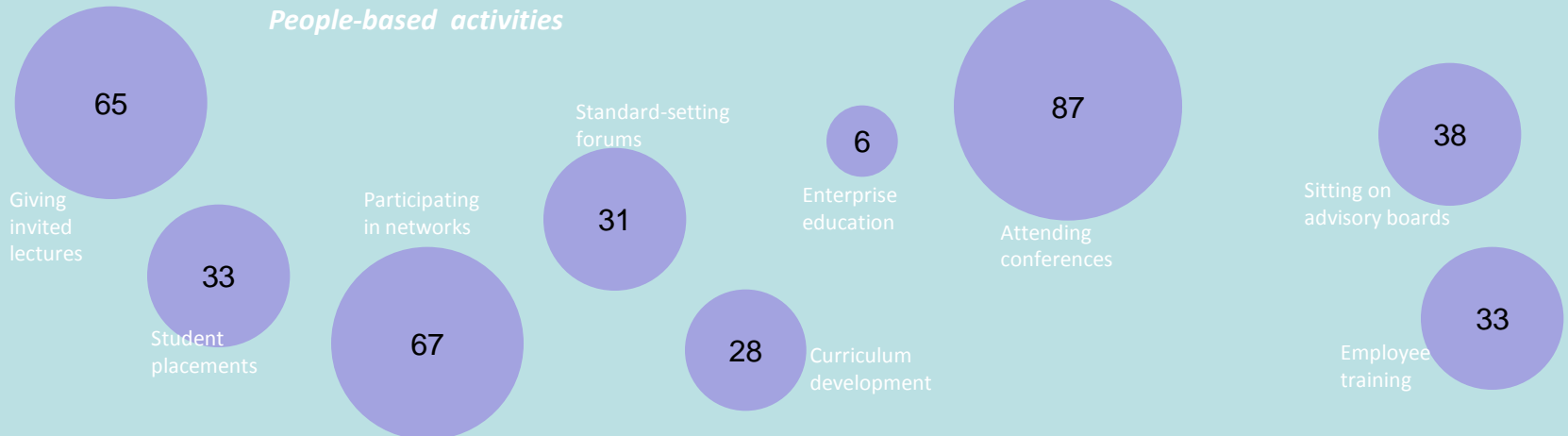


Format adapted from Ulrichsen (2009)

Abreu, Grinevich, Hughes and Kitson (2009)

All Interactions for UK

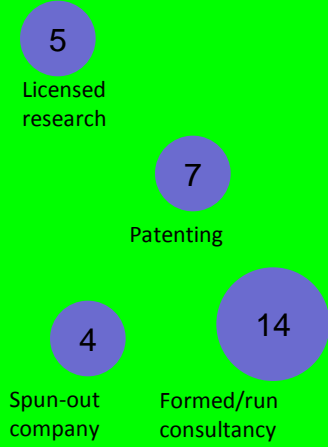
People-based activities



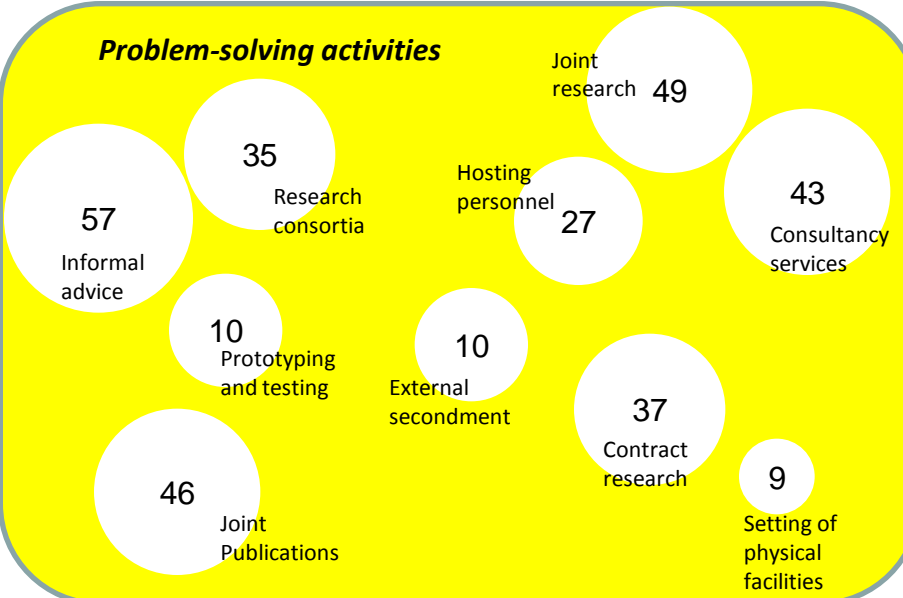
Community-based activities



Commercialisation activities



Problem-solving activities



Format adapted from Ulrichsen (2009)

Abreu, Grinevich, Hughes and Kitson (2009)



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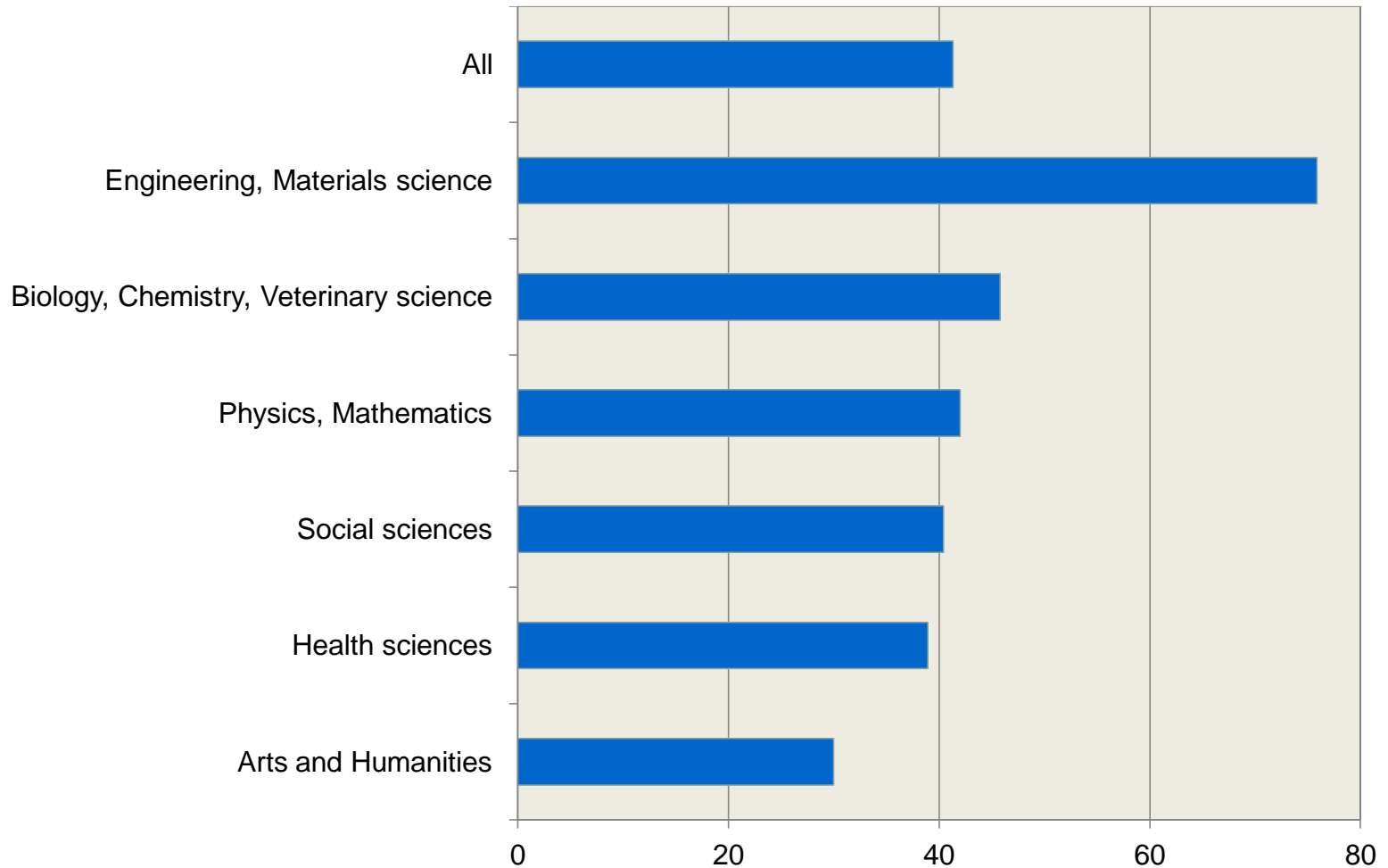
Who do academics partner with?

- Private sector companies across a range of sectors (40% of academics)
- Public sector - UK and abroad (53% of academics)
- Third sector – including charities, non-profit organisations and social enterprises (44% of academics)

Source: Cambridge Centre for Business Research Survey of Knowledge Exchange Activity by UK Academics (Hughes, A., Kitson, M., Abreu, M., Grinevich, V., Bullock, A. and Milner, I.)

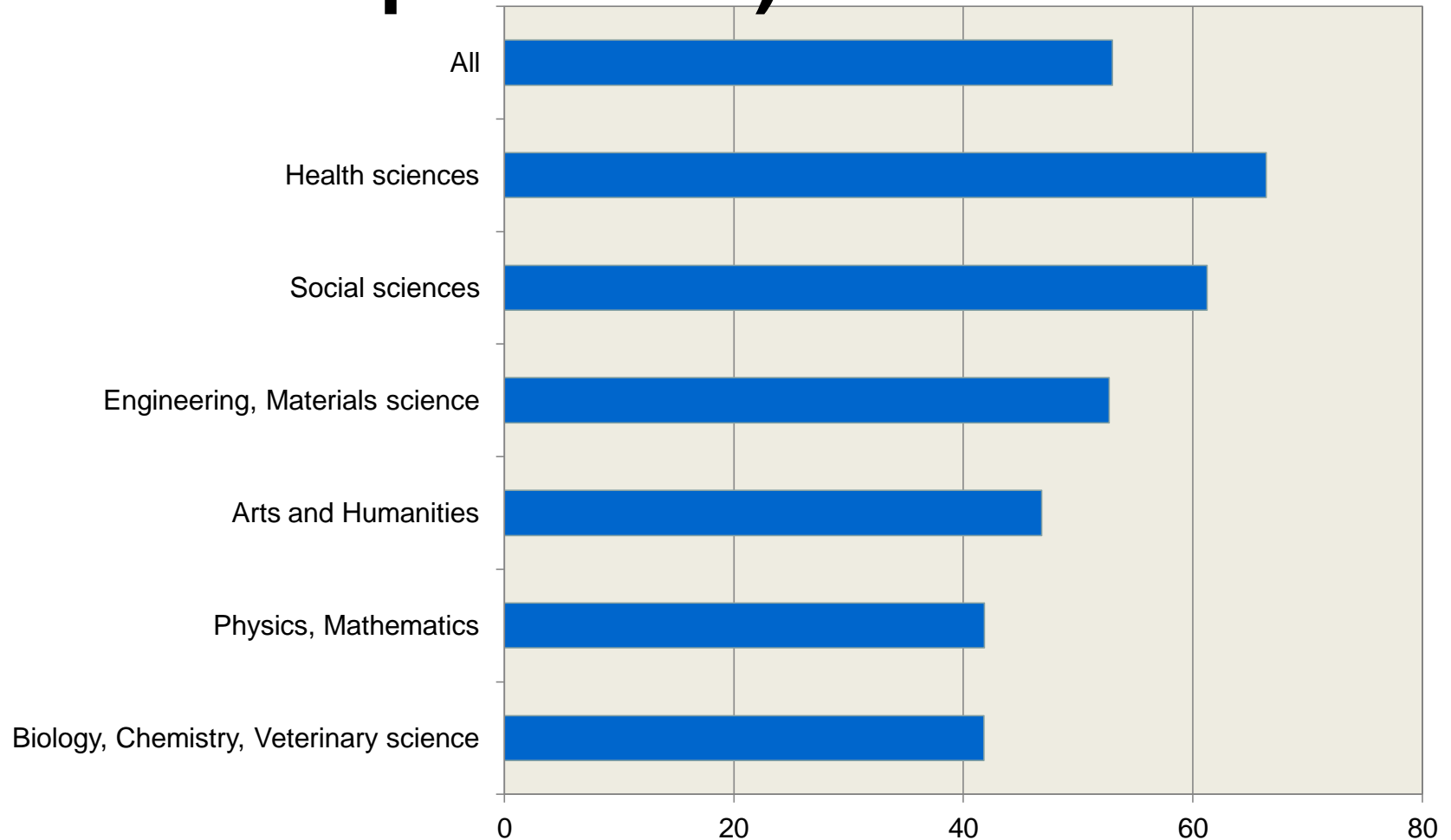
UK Data Archive Study Number 6462.

Interactions with private sector companies (% of respondents)



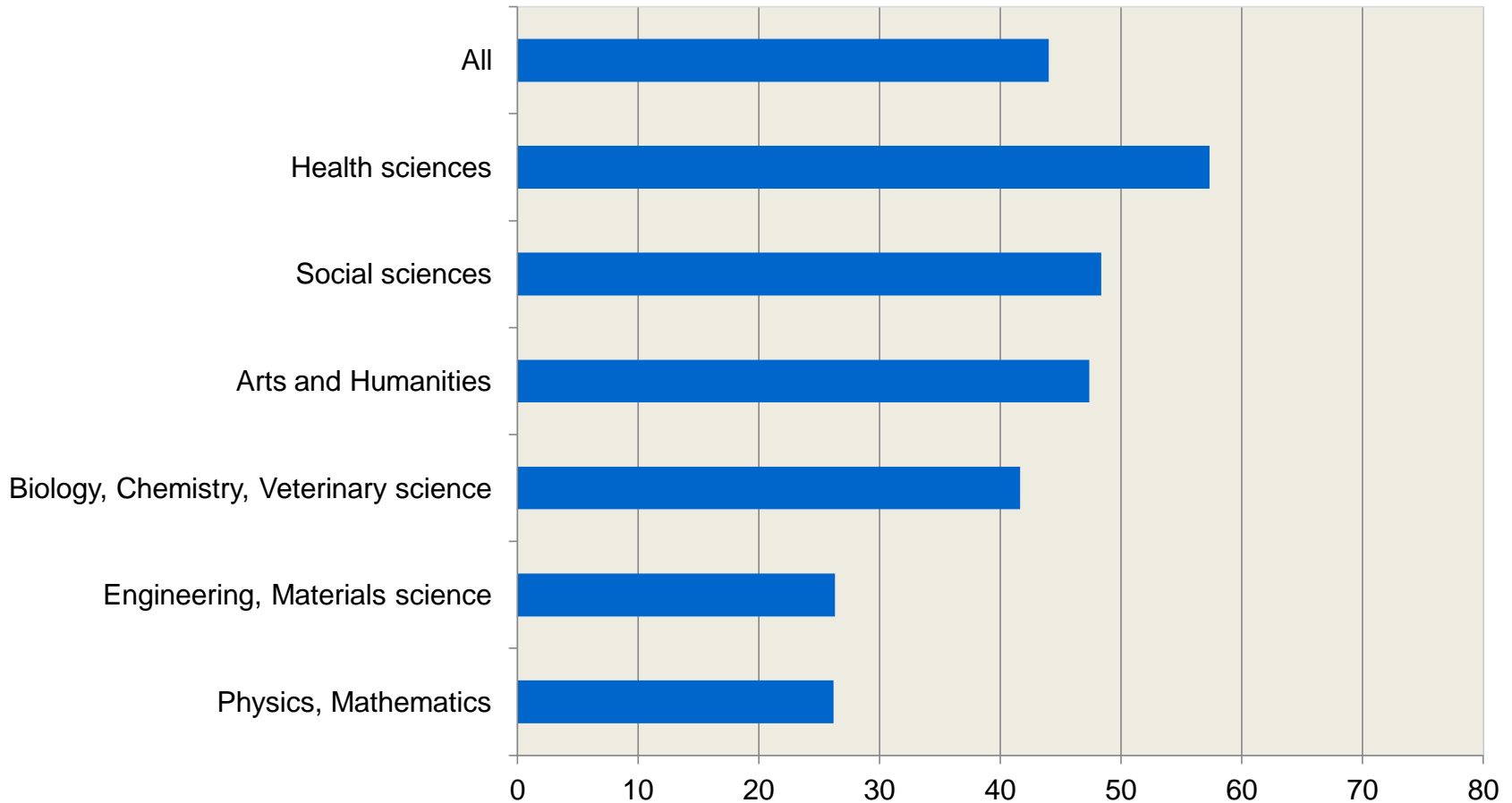
Source: Cambridge Centre for Business Research Survey of Knowledge Exchange Activity by UK Academics (Hughes, A., Kitson, M., Abreu, M., Grinevich, V., Bullock, A. and Milner, I.) UK Data Archive Study Number 6462.

Interactions with public sector organisations (% of respondents)



Source: Cambridge Centre for Business Research Survey of Knowledge Exchange Activity by UK Academics (Hughes, A., Kitson, M., Abreu, M., Grinevich, V., Bullock, A. and Milner, I.) UK Data Archive Study Number 6462

Interactions with the third sector organisations (% of respondents)

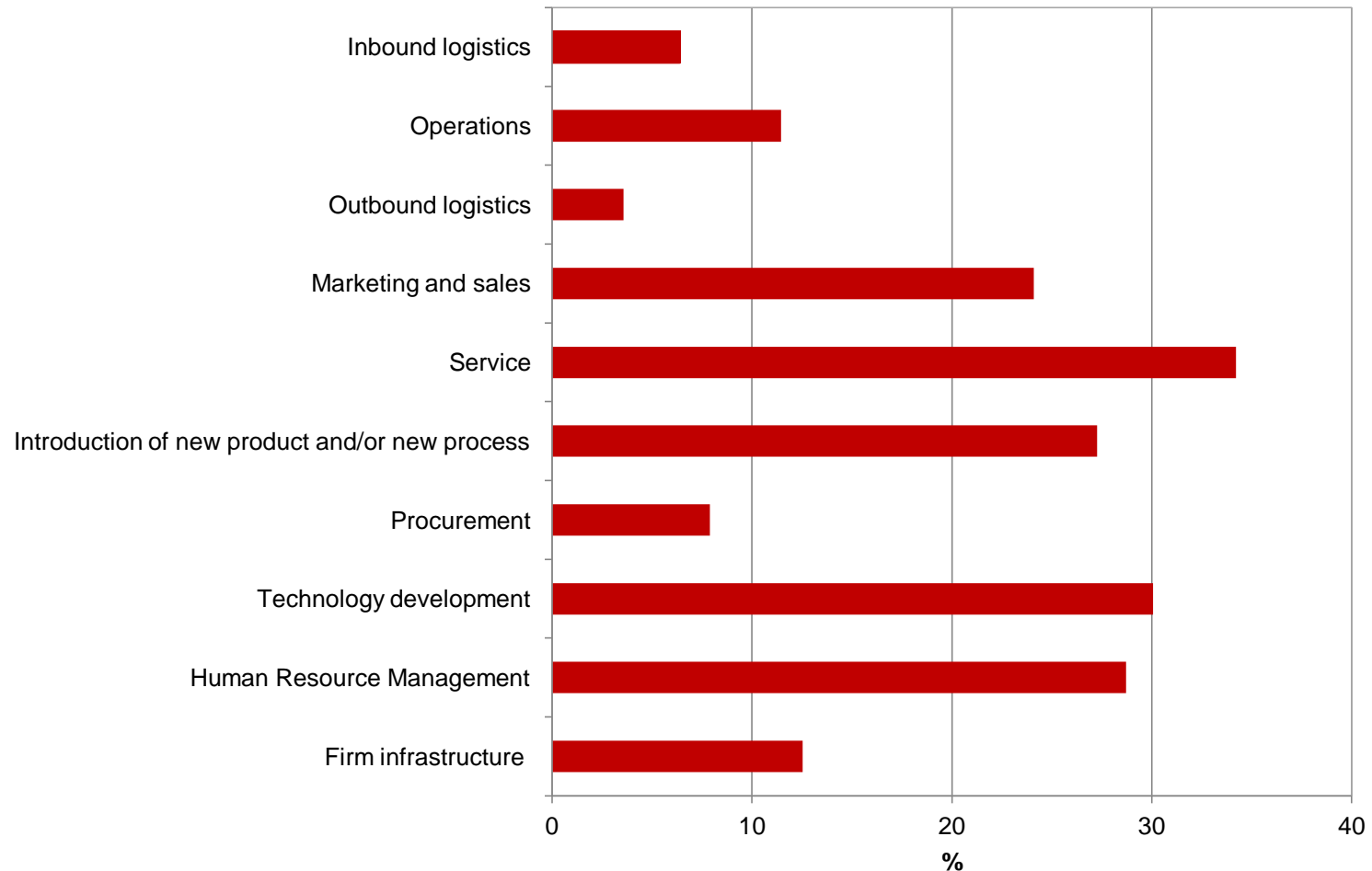


Source: Cambridge Centre for Business Research Survey of Knowledge Exchange Activity by UK Academics (Hughes, A., Kitson, M., Abreu, M., Grinevich, V., Bullock, A. and Milner, I.) UK Data Archive Study Number 6462.

Importance of Technological Innovation

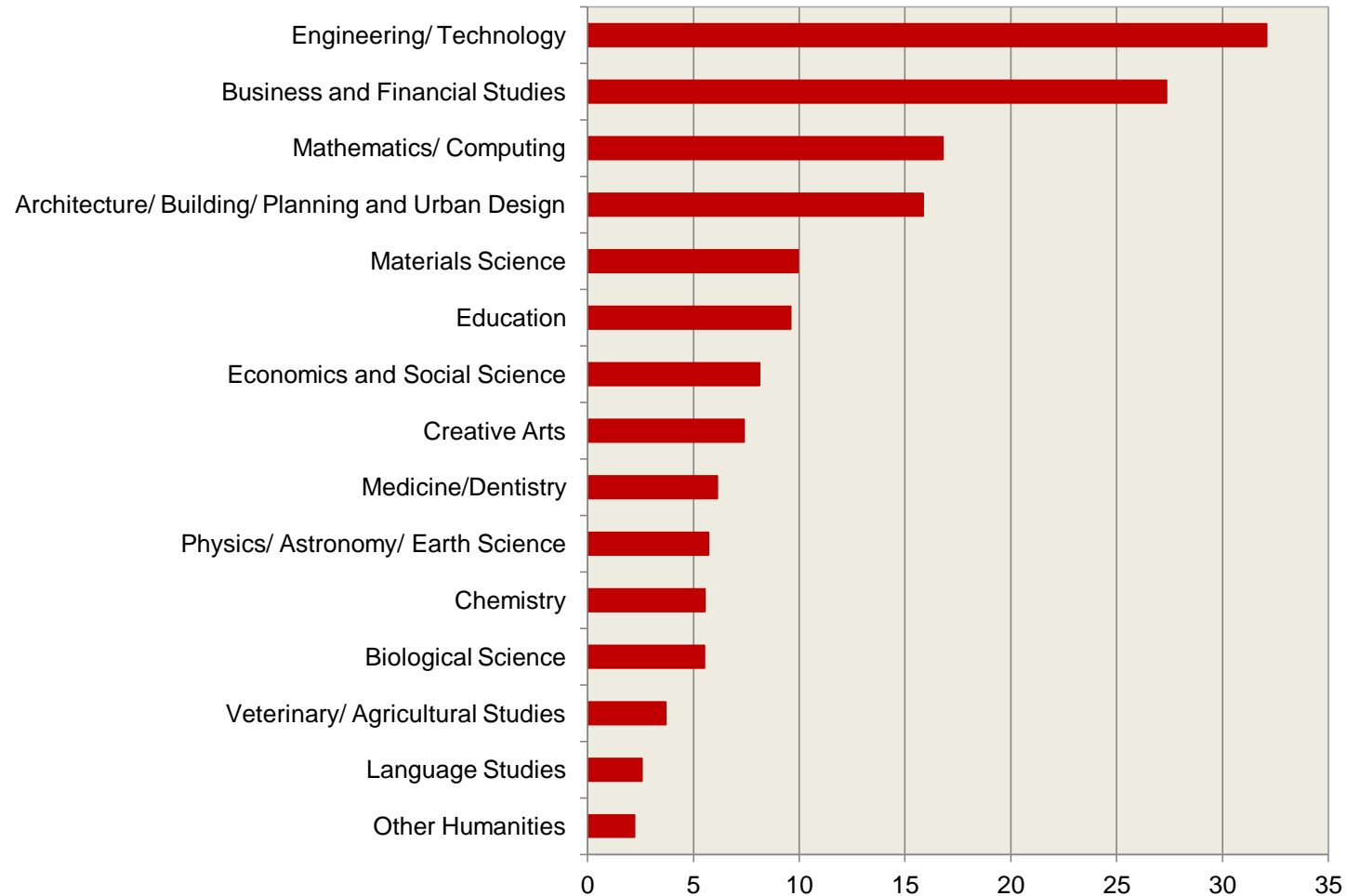


Why businesses interact with Universities?

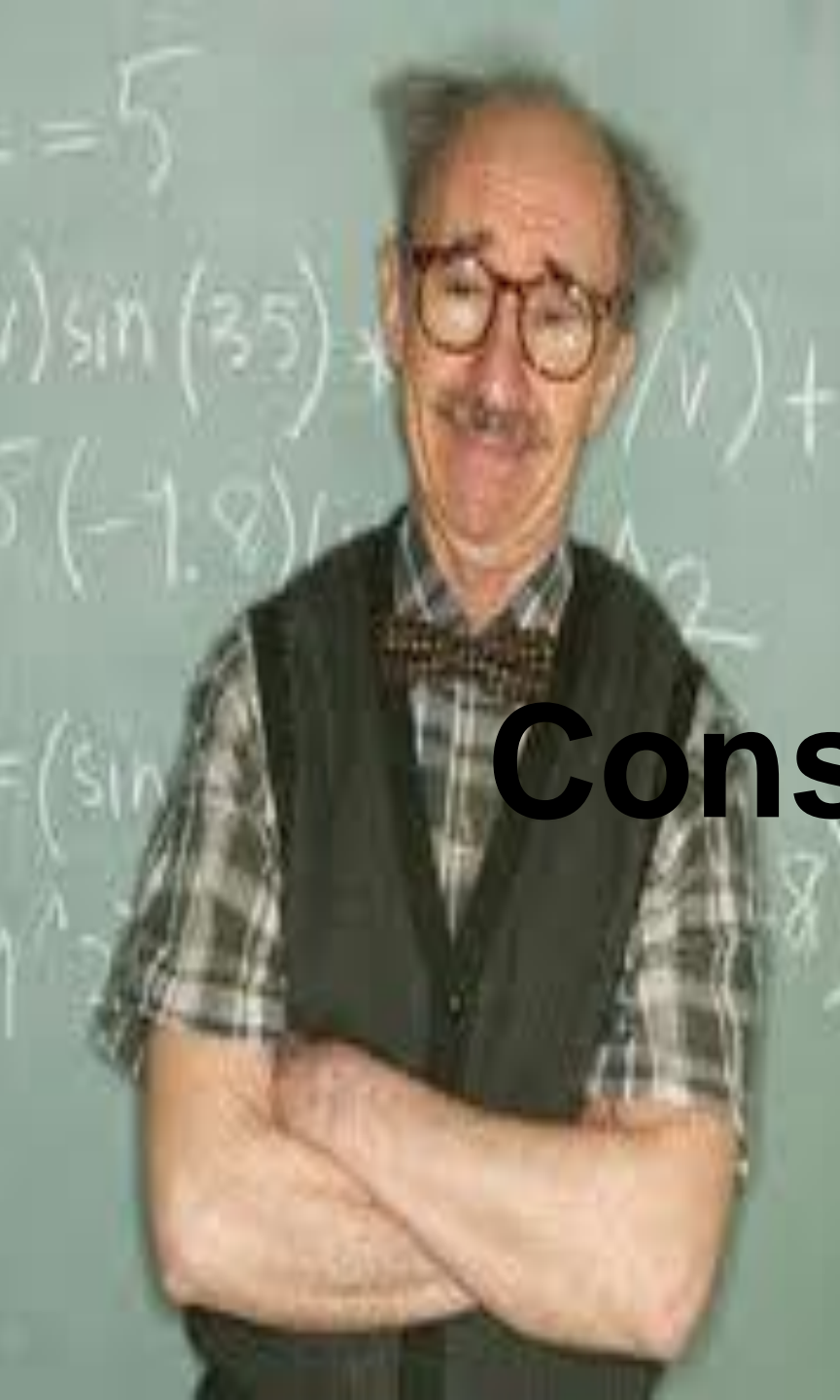


Source: Hughes, A. and Kitson, M. (2011), *Connecting with the Ivory Tower: The Business Perspective on Knowledge Exchange in the UK*, Centre for Business Research, University of Cambridge, Cambridge.

Who do businesses interact with?



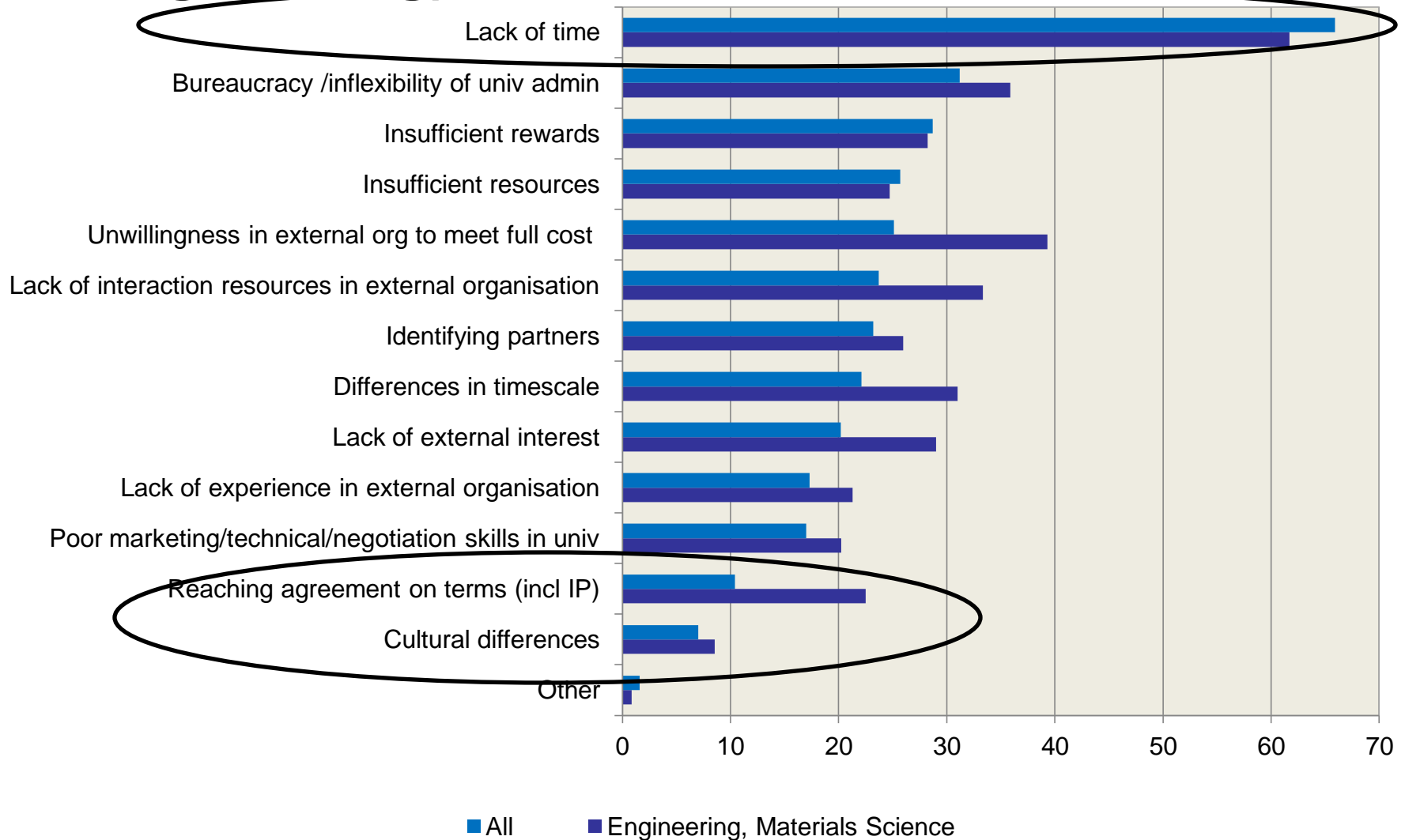
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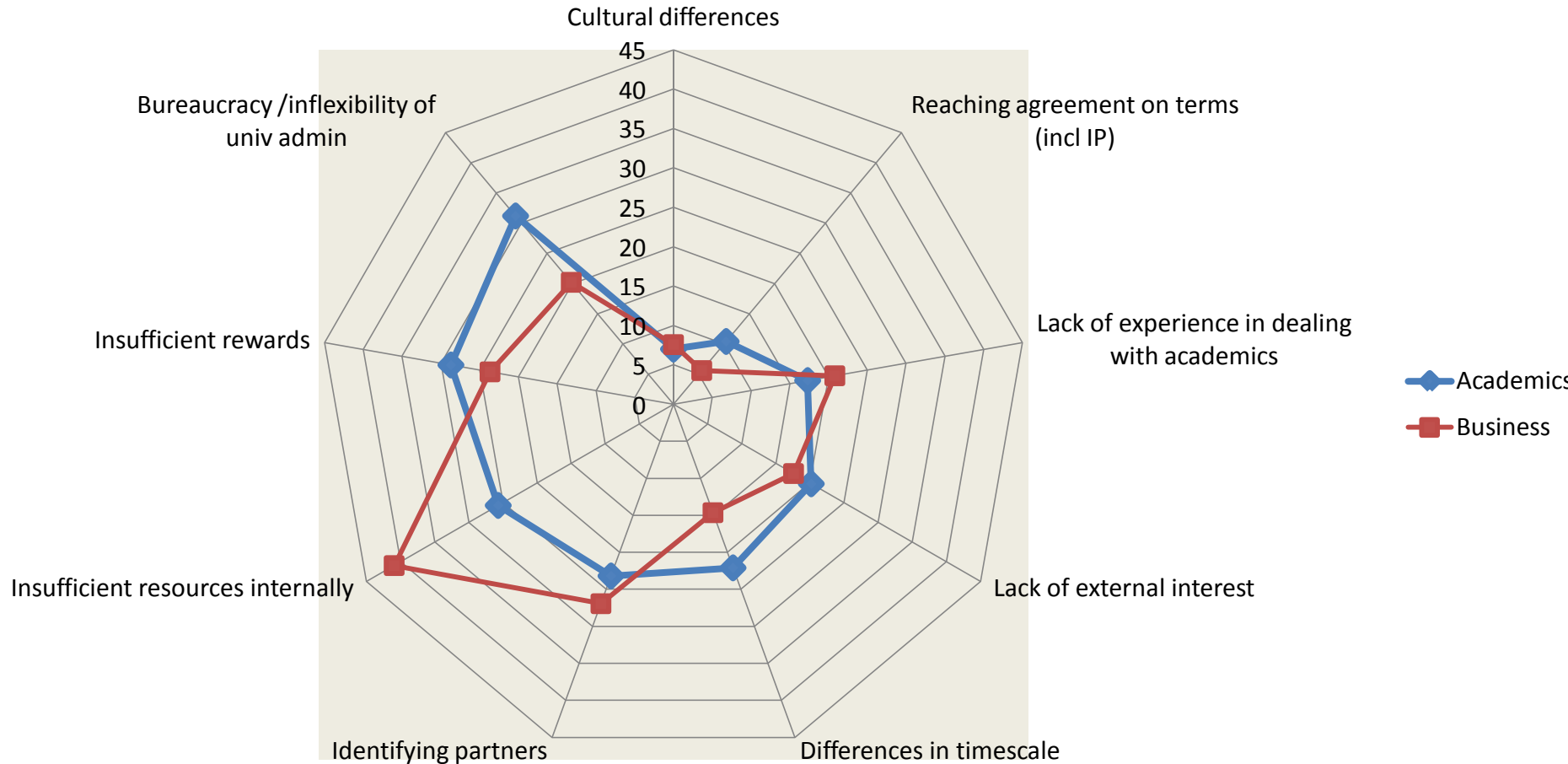
Constraints



Constraints on interactions with external organisations (% of respondents – All and Engineering)

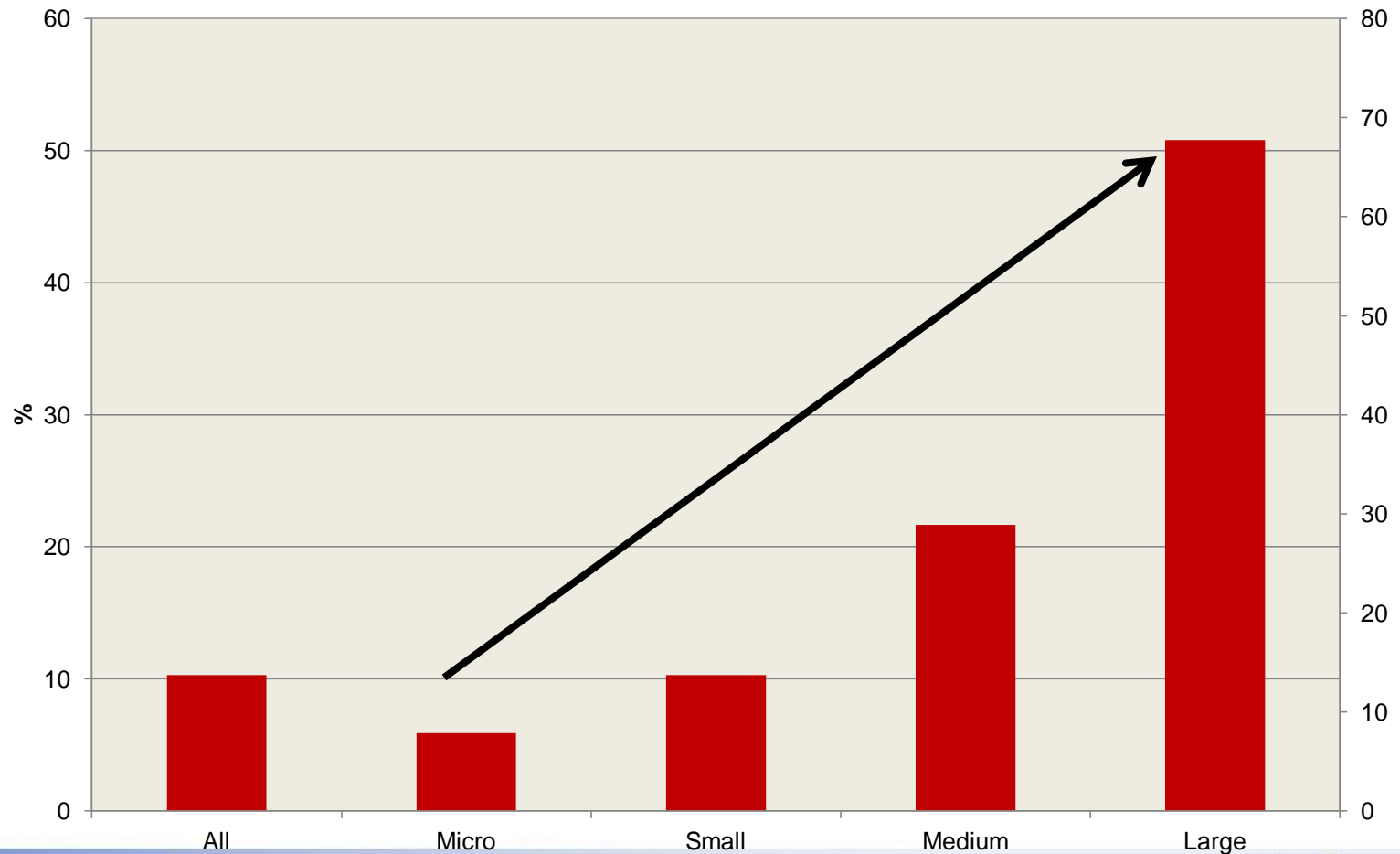


Academic and business perceptions of constraints on interactions



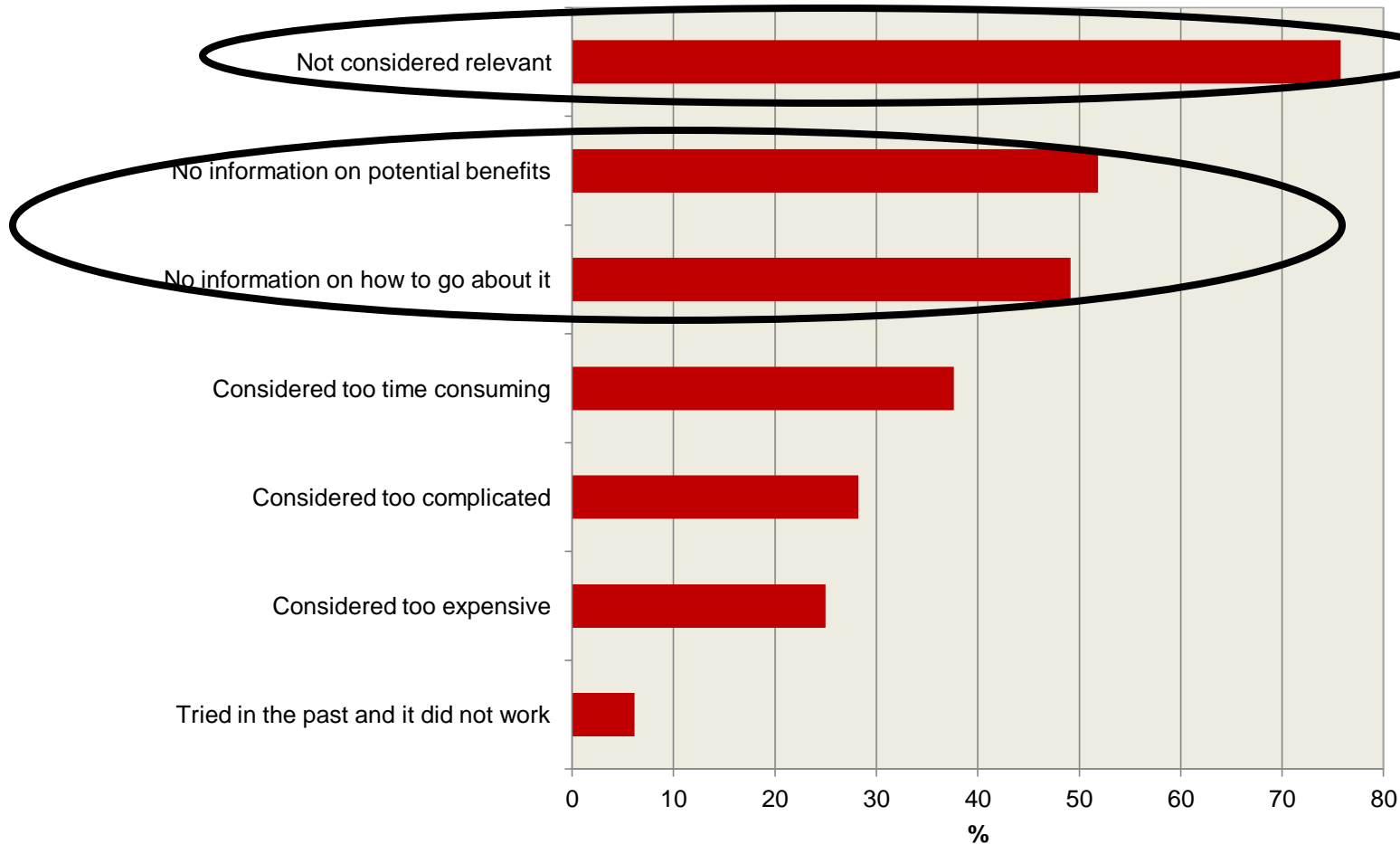
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Businesses (%) employing someone to liaise with HEIs



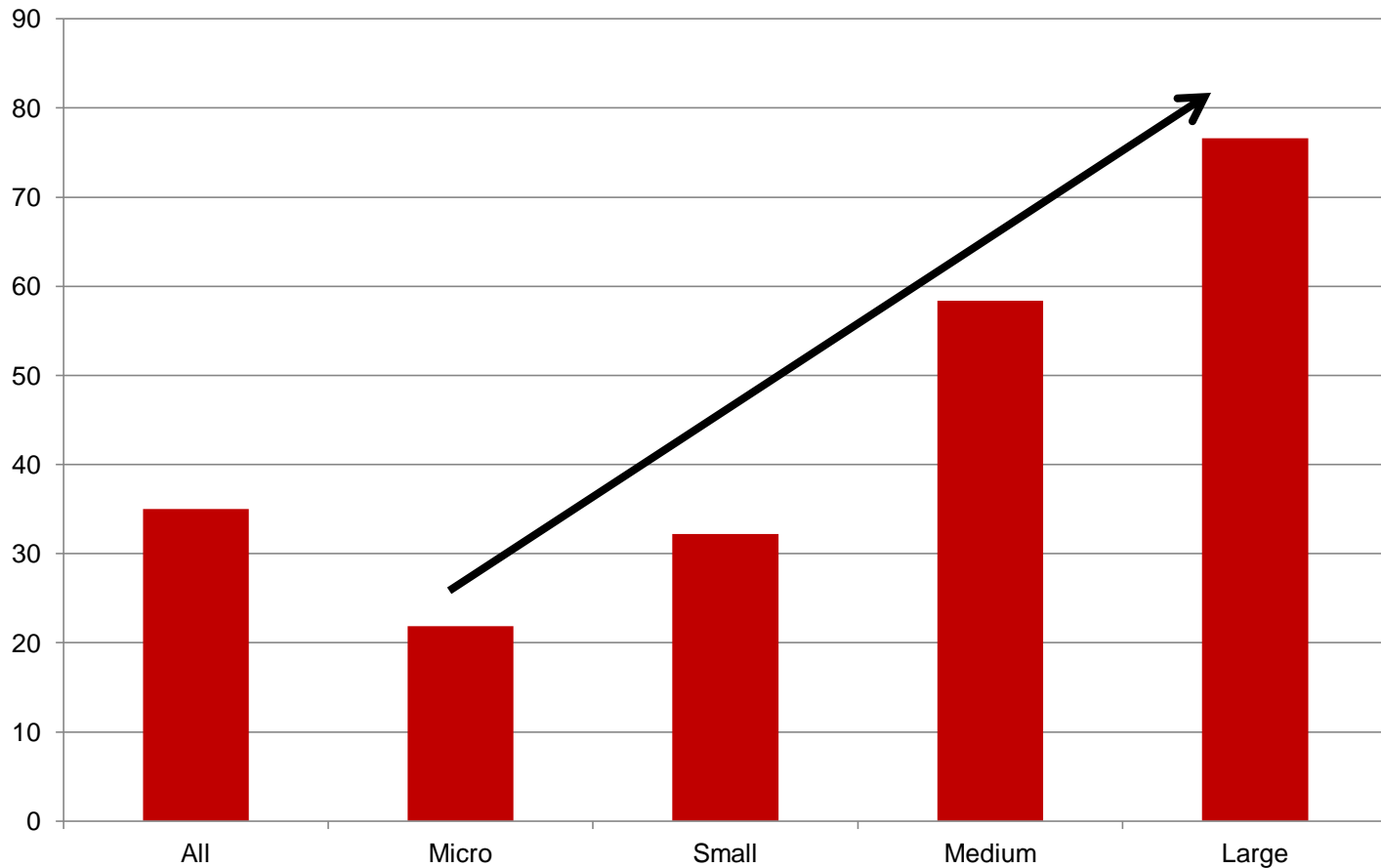
Source: Hughes, A. and Kitson, M. (2011), *Connecting with the Ivory Tower: The Business Perspective on Knowledge Exchange in the UK*, Centre for Business Research, University of Cambridge, Cambridge.

Reasons for not interacting (% of non collaborating firms)



Source: Hughes, A. and Kitson, M. (2011), *Connecting with the Ivory Tower: The Business Perspective on Knowledge Exchange in the UK*, Centre for Business Research, University of Cambridge, Cambridge.

Businesses (%) interacting with HEIs



Source: Hughes, A. and Kitson, M. (2011), *Connecting with the Ivory Tower: The Business Perspective on Knowledge Exchange in the UK*, Centre for Business Research, University of Cambridge, Cambridge.

Mode 2 v

Mode 3

- The importance of technology transfer
- **Only part of the knowledge exchange picture ignores many people-based, problem-solving and community interactions**

Mode 2 v

Mode 3

- Focus on university-business links
- **Ignores the many and varied interactions with the public and third sectors**

Mode 2 v

Mode 3

- Businesses connect with academia for technical innovation
- **Businesses connect with academia for many reasons, many of which are NOT concerned with technical innovation**

Mode 2 v

Mode 3

- Major constraints include cultural difference and disputes over IP
- **Such constraints only apply to small range of interactions**
- **Significant constraints/problems include a lack of resources (time and people) and a lack of information**

Knowledge Exchange in the UK: The State of Play

- There are significant interactions between academics and the rest of society
- Other evidence may understate the importance of academics as they look at formal collaborations and focus on narrow innovation
- Wide range of interactions, but people-based interactions are most frequent
- Interactions encompass a wide range of disciplines not just STEM
- And involve public and third sectors as well as business
- ‘Third stream’ may be a misnomer as interactions support teaching and research

Implications for policy and practice

- Academia is importance source of knowledge for wider innovation
- The demand-side problem
 - Lack of competences and relevant skills in business
- The size problem
 - Difficult for SMEs to connect with universities
 - The aggregation problem for knowledge exchange projects
- The information problem – lack of knowledge about what academia can offer and how to access it

Implications for policy and practice

- The importance for ‘boundary spanners’ to initiate and manage interactions
- May require new skills in existing organisations
- May require new intermediary organisations

THE MYTH OF THE ACADEMIC IVORY TOWER

