Technology T. & Knowledge T. Strategy

Università 4.0

Strategy & Mission

Technology Transfer & Innovation

01

UNIVERSITA’ 4.0

Quale Ricerca 4.0 ?

Lavagna Bianca ?

Qualche dubbio e paradosso *

OCSE: + istruzione – rischi salute + coesione sociale ma

Le famiglie non investono in cultura (-38% in 20 anni) - 30% numero posti PHD in 5 anni

12,5% contributo IT per H2020 → 8,1% finanziamenti … successo ERC sotto media

8° al mondo per produzione scientifica che però decresce ma

con quota IT nelle riviste eccellenti top 5% sopra la media

Eccellenza procapite per ricercatore o investimento

* Fonte dati Rapporto Anvur 2016, PNR, OECD 2015, ISTAT 2015

Qualche dubbio e paradosso *

Basso rapporto spesa R&D / PIL

Poca spesa R&D imprese (1/4 da multinazionali) e pochi ricercatori privati

2% di studenti che studiano all'estero sono in IT

* Fonte dati Rapporto Anvur 2016, PNR, OECD 2015, ISTAT 2015

Premesse e contesto

- Realtà molto meno prevedibile (ricerca industriale o di base?)
- Imprese investono meno in ricerca al proprio interno (allineamento su tempi e risultati?)
- Sempre più la ricerca e innovazione è “glocal” (innovare la filiera)
- Ricerca e didattica sempre più connesse (dal territorio alle KIC)
- Il TT è diventato TM con stakeholders diversi

Opportunità

- 5 aree: Strategia Nazionale di spec. intelligente
- Industria 4.0
- Fondi strutturali in fase di implementazione
- 3° fase KIC (Knowledge Innovation Community)
- Sviluppo open innovation industriale

- Il prossimo FP9 ?
- EIC (European Innovation Council) ?

Vincoli

- Mancanza di incentivi (individuali e di ente)
- Mancanza di efficace correlazione valutazione-incentivi
- Rigidità gestione del personale
- Elevati costi burocratici
- Mancanza di reale autonomia gestionale-amminis.
- Normative avverse (i.e. IP professor priviledge)

?

which is the aim of research?

what is espected from researchers?

publication of papers ➔ number of papers

education of the ruling class ➔ quality of politicians and decisors

contribution to the progress of the nation ➔ GDP / wealth / wellbeing

generation of culture ➔ quality of population

about

The mission of the Massachusetts Institute of Technology is to advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century. We are also driven to bring knowledge to bear on the world's great challenges.

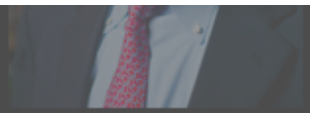
130,000 living alumni.

At its founding in 1861, MIT was an educational innovation, a community of hands-on problem solvers in love with fundamental science and eager to make the world a better place. Today, that spirit still guides how we educate students on campus and how we shape new digital learning technologies to make MIT teaching accessible to millions of learners around the world.

MIT's spirit of interdisciplinary exploration has fueled many scientific breakthroughs and technological advances. A few examples: the first chemical synthesis of penicillin and vitamin A. The development of radar and creation of inertial guidance systems. The invention of magnetic core memory, which enabled the development of digital computers. Major contributions to the Human Genome Project. The discovery of quarks. The invention of the electronic spreadsheet and of encryption systems that enable e-commerce. The creation of GPS. Pioneering 3D printing. The concept of the expanding universe.

Current research and education areas include digital learning; nanotechnology; sustainable energy, the environment, climate adaptation, and global water and food security; Big Data, cybersecurity, robotics, and artificial intelligence; human health, including cancer, HIV, autism, Alzheimer's, and dyslexia; biological engineering and CRISPR technology; poverty alleviation; advanced manufacturing; and innovation and entrepreneurship.

MIT's impact also includes the work of our alumni. One way MIT graduates drive progress is by starting companies that deliver new ideas to the world. A recent study estimates that as of 2014, living MIT alumni have launched more than 30,000 active companies, creating 4.6 million jobs and generating roughly $1.9 trillion in annual revenue. Taken together, this "MIT Nation" is equivalent to the 10th-largest economy in the



site for more information

Institute initiatives

Digital learning

Integrated Learning Science

Climate Change

Energy

Environmental solutions

Innovation

Entrepreneurship

Cancer

Global

Institutional Awards and Honors

MIT ranked No. 1 among world's universities

MIT ranked No. 1 in architecture globally

MIT named No. 1 university worldwide for social sciences

01

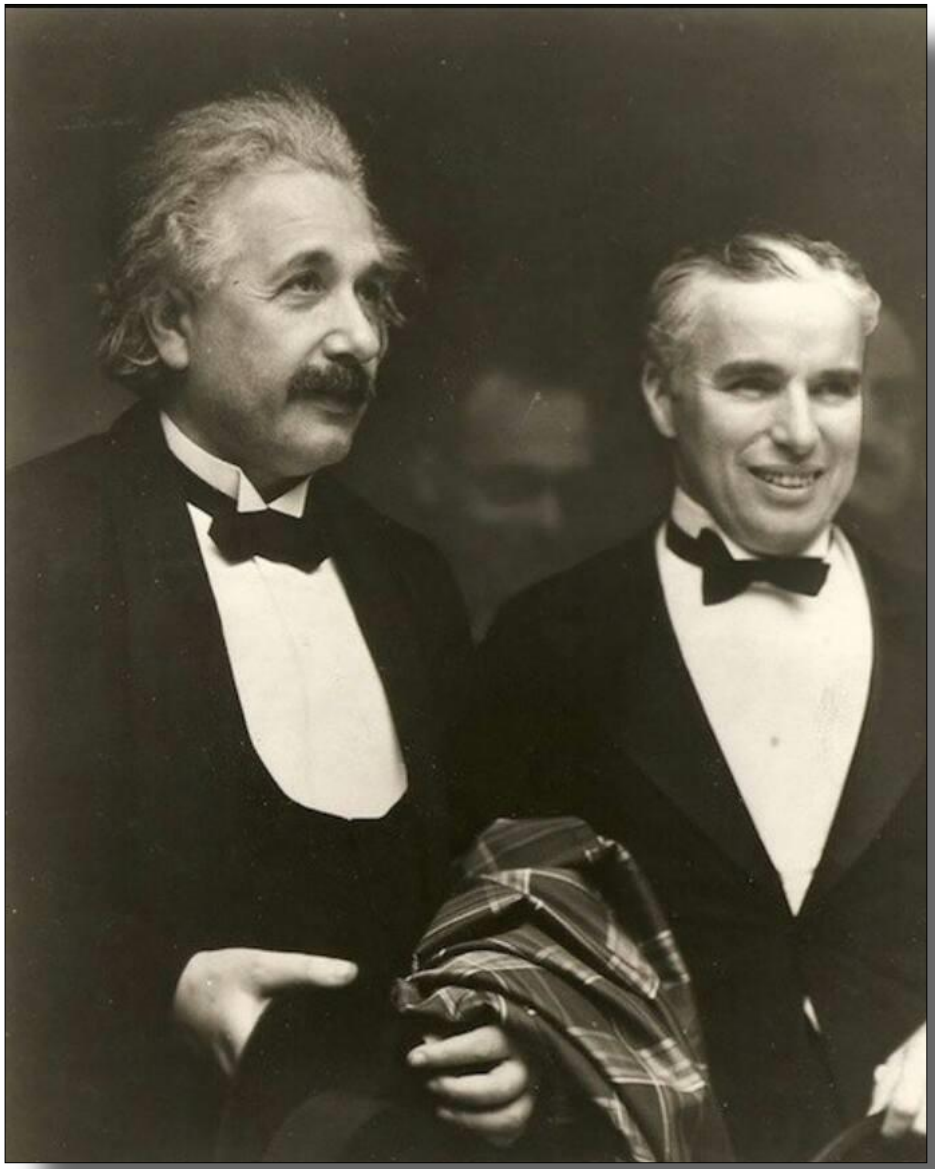
Future of Knowledge Transfer… Third Mission

Case Study Oxford - Isis Innovation

National Evaluation Agency

Organizzazione e Strutture

02



In 1930 Charlie Chaplin e Albert Einstein met and an adectode is reported.

Einsten said:

> "What I most admire about your art, is your universality. You don’t say a word, yet the world understands you!"

Chaplin replied:

> "True. But your glory is even greater! The whole world admires you, even though they don’t understand a word of what you say."

“THIRD MISSION” … the framework

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

La definizione di Terza Missione: esempi di definizioni

- Third Stream activities are defined as **knowledge exchange and productive interactions with business, public sector organisations and the wider community**, for the benefit of the economy and society (Report for the Russel Group of UK Universities)

- Third mission activities encompass the **university’s relationships with the non-academic outside world: industry, public authorities and society** (Observatory of European University PRIME Network).

- “Activities concerned with the **generation, use, application and exploitation of knowledge and other university capabilities outside academic environments**, these being distinct from the core activities of teaching and research (HE BCI Survey, UK).

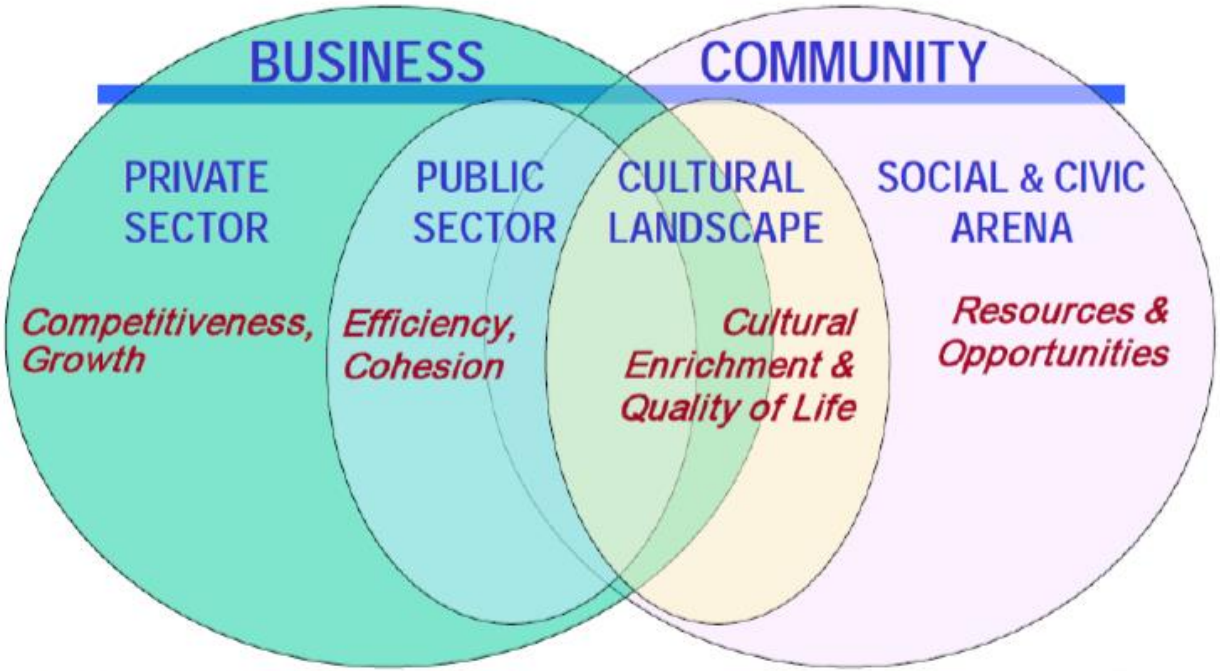
- “Activities related to **technology transfer and innovation**, to **continuing education** and to **social engagement** (E3M Project on Measuring Third Mission)

Slide 5 Federico Munari Seminario Fondazione CRUI

“THIRD MISSION” … the new vision

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

… ad una visione più ampia di Terza Missione



Fonte: Frost (HEFCE, 2013)

“THIRD MISSION” … moving to…

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Dalla visione sequenziale di Technology Transfer ad una visione più ampia di 3M

Where we have come from		Where we are going
Focus on STEM	→	All Disciplines
Simple ‘transmission’ model of knowledge	→	Dynamic exchange model (engagement, not outreach)
Wealth creation	→	Innovation, productivity, quality of life, cultural enrichment, civic dev, community regeneration etc.
Large, multi-national businesses	→	Spectrum from global to local/ regional and all users

Fonte: Frost (2013) HEFCE, UK

Oxford & Isis Innovation

OXFORD

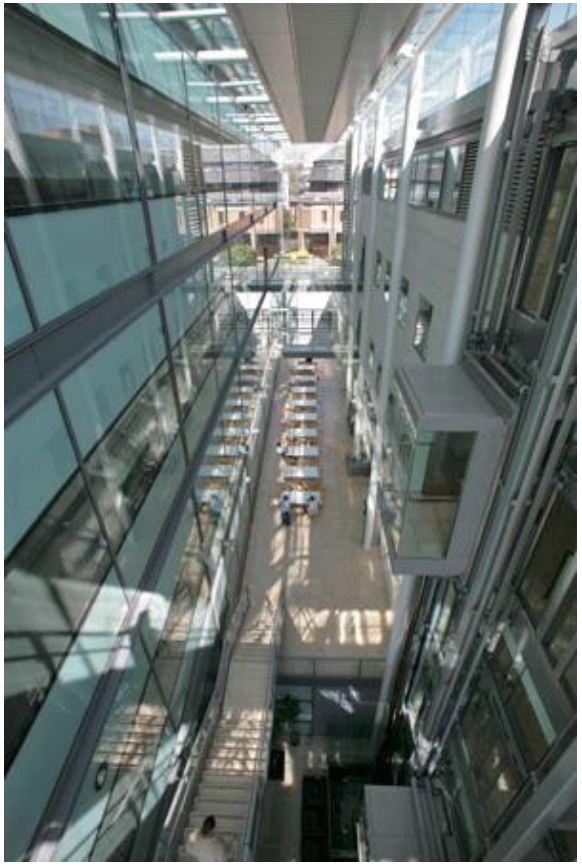
Most Powerful UK Research University

According to the 2014 Research Excellence Framework, Oxford has the largest volume of world-leading (4*) research in the UK.

Highest University Research Spend in UK at £612 million (2014)

5,809 academics and researchers, and

10,173 postgraduate students



ISIS INNOVATION

A company 100% owned by the University of Oxford, established in 1988

Isis *helps* researchers *who wish to* commercialise the results of their research

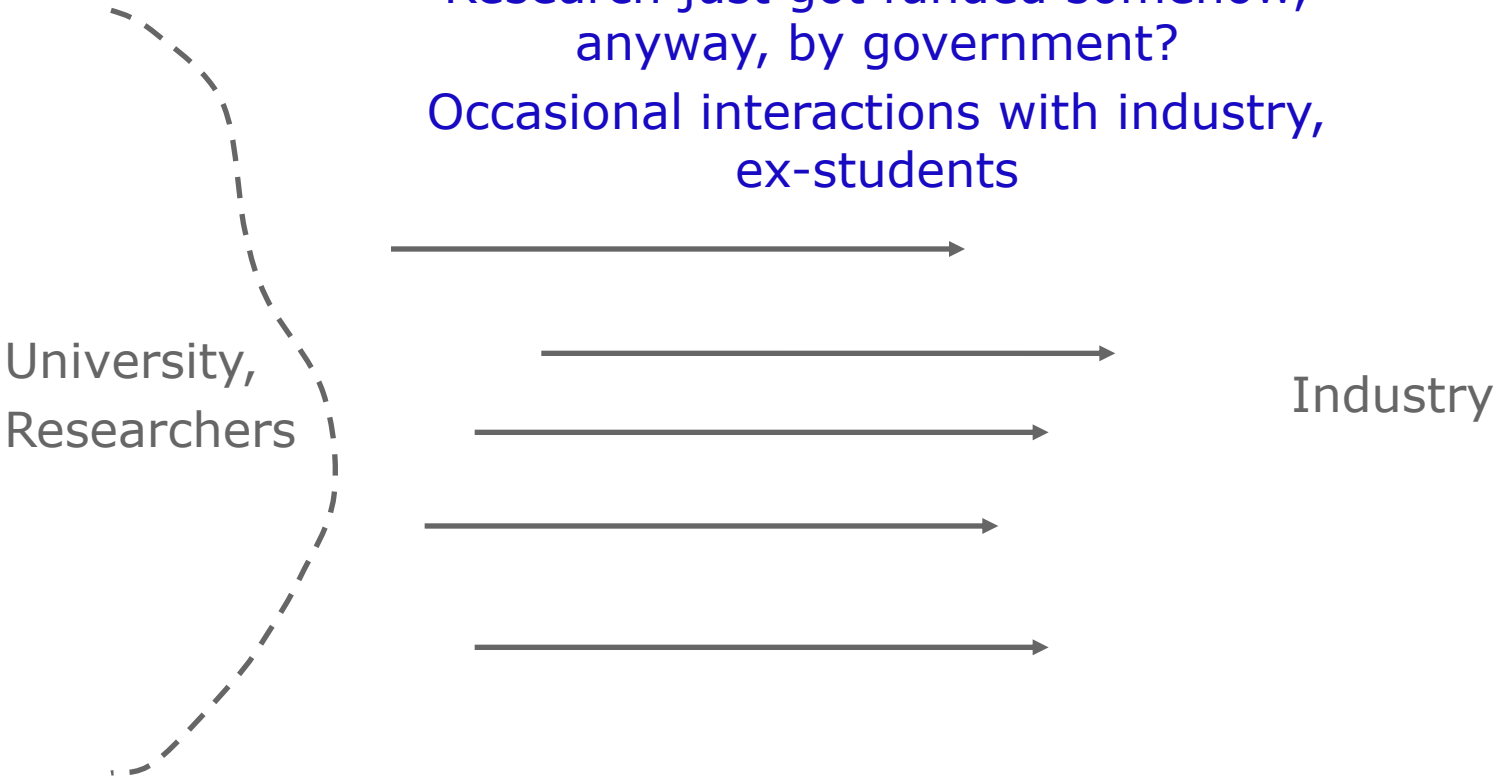
A world-class Technology Innovation business

- 4th highest British PCT patent applicant

Phase 1

Research just got funded somehow, anyway, by government?

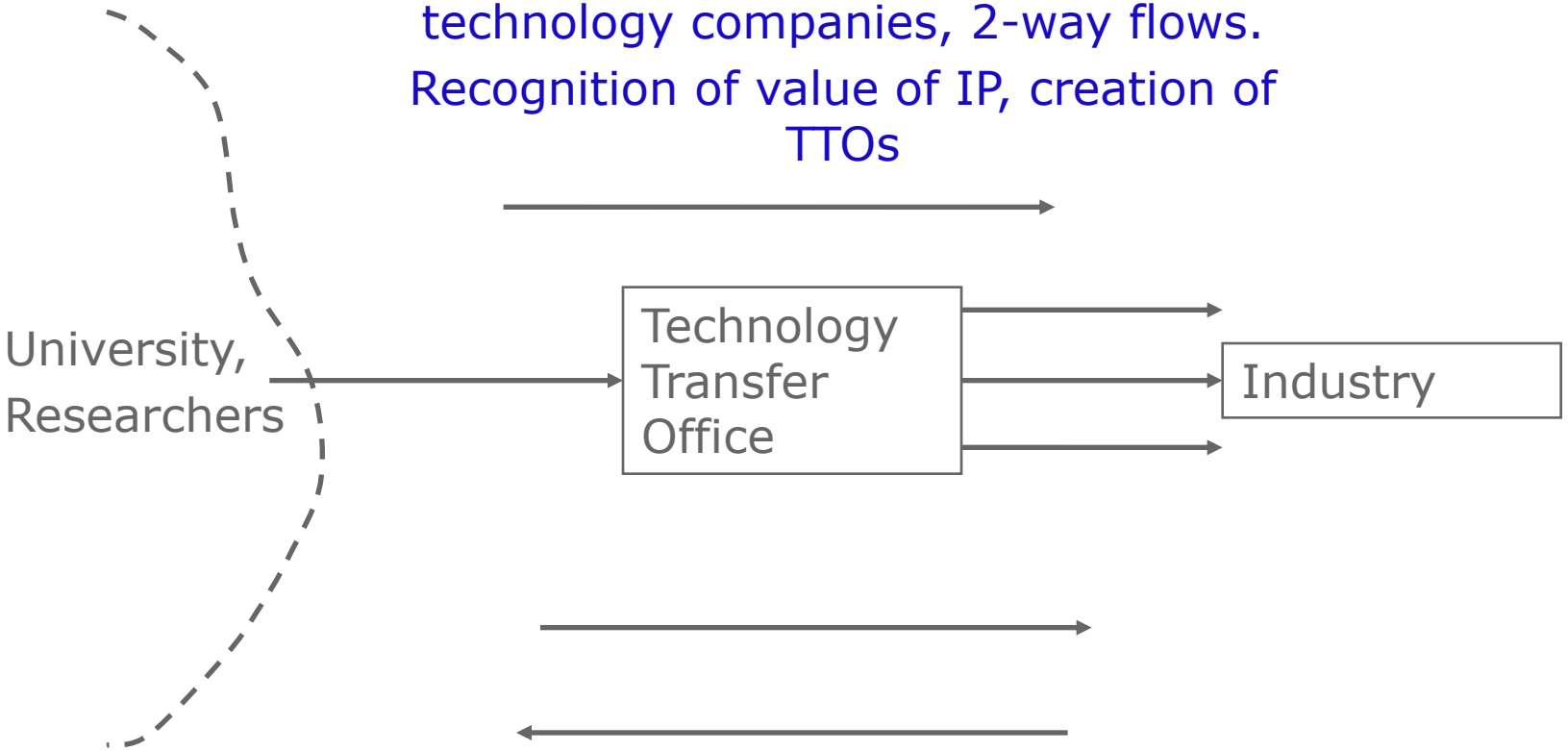
Occasional interactions with industry, ex-students



Phase 2

Increasing interactions with industry, technology companies, 2-way flows.

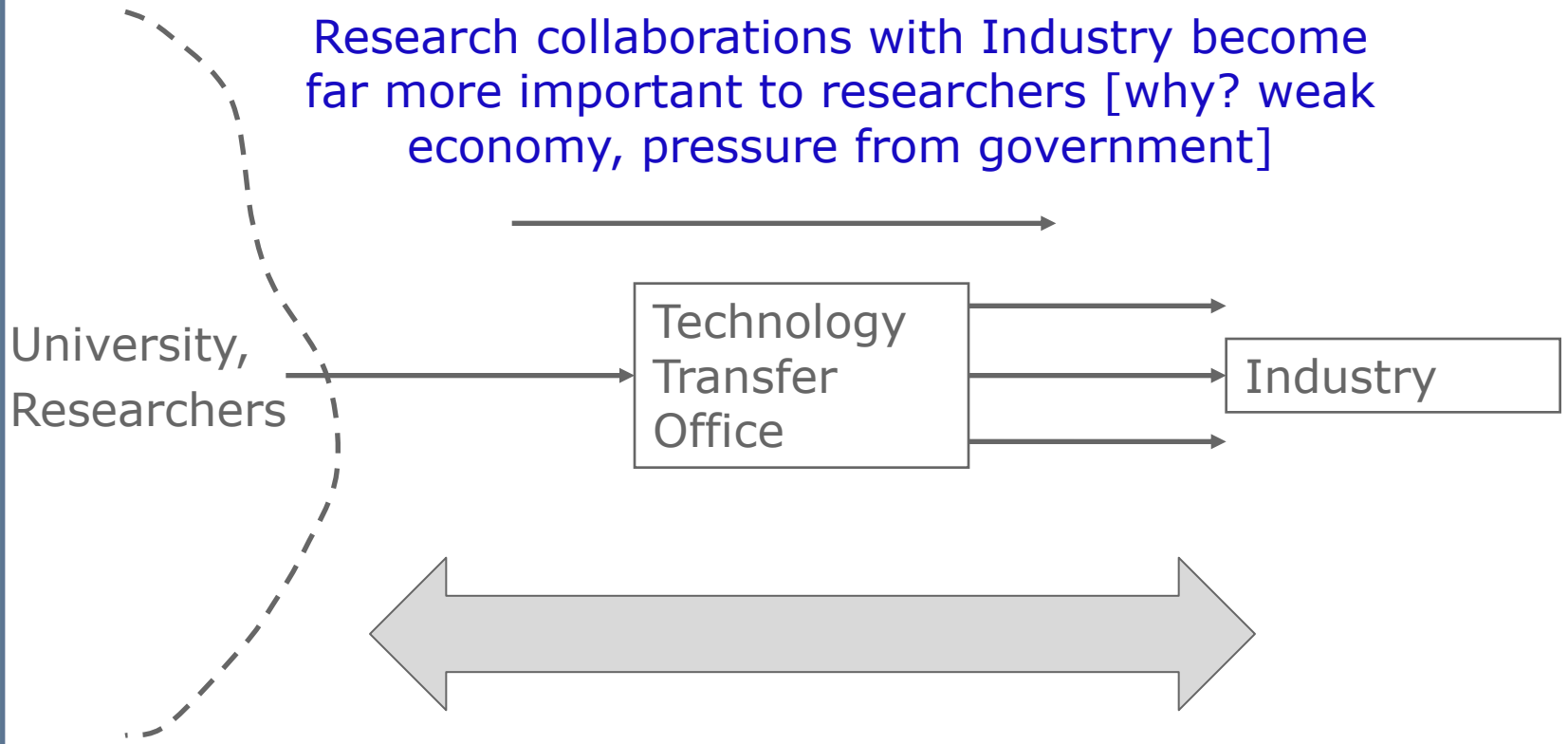
Recognition of value of IP, creation of TTOs



Phase 3

TTO's mature, some thrive, many struggle.

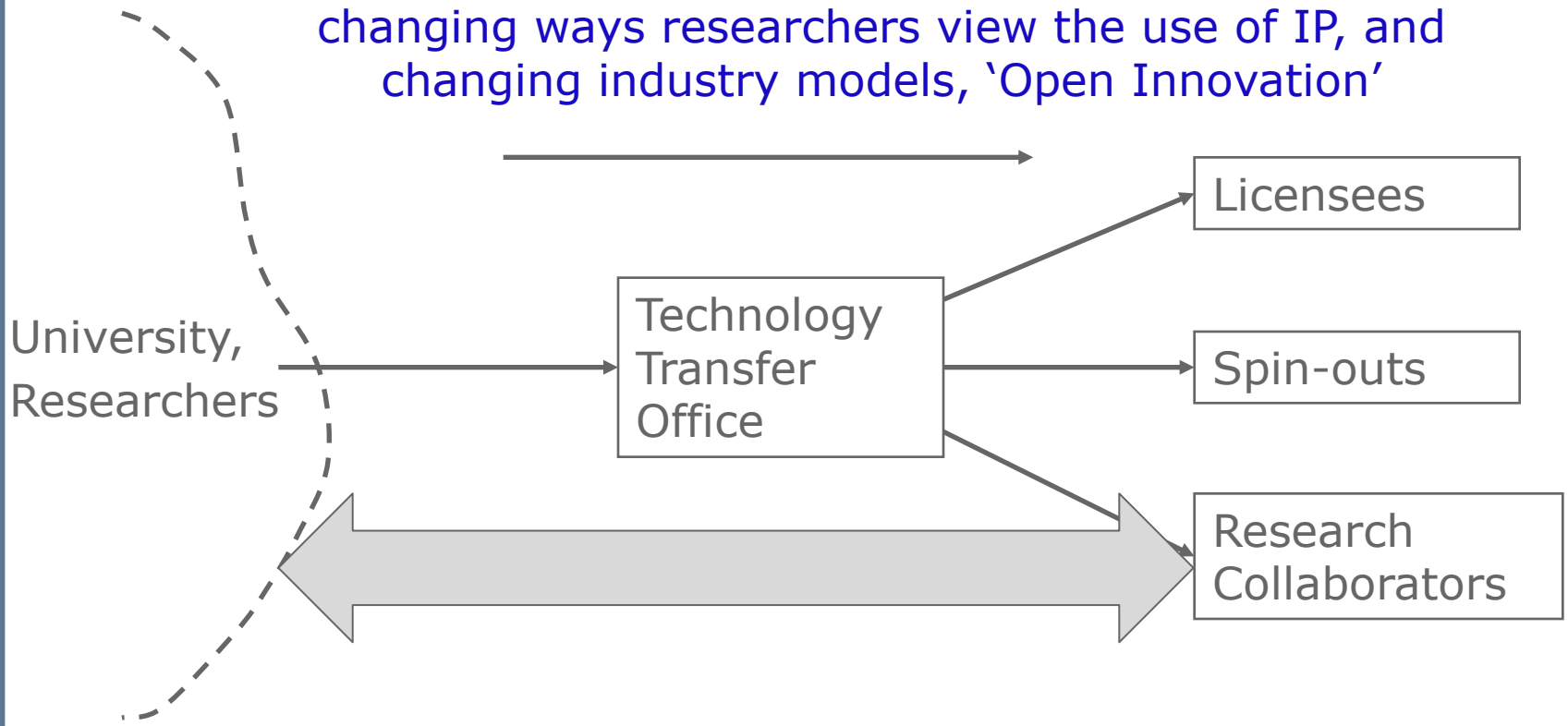
Research collaborations with Industry become far more important to researchers [why? weak economy, pressure from government]



Researchers now view IP differently, as a means to research funding, not only TT deals

Phase 4

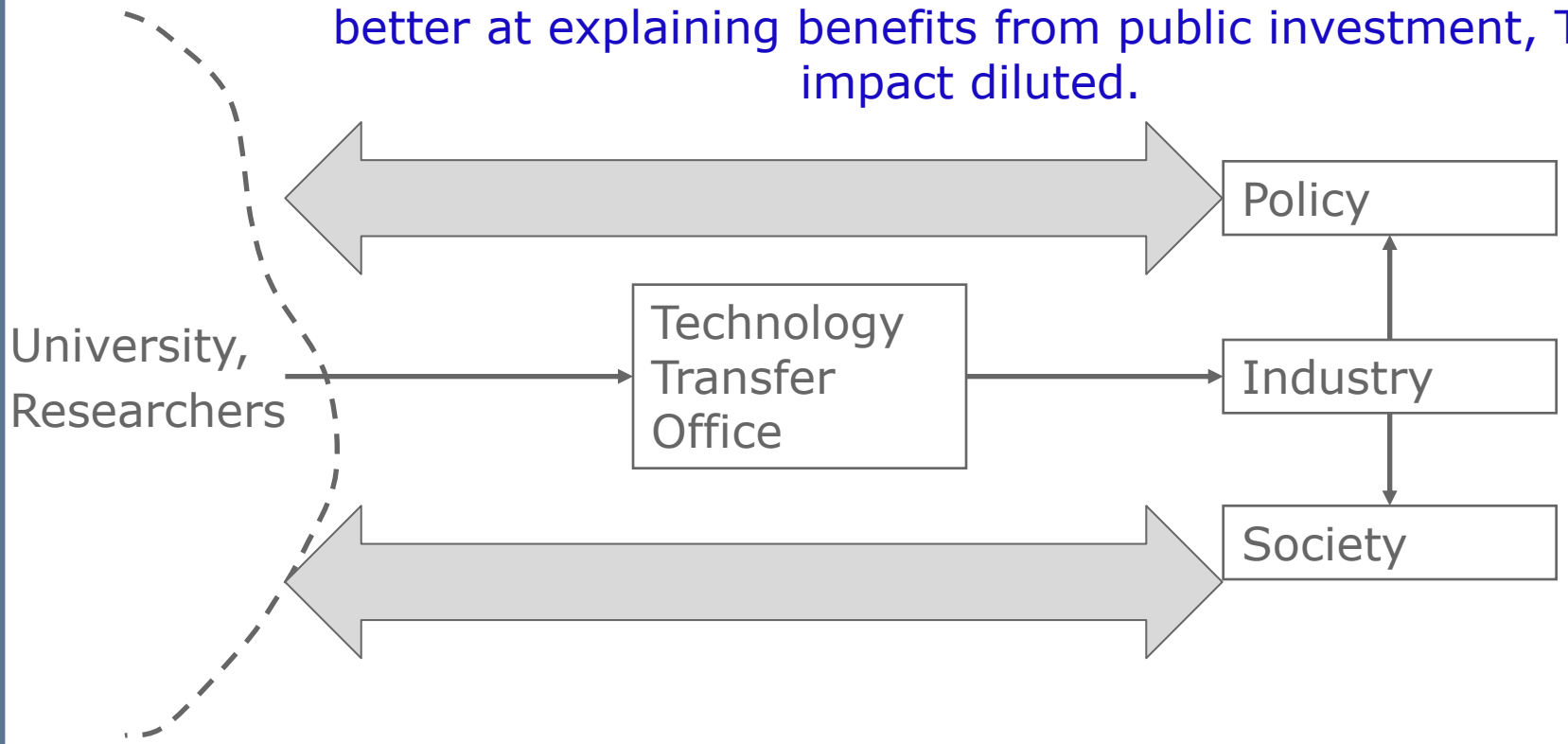
TTO's need to adopt more flexible models, to satisfy changing ways researchers view the use of IP, and changing industry models, 'Open Innovation'



Universities need to modify its expectations of the TTO. Will character of TTO's change …?

Phase 5

Universities respond to pressure for Impact, become far better at explaining benefits from public investment, TT impact diluted.

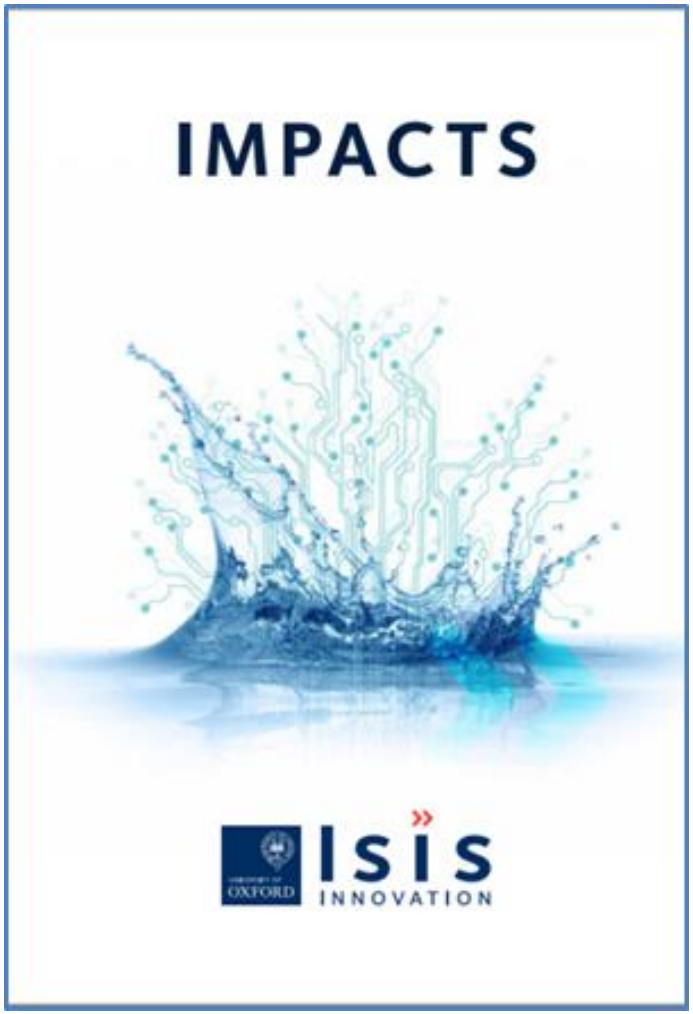


University views TTO as (relatively) smaller part of a bigger picture.

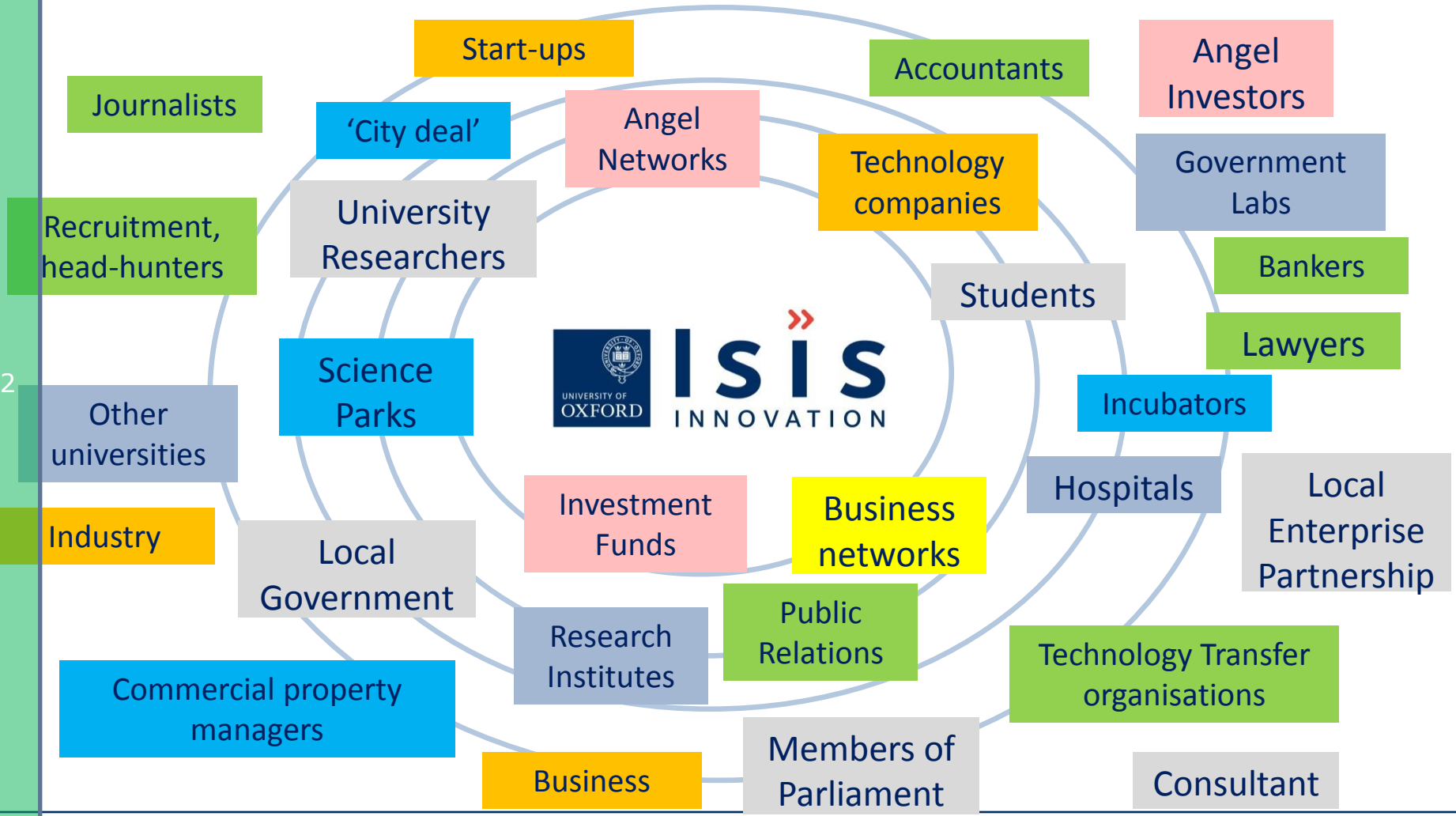
Facilitating Impact at Oxford

Isis Impacts

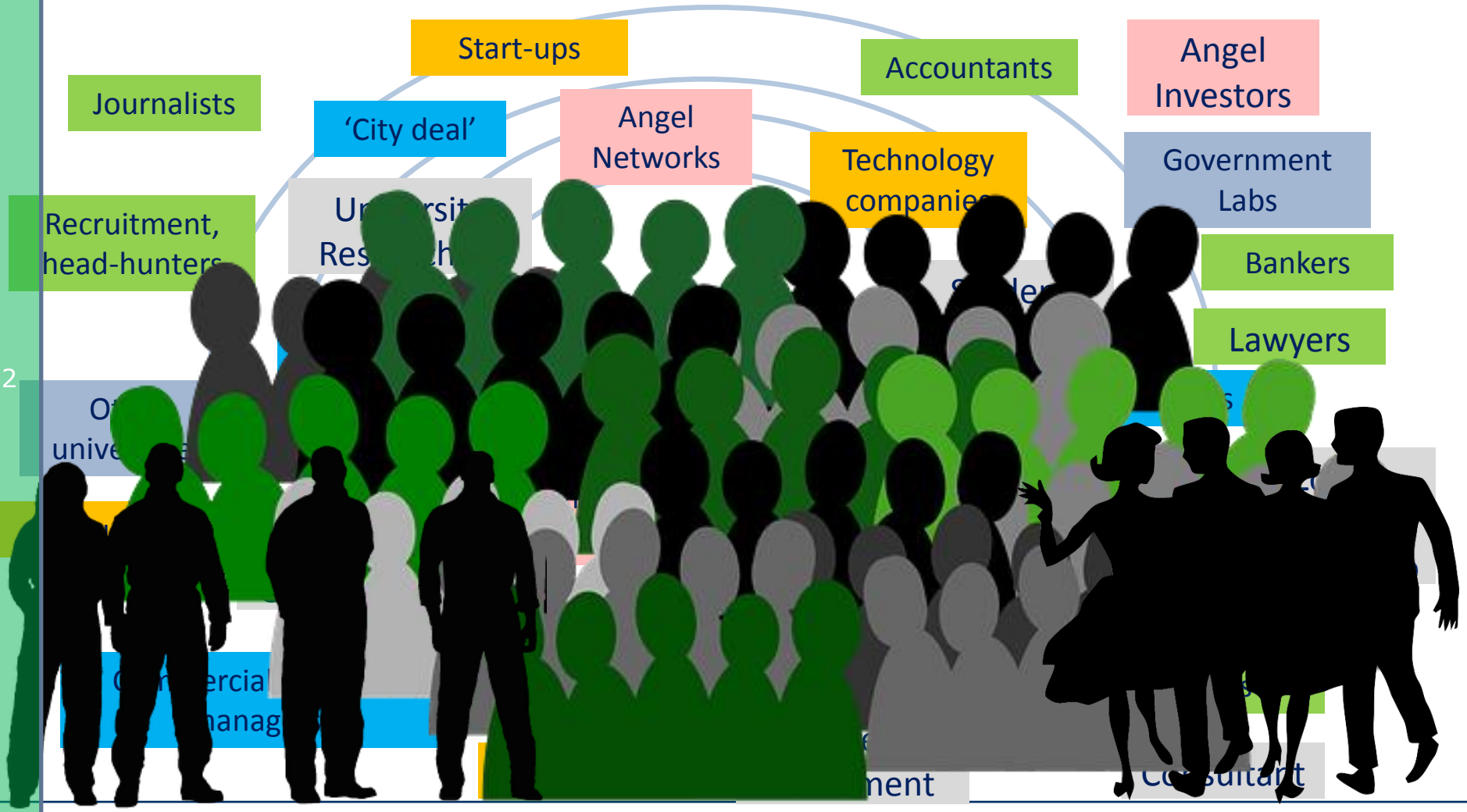
The impact of Isis activities to commercialise technologies and expertise from Oxford University is seen through the creation of new products and services.



The Innovation ~~Ecosystem~~ Community



The Innovation Community



Everything Changes – the Language

- Technology Transfer
- Knowledge Transfer
- Third arm … leg … thing … mission
- Knowledge Exchange
- Wider engagement
- *KEC - Knowledge Exchange & Commercialisation*

- Technology Commercialisation
- Wider engagement

Vision for Isis

Technology	From Oxford and elsewhere
Innovation	Successful ~~exploitation~~ implementation of new ideas
For People	Health & Wealth of Society

“THIRD MISSION” – ANVUR (National Agency)

TM means INTERACTION with society ..all stakeholders

Different and more than student interaction (teaching) and research interaction (other researchers)

Two dimension:

- Knowledge expolitation and exchange
- Public and common goods (society exploitation)

→ Not only IP and TT

“THIRD MISSION” – ANVUR (National Agency)

Evaluating TM means… self evaluation & accountability

Through: different ways …

IP
Spin-off
Research contracts
TTO, Incubators and Science Park
Consortia ad Netowrks
Public engagement
life long learning
Museum
Archeological dig
Clinical trials

“THIRD MISSION” – ANVUR (National Agency)

Through: different ways … and different INDICATORS ??

IP	How many - Ownership - revenue
Spin-off	How many - ETP - revenue
Research contracts	How many – partners
TTO, Incubators and Science Park	How many – ETP - budget
Consortia ad Netowrks	How many – ETP - budget
Public engagement	How many – attendees
life long learning	How many – attendees
Museum	… BUT
Archeological dig	NOT only QUANTITY
Clinical trials	but also QUALITY

Organizzazione

e

strutture

Traettorie

- Integrazione Ricerca, Didattica e Terza Missione
  - Il brand
  - Il public engagement e lo story telling
  - L’impatto della ricerca

- Apertura dei processi a diversi stakeholders
  - Laboratori di ricerca pubblico privati ?
  - Student entrepreneurship ?
  - Il Placement visto dalle Aziende ?

Organizzazione

- Ricerca ancora nei singoli dipartimenti?
- Quali servizi centralizzati e quali nei dipartimenti?

- Quale confine organizzativo tra aree Ricerca, Terza Missione, Internazionalizzazione, Didattica?

- Quali possibilità di esternalizzazione? Di quali processi? Con che forme (società, consorzi, associazioni, fondazioni?)

- Passaggio dalla logica di processo a quella di utente, da quella di cliente a quella di partner, dall’egosistema all’ecosistema

Take Home Message

- One – size – fits - all policies R & TM do not work: variabili in funzione dell'università, del settore di ricerca e del contesto geografico
- La ricerca ha bisogno di mostrare il suo IMPATTO che non è solo/più il Trasferimento Tecnologico
- professionalità senior e endorsment politico sono condizione necessaria: autonomia e cooperazione la base del successo
- Università come PARTNER di SVILUPPO ECONOMICO (per le pmi il problema è che gli addetti non hanno il nostro linguaggio e gli studenti saranno nostri ambasciatori)

2. THM e Homework

- Think out of the box superare gli schemi ed essere creativamente flessibili
- Non farci prendere dalla sindrome del Palio di Siena (ok perdere purchè perda anche tu) - Passare dall'Egosistema all'Ecosistema della ricerca e TM –aumentare la velocità media dei vagoni
- Bene Ricerca di qualità e attrattiva per partnership di lungo periodo con grandi gruppi industriali
- Bene anche modello delle Flagship universities per il territorio
  - → Sostenibili entrambi i modelli?
  - → Quale modello per l'Italia?

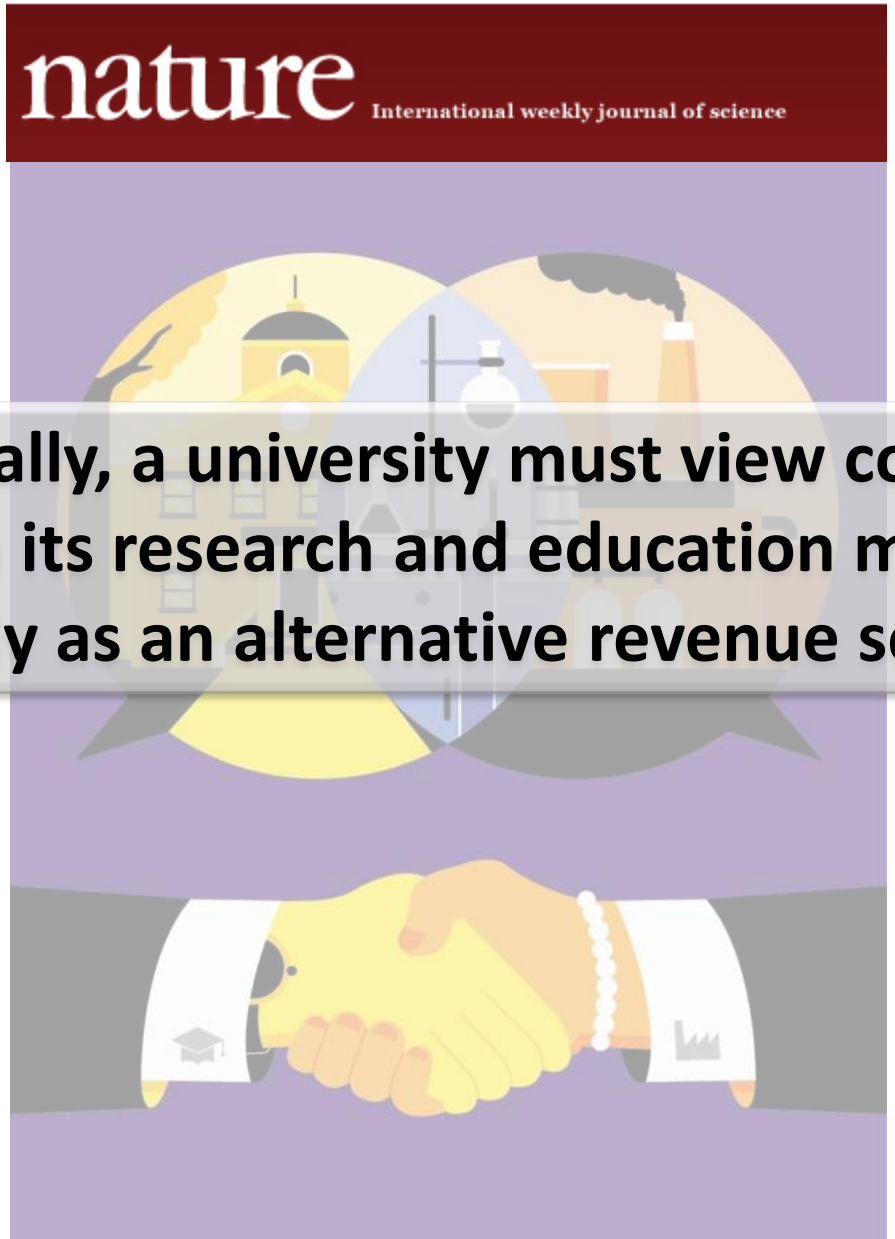
IP Exploitation
Collaborative Research

The Dowling review report

IP negotiation … The way @ Alma Mater Studiorum

03

Academia and industry: Companies on campus



Fundamentally, a university must view companies as partners in its research and education mission, not simply as an alternative revenue source

Academia and industry: Companies on campus

Successful academia–industry partnerships require:

Common interests

Trust

Good communication

For each of these, <u>proximity helps</u>

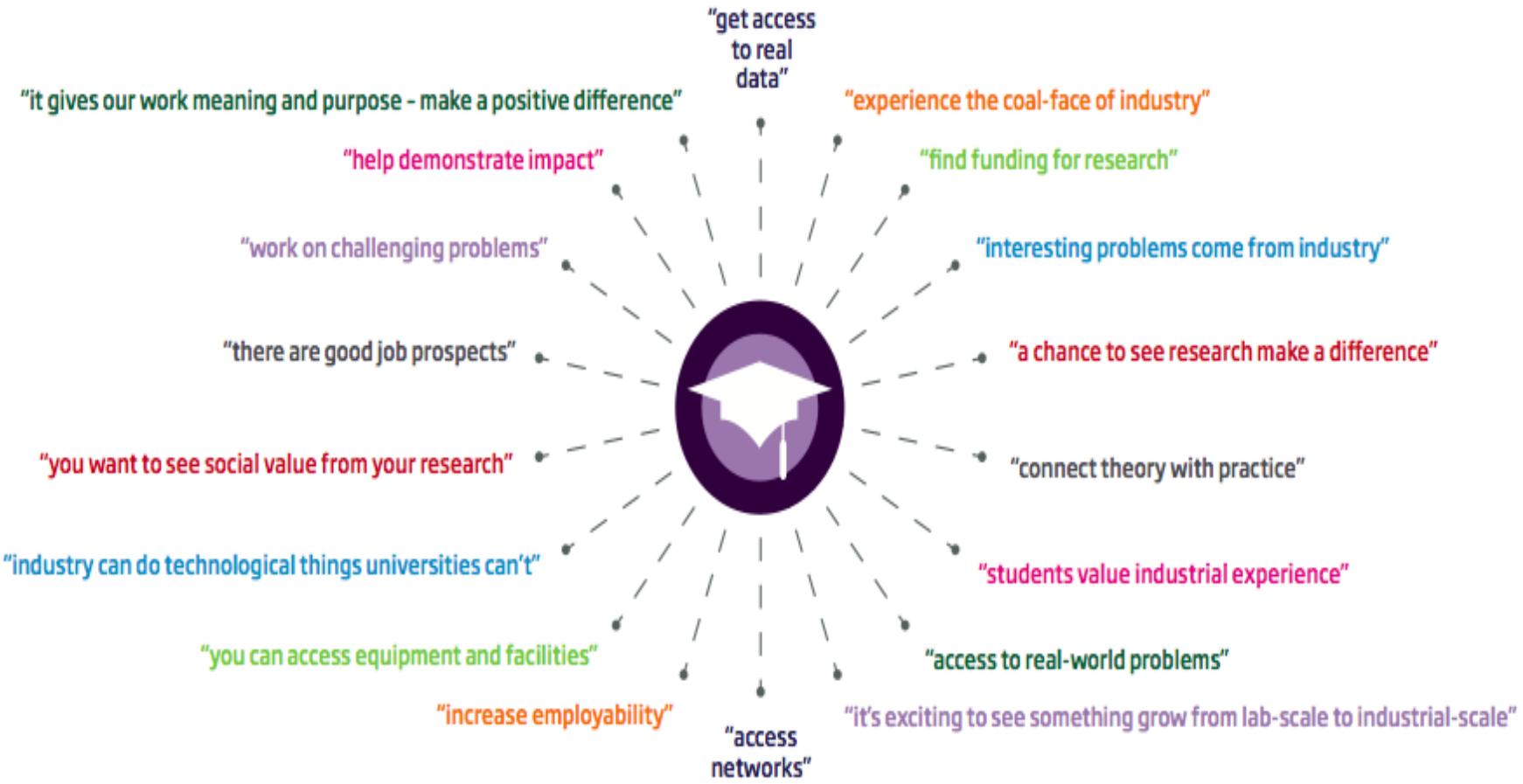
03

The Dowling Review of Business-University Research Collaborations

July 2015

03

Figure 4
Academics' motivations for engaging in collaboration with business[6]



03

Figure 12
Top ten most highly cited barriers to collaboration[42]

Rank	Top ten barriers for **business**	Rank	Top ten barriers for **universities**
1	IP and other contract negotiations are difficult to complete, processes difficult to navigate, or take too long	1	University metrics, including the REF, prioritise the production of high-quality publications
2	Business find it difficult to identify academic partners or where academic capability lies	2	IP and other contract negotiations are difficult to complete, processes difficult to navigate, or take too long
3	Business and academia operate to different timescales	3	Other pressures on academic time (teaching and research) limit resources for collaboration
4	Lack of funding	4	Lack of funding
=5	Lack of alignment of objectives: tension between business and university needs or objectives	=5	Collaborative experience not valued as part of academic career progression
=5	Lack of trust or mutual understanding	=5	Lack of time/resource for networking or project development
=7	Businesses focus on the short term, rather than long term R&D	=7	Business and academia operate to different timescales
=7	Other funding issues (for example, SME eligibility, subjects within scope)	=7	Tension between academic desire to publish work, and business concerns about competition
9	Low overall levels of business investment in R&D, including a lack of absorptive capacity	9	Lack of trust or mutual understanding
10	Lack of understanding within business of potential benefits of working with universities	10	Low overall levels of business investment in R&D, including a lack of absorptive capacity

Sponsored Consultancy

analysis or technical advice, application of Unibo background knowledge to validate results, implement testing, feasibility studies etc

Typical results are scientific reports

No IP is expected

Sponsored Research

Generation of new knowledge

IP is expected

IPR in university-industry collaboration

University

- ✓ socially oriented
- ✓ wants to turn ideas into cultural, economical, social value
- ✓ needs companies and market to turn ideas to new products and services

Industry

- ✓ profit oriented
- ✓ wants to turn your ideas into money
- ✓ needs university for new ideas to be turned into profitable products and services for the market

IPRs

- ✓ grant competitive advantage to companies
- ✓ ensure commitment in developing ideas to society
- ✓ grant economical returns to industry and research

Intellectual Property Rights increase the opportunities of success in exploiting

Principi 1/2

- Proteggere l'IP sulle conoscenze e informazioni pregresse (Background)
- Proteggere l'IP sulle conoscenze e sulle informazioni che derivano dalla collaborazione (Foreground)
- Proteggere la confidenzialità delle informazioni reciprocamente scambiate
- Garantire ai ricercatori la possibilità di effettuare pubblicazioni
- Applicare correttamente la normativa sull'uso dei segni distintivi (marchio) dell'Ateneo da parte dei committenti

Principi 2/2

- Assicurare i diritti d'accesso dell'università ai risultati della ricerca a scopo di didattica e ricerca interna
- Contemperare il diritto alla pubblicazione dei risultati con gli interessi commerciali delle imprese
- Valorizzare l'IP generata dall'università
- Aumentare numero brevetti di cui è titolare l'università

In sintesi

Consulenza

Mera applicazione di conoscenze
Risultato finale = report scientifico
Non si prevede IP
Es: test, studi fattibilità

Report scientifici sono del committente
Per eventuali risultati IP inattesi si rimanda ad accordo separato

Ricerca

Produzione di nuova conoscenza
Risultato proteggibili da titolo IP

3 opzioni

In sintesi

Opzione 1: FG di Unibo, Unibo può brevettare a proprie spese, committtente ha diritto di opzione per licenza a fronte di corrispettivi da determinare in accordo separato

Opzione 2: FG di Unibo e committente in parti uguali, committente paga brevetti e ha diritto di opzione per licenza esclusiva a fronte di corrispettivo fisso minimo + royalties con fatturato > 1M€

Opzione 3: FG di Unibo e committente in parti uguali, committente paga brevetti e ha diritto di opzione per cessione quota Unibo a fronte di corrispettivo fisso minimo + royalties con fatturato > 1M€

Connecting dots…

TTO → KTO → TMO (Third Mission Office)

Looking for partner needs (and point of view)

Learning from stakeholders beahviour

Means..

New professional/skills need

New organisation