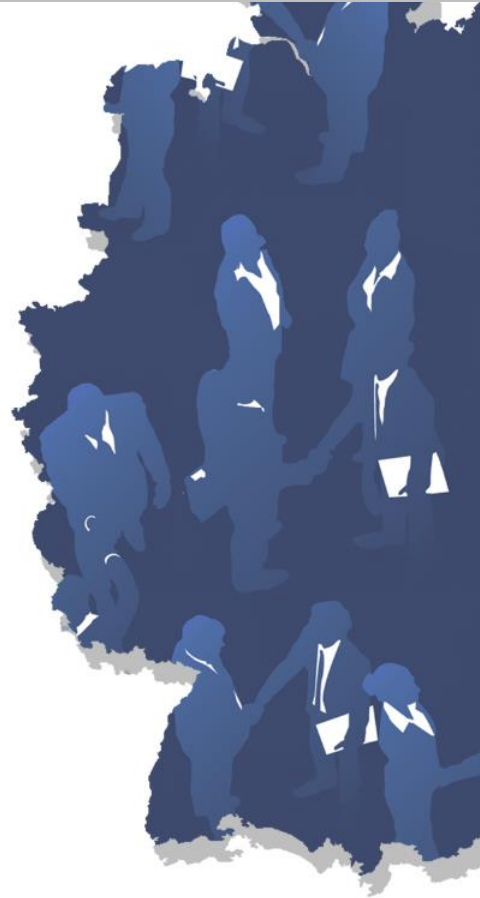# The UBC Ecosystem

Effectively working in University-Business Cooperation (UBC) requires an understanding of:

(i) The key stakeholders (<u>Triple-Helix</u>) involved

(ii) The <u>entire UBC ecosystem</u>
- The actions they can undertake
- What influences their actions
- The impacts of their actions

Describing University-Business Cooperation (UBC)

The UBC Ecosystem

A model for understanding the important elements affecting University-Business Cooperation (UBC)

Presentation at the Pre-Conference Special Events for the Triple Helix Conference
Oxford & Cambridge Club
Malborough Room
Sunday, 7th July, 2013

Todd Davey
Victoria Galan Muros
Thomas Baaken
Arno Meerman

1 Indirect outcome (society)

2 Direct outcome (actors)

3 University-Business Cooperation (UBC) types

4 Influencing factors

5 Supporting mechanisms

6 Key stakeholders

apprimo — innovation and market cultivation

Science Marketing_
Science-to-Business Research Centre Germany

UIIN
University Industry Innovation Network

The UBC Ecosystem was created during the "Study on the cooperation between HEIs and public and private organisations in Europe (HIPPO)"

Client: DG Education and Culture, European Commission

Duration: May 2010 to August 2011 (15.5 months)

4 project partners:

Coventry University

Red OTRI Universidades

Cracow University of Economics

Free University Amsterdam

Project objectives

1. To chart the current situation regarding UBC in Europe,

2. To describe the factors that facilitate or inhibit UBC,

3. To identify and describe 30 examples of good practice in European UBC.

About the study
Largest study ever into European university-business cooperation (UBC)

6,280 full responses (4,123 academics, 2,157 from HEI Mngt.

3

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A. Secondary information search

Literature, published reports (national and EU level), books and journals.

B. Qualitative research

11 expert interviews with European experts in UBC

C. Quantitative research (major survey)

- Survey translated into 22 languages, sent to all European HEIs (3551HEIs) in 33 countries,
- Representative sample achieved 6,280 responses
- Scientific testing of relationships of ecosystem variables

D. Qualitative workshop

12 experts in UBC met in Brussels

E. Case studies

30 good practice European UBC case studies

F. Validation workshops

Validated in workshops with 105 practitioners in Liechtenstein. Netherlands, Germany and Australia

UBC ECOSYSTEM MODEL > Detailed

1 Indirect outcomes

Indirect outcomes for society
Economic and social contribution to society generally

2 Direct outcomes

Direct Outcomes for actors
Contribution to students, academics, HEIs and business

3 University-Business Cooperation types

| Collaboration in R&D | Academic mobility | Student mobility | Commercial-isation of R&D results | Curriculum development & delivery | Lifelong learning | Entrepren-eurship | Governance |

4 Influencing factors

Benefits | Drivers & Barriers | Situational Factors

5 Supporting mechanisms

Strategies | Structures & approaches | Activities | Framework Conditions

6 Key stakeholders

HEIs
Mngt. | KTPs | ACAD

Business

Government
EU | Nat. | Local

1. INDIRECT OUTCOMES

DEF Refers to the <u>indirect outcomes</u> experienced by society generally from UBC.

The indirect social contribution of UBC includes:

- creates <u>jobs</u> and stimulates <u>economic growth</u>,
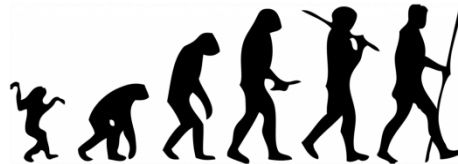- increases <u>living standards</u>, <u>productivity</u> and <u>social cohesion</u>.

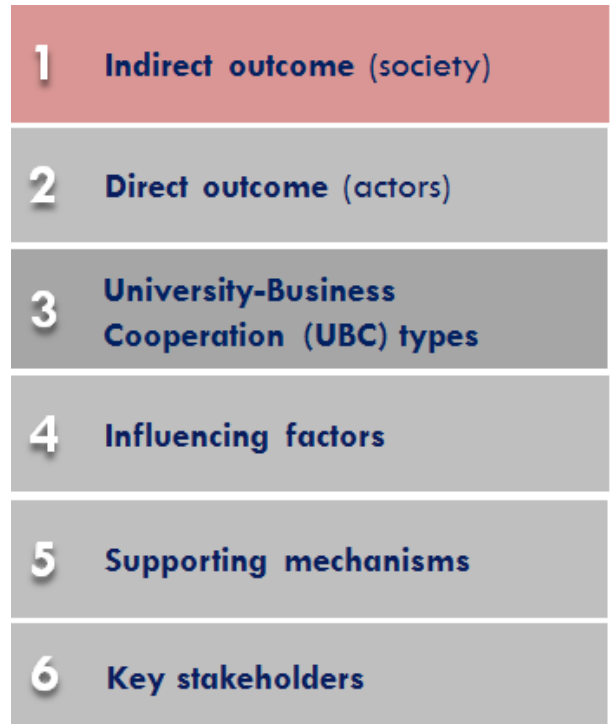> **Farming (land)**

  > **Industrial age (labour)**

  > # Knowledge society

  Consisting of:

  (1) Innovation

  (2) Education,

  (3) ICT

  (4) Science & Technology

  HEIs have a crucial role

1	Indirect outcome (society)
2	Direct outcome (actors)
3	University-Business Cooperation (UBC) types
4	Influencing factors
5	Supporting mechanisms
6	Key stakeholders

<u>ACTION</u>: Promote ways of measuring and recognising this contribution

Validation: Literature, expert interviews and 30 case studies show that UBC is crucial for creating a knowledge society

Indirect Outcome 1

UBC is a <u>crucial activity</u> in the development of a knowledge society

.. which <u>indirectly contributes to the social and economic development</u> of the whole society

7

2. DIRECT OUTCOMES

DEF Refers to the <u>direct outcomes</u> experienced by an HEI/business/academic/student from UBC specifically in regard to:

1. <u>teaching</u>,
2. <u>research</u> and
3. <u>knowledge transfer</u>

The following stakeholder outcomes have been documented:

HEIs	Academics	Business
Improving/increasing • future <u>job prospects of students</u>, • the research conducted within the HEI, • transfer of knowledge and technology to society • increasing third-party money	• more <u>relevent research and teaching</u> content • better / greater opportunities to fund projects • more publishing opportunities	• drives local business through <u>product and service development</u>, • drives necessary skills and knowledge • drives future income

1 Indirect outcome (society)

2 Direct outcome (actors)
   Students | Academics | HEIs | Business

3 University-Business Cooperation (UBC) types

4 Influencing factors

5 Supporting mechanisms

6 Key stakeholders

<u>ACTION</u>: Promote these outcomes with stakeholders

Validation: Literature, expert interviews and 30 case studies show that UBC is crucial for creating a knowledge society

Direct Outcome

2

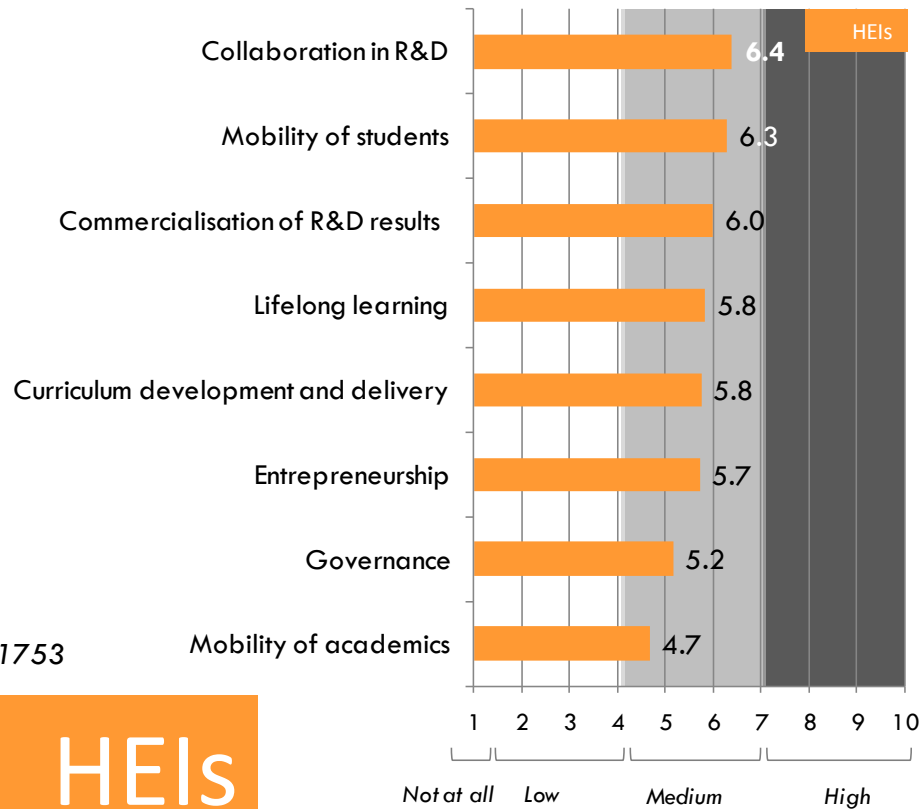## UBC is a crucial activity for each of the stakeholders groups involved

… which <u>directly</u> benefits HEIs, business, academics and students in respect to research, teaching, knowledge transfer and innovation

9

DEF Refers to the <u>extent of UBC</u> being undertaken by a <u>HEI or an academic</u>.

There are eight types of UBC… with different levels of development (results below from European HEIs)

Collaboration in R&D — 6.4
Mobility of students — 6.3
Commercialisation of R&D results — 6.0
Lifelong learning — 5.8
Curriculum development and delivery — 5.8
Entrepreneurship — 5.7
Governance — 5.2
Mobility of academics — 4.7

n=1753

HEIs

Not at all   Low   Medium   High

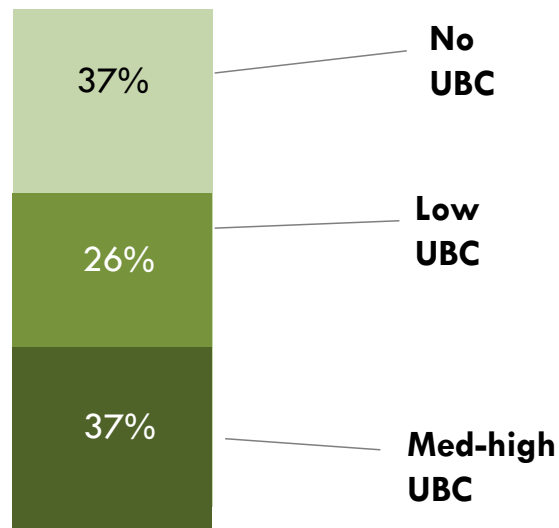| 1 | Indirect outcome (society) |
2	Direct outcome (actors)
3	University-Business Cooperation (UBC) types
	8 types of cooperation
4	Influencing factors
5	Supporting mechanisms
6	Key stakeholders

ACTION: Promote all the 8 types of UBC

3. EXTENT OF UBC

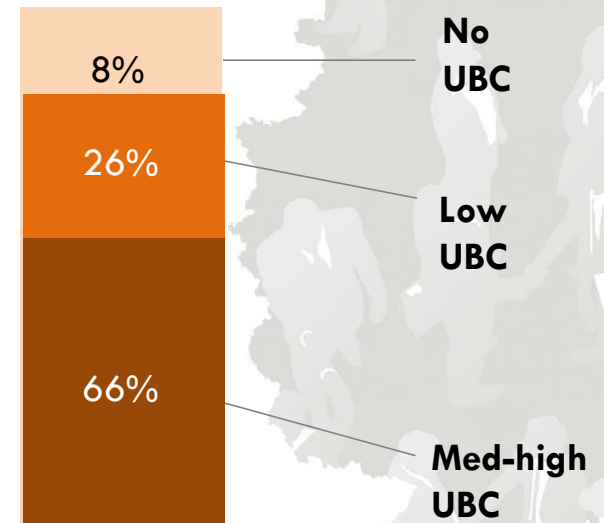**Approximately <u>2 of every 5 academics</u> are responsible for most of the UBC activity**

<u>1 of every 3 HEIs</u> undertake no or a low amount of UBC activity

Academic UBC in Europe
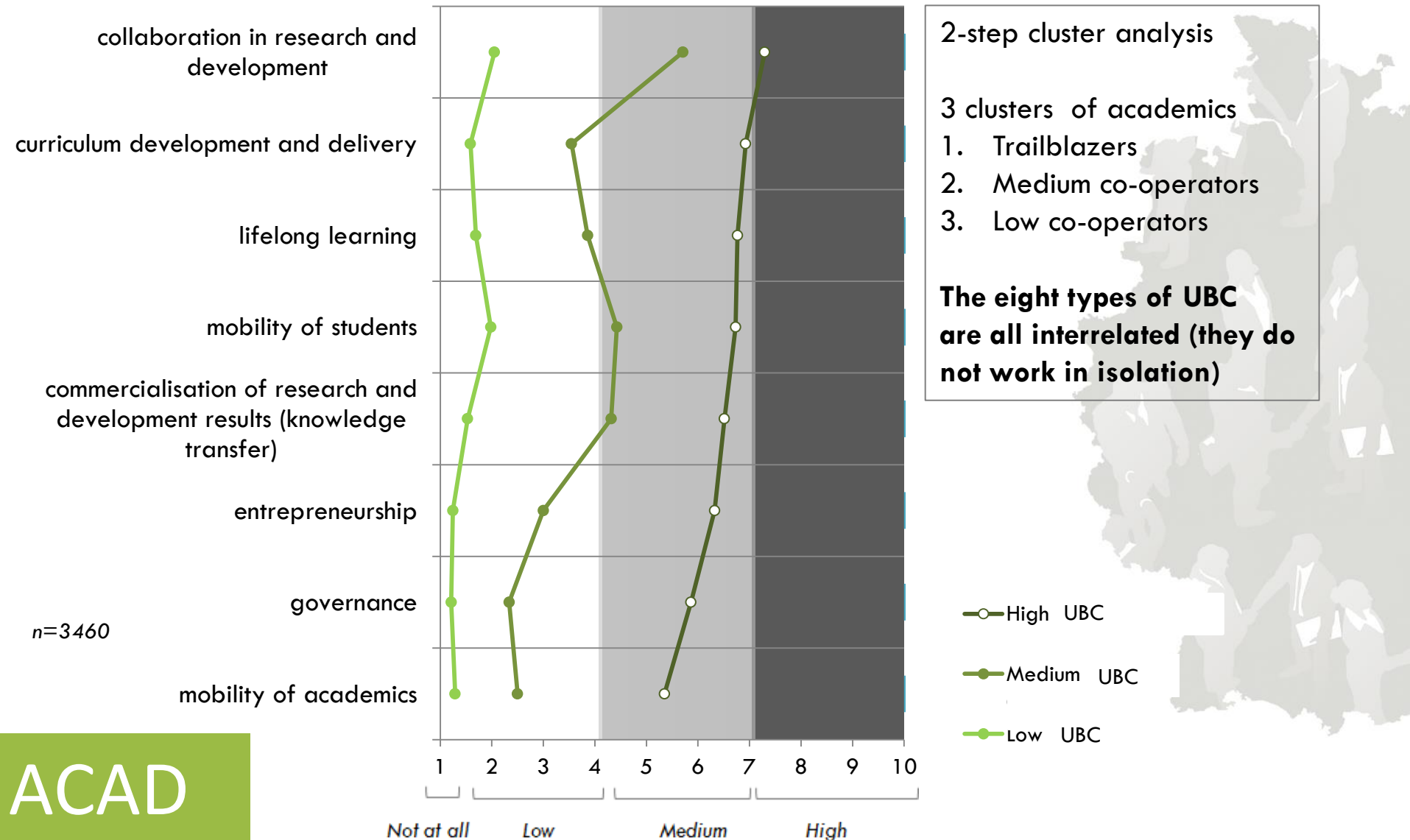
37% — No UBC

26% — Low UBC

37% — Med-high UBC

n=6280

HEI UBC in Europe

8% — No UBC

26% — Low UBC

66% — Med-high UBC

n=2136

ACAD

HEIs

11

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11

collaboration in research and development

curriculum development and delivery

lifelong learning

mobility of students

commercialisation of research and development results (knowledge transfer)

entrepreneurship

governance

mobility of academics

n=3460

1 2 3 4 5 6 7 8 9 10

Not at all   Low   Medium   High

2-step cluster analysis

3 clusters of academics
1. Trailblazers
2. Medium co-operators
3. Low co-operators

The eight types of UBC are all interrelated (they do not work in isolation)

—○— High UBC

—●— Medium UBC

—●— Low UBC

ACAD

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12

Types of UBC

3

There are eight types of UBC which are all interrelated (they do not work in isolation)

Those types of UBC offering:
1. more direct,
2. measurable, and
3. promotable benefits…
are the most developed ones.

Influencing factors explain the aspects that effect the extent of UBC for academics and HEIs.

Influencing factors are:

a) Situational factors
(e.g. age, faculty, years in business, etc.)

b) Barriers

c) Drivers

d) Perceived benefits

1	Indirect outcome (society)
2	Direct outcome (actors)
3	University-Business Cooperation (UBC) types
4	Influencing factors
	Situational factors / Barriers / Drivers / Benefits
5	Supporting mechanisms
6	Key stakeholders

Validation: Literature, expert interviews, 30 case studies, a survey pre-test and then quantitative analysis of the major study provided the validation of the importance of each of the influencing factors. Furthermore Kruskal-Wallis tests confirmed their significant influence on the extent of UBC.
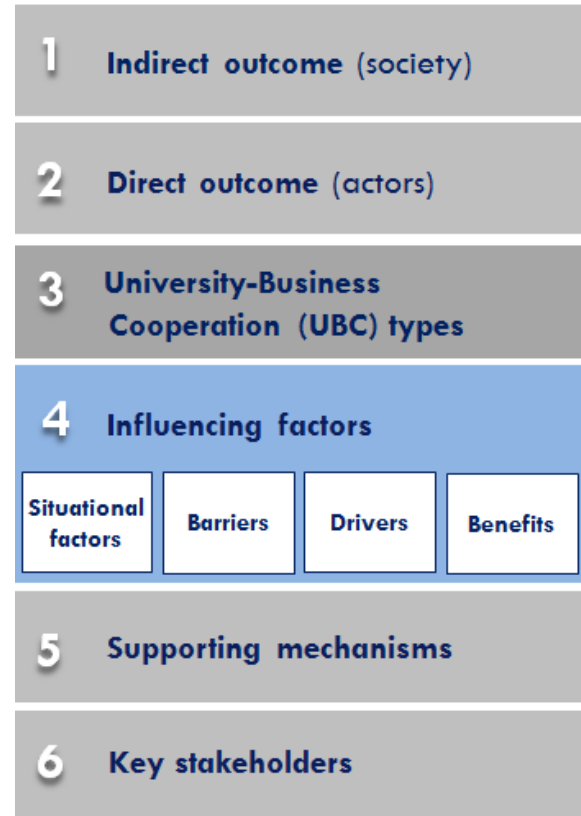
ACTION: Consider the four different factors and their effects on UBC

All Situational factors help to explain UBC

Gender

Years working in the HEI

Age

Years working in business
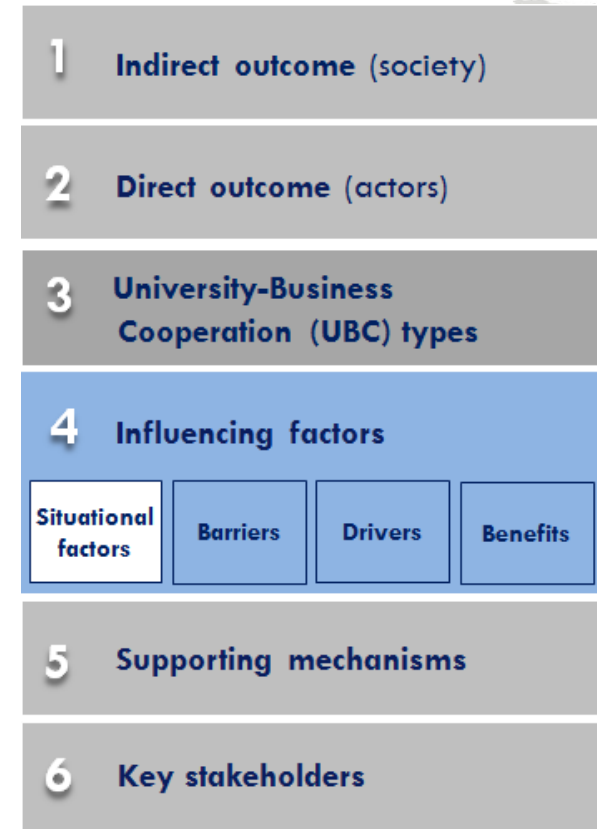
Country

The type of HEI they work for

Faculty

...but only a few of them have practical implications

Finding: The extent of UBC is significantly higher with those academics with some experience in business

Scale: 1 = none,
>1 - 4 = low;
>4 - 7 = medium;
>7 - 10 = high

Years in business	Extent of UBC
None	3.4
> 0 - 2	3.9
> 2 – 5	4.2
> 5 – 9	4.4
> 9 - 19	**4.5**
> 19 years	**4.5**

ACAD

1	Indirect outcome (society)
2	Direct outcome (actors)
3	University-Business Cooperation (UBC) types
4	Influencing factors
	Situational factors / Barriers / Drivers / Benefits
5	Supporting mechanisms
6	Key stakeholders

ACTION: Employ academics with business experience or provide opportunities for academic mobility

Country	Collaboration in R&D	Mobility of academics	Mobility of students	Commercialisation of R&D Findings	Curriculum development and delivery	Lifelong learning	Entrepreneurship	Governance	Total UBC
Austria	6.7	3.8	5.1	5.5	5.0	5.4	4.5	4.4	**5.0**
Belgium	6.3	4.5	5.9	5.6	5.5	5.4	5.6	4.5	**5.4**
Bulgaria	5.4	5.4	6.0	4.8	5.7	6.4	5.6	5.5	**5.8**
Czech Republic	6.1	5.0	5.8	5.0	6.3	6.3	4.0	3.9	**5.3**
Denmark	6.3	4.8	6.7	5.4	5.8	6.3	6.0	4.7	**5.8**
Estonia	5.1	4.1	5.2	4.7	6.9	6.4	4.9	4.0	**5.1**
Finland	7.4	5.3	7.0	5.4	5.9	6.6	6.0	5.0	**6.2**
France	6.8	4.0	6.8	5.2	6.3	6.2	6.0	5.9	**5.9**
Germany	7.2	4.6	6.7	5.9	4.9	5.3	5.6	4.7	**5.6**
Hungary	6.4	4.6	5.4	4.7	6.1	6.2	4.8	5.1	**5.6**
Ireland	7.9	5.1	7.2	7.7	7.3	7.1	7.6	6.8	**6.9**
Italy	5.8	4.8	6.0	5.0	5.9	5.5			
Latvia	6.4	5.9	7.2	4.4	6.7	6.8			
Lithuania	4.9	5.9	7.2	4.4	6.7	6.8			
Netherlands	6.4	4.6	6.1	5.4	5.2	5.4			
Norway	6.5	4.0	5.3	4.7	4.5	4.7			
Poland	4.9	4.4	5.5	4.0	5.1	5.2			
Portugal	6.0	4.8	6.8	4.8	6.0	6.4			
Romania	6.8	6.3	7.2	5.5	6.9	7.0			
Slovakia	5.1	4.8	5.4	4.4	4.9	5.5			
Spain	6.9	4.9	6.6	6.1	5.7	6.4			
Sweden	7.0	4.4	5.4	6.2	5.5	5.8			
Turkey	5.6	5.0	5.4	4.5					
United Kingdom	7.6	5.4	6.5	7.4					
AVERAGE	**6.3**	**4.9**	**6.2**	**5.3**					

GERMANY
Above average in
1. Collaboration in R&D
2. Commercialisation of R&D

Below average in
1. Curriculum development & Delivery
2. Lifelong learning
3. Governance

HEIs

Scale: 1 = No UBC, >1 - 4 = low ; >4 - 7 = medium ; >7 - 10 = high

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Situational factors

4a

Situational factors help to explain UBC

...although only a few of them have practical implications

4. INFLUENCING FACTORS > <u>Barriers</u> to UBC

<u>Barriers</u> are those obstacles that restrict or inhibit the ability of the academic or HEI to engage in UBC.
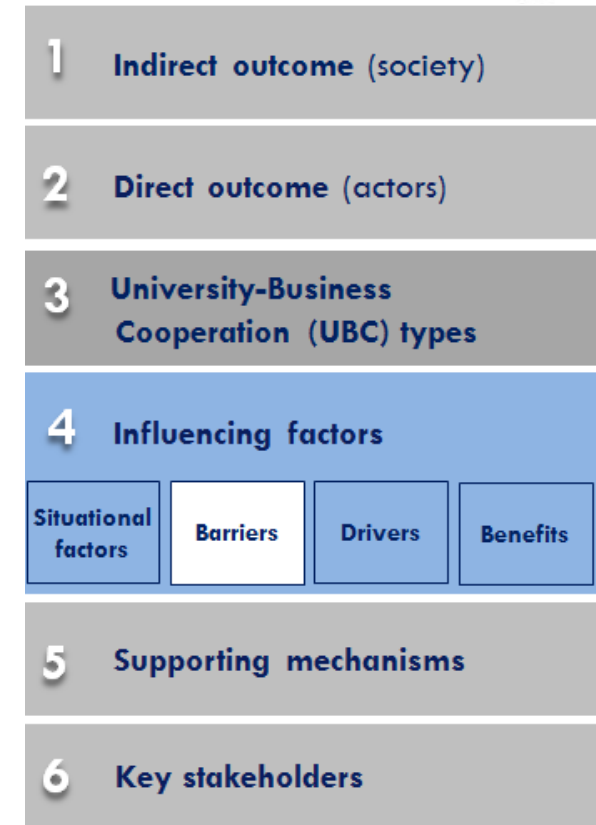
Three groups of UBC barriers
Resulting from an analysis of the results, barriers can be categorised in the following groups:
I.   usability of results,
II.   funding barriers and
III.   relationship barriers.

Barriers to UBC measured included:
'Lack of external funding for University-Business cooperation', 'Lack of financial resources of the business', 'Business lack awareness of university research activities / offerings', 'The current financial crises', 'Lack of university funding for University-Business cooperation', 'Differing time horizons between university and business', 'The limited absorption capacity of SMEs to take on internships or projects', 'The need for business to have confidentiality of research results', 'Bureaucracy within or external to the university', 'Differing motivation / values between university and business', 'The focus on producing practical results by business', 'Universities lack awareness of opportunities arising from University-Business cooperation', 'Business fear that their knowledge will be disclosed', 'Limited ability of business to absorb research findings', 'Differing mode of communication and language between university and business', 'Difficulty in finding the appropriate collaboration partner', 'A lack of contact people with scientific knowledge within business', and 'No appropriate initial contact person within either the university or business'.

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18

Most important barriers for **academics**

1. Bureaucracy within or external to the HEI (7.3)
2. Lack of HEI funding for UBC (6.9)
3. Lack of external funding for UBC (6.9)

Most important barriers for **HEIs**

1. Lack of external funding for UBC (7.0)
2. Lack of financial resources of the business (6.9)
3. Business lack awareness of HEI activities (6.9)

Scale: 1 = No importance, - 10 = high importance

Finding: All European academics and HEI representatives see the same barriers to UBC no matter their extent of cooperation

1	Indirect outcome (society)
2	Direct outcome (actors)
3	University-Business Cooperation (UBC) types
4	Influencing factors
	Situational factors — Barriers — Drivers — Benefits
5	Supporting mechanisms
6	Key stakeholders

ACTION: Remove barriers to UBC for academics and HEIs especially funding and bureaucracy

UBC Barriers

4b

Lack of funding and excess of bureaucracy at all levels (HEI, national, European) are the highest barriers to UBC
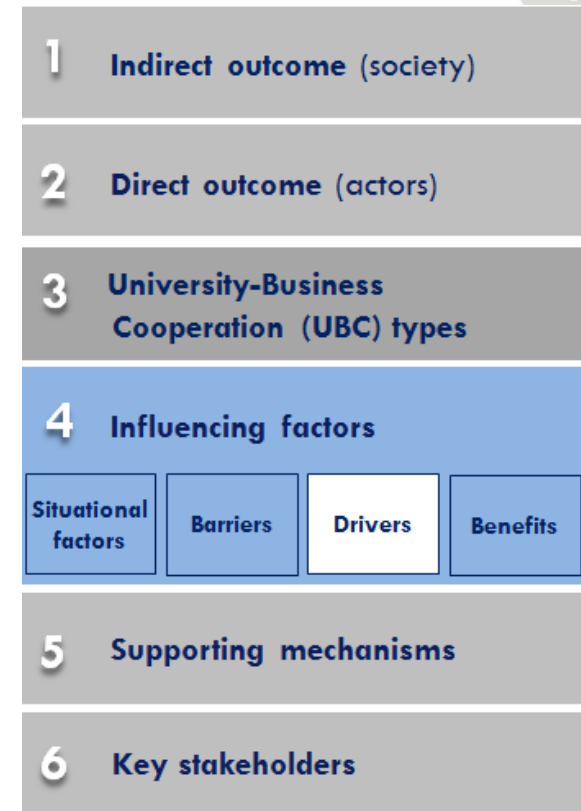
… but removal of barriers does not necessarily create UBC

<u>*Drivers*</u> are those factors that facilitate the academic or the HEI to engage in UBC.

Two groups of UBC drivers
Resulting from an analysis of the results, drivers can be categorised in the following groups:
I.   Relationship drivers and
II.   Outcome drivers

Drivers of UBC measured included:
'Commercial orientation of the university', 'Possibility to access funding /financial resources for working with business7', 'Flexibility of business partners', 'Interest of business in accessing scientific knowledge', 'Access to business-sector research and development facilities', 'Employment by business of university staff and students', 'Short geographical distance of the university from the business partner', 'Existence of mutual trust', 'Existence of mutual commitment', 'Having a shared goal', 'Understanding common interest by different stakeholders (e.g. universities, business, individuals, students)', 'Prior relation with the business partner', and 'Cooperation as effective means to address societal challenges and issues'.

Most important drivers for **academics**

1. Existence of mutual trust (7.4)
2. Existence of mutual commitment (7.0)
3. Having a shared goal (7.0)

Most important drivers for **HEIs**

1. Existence of mutual trust (7.5)
2. Existence of mutual commitment (7.1)
3. Having a shared goal (7.1)

Scale: 1 = No importance, - 10 = high importance

Finding: Those academics or HEIs perceiving higher drivers for UBC are more engaged in UBC than those perceiving low drivers for UBC

1	Indirect outcome (society)
2	Direct outcome (actors)
3	University-Business Cooperation (UBC) types
4	Influencing factors

| Situational factors | Barriers | Drivers | Benefits |

| 5 | Supporting mechanisms |
| 6 | Key stakeholders |

ACTION: Support the creation and development of long-term personal relationship (partnerships)

UBC Drivers

4c

Personal relationships drive UBC. It's a people game!

Existence of mutual trust and commitment are the most important drivers of UBC for both academics and HEIs.

Those academics or HEIs perceiving higher drivers for UBC are more engaged in UBC than those perceiving low drivers for UBC

23

<u>*Benefits*</u> are the advantages that are received by the stakeholders from undertaking UBC.

Four groups of UBC benefits for academics
Resulting from an analysis of the results, benefits for academics can be categorised in the following groups:
(I)   benefits for students,
(II)   benefits for business,
(III) benefits for HEIs and
(IV) personal benefits for academics.

1	**Indirect outcome** (society)
2	**Direct outcome** (actors)
3	**University-Business Cooperation (UBC) types**
4	**Influencing factors**

Situational factors	Barriers	Drivers	Benefits

|	
5	**Supporting mechanisms**
6	**Key stakeholders**

Benefits from UBC measured included:
Benefits for students (improving the learning experience of students, increasing skills and graduate development, improving the employability of future graduates), benefits for business (improves the performance of business), benefits for society (increasing local employment, benefitting the local industry, increasing local GDP and disposable income, creating a variety of range of social and recreational benefits, and improving regional productivity), benefits for HEIs (achieving the mission of the HEI), and personal benefits for academics (increasing the academics reputation in the field, being vital for personal research, increasing chances of promotion and employability, and improving the standing within the HEI).
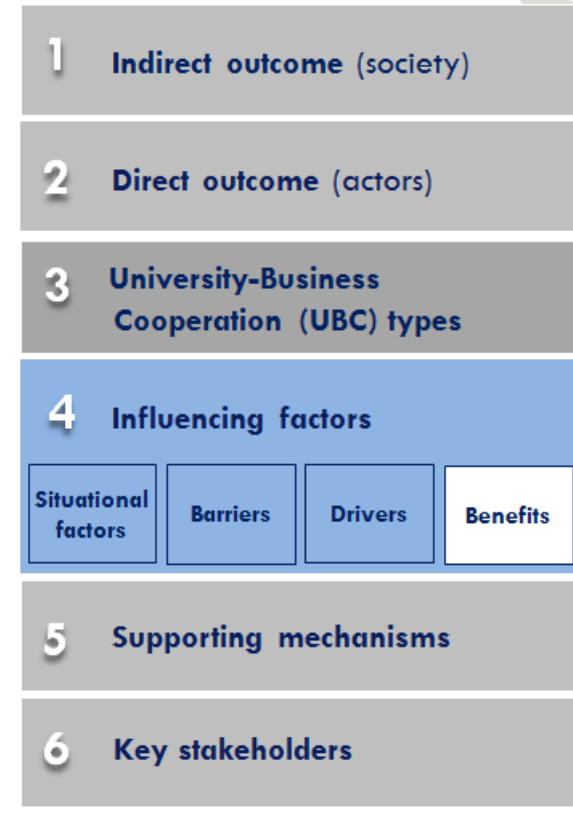
Perceptions of high benefits & incentives drive UBC.

|	
1 Students	
2 Business	
3 HEI	
4 Academics	
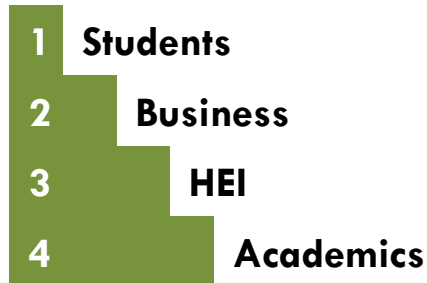
Academics recognise benefits for different stakeholders... however to a <u>lower extent the personal benefits</u> they receive from UBC.

1 Students	
2 Business	
3 HEI	
4 Society	

HEIs rated the highest benefits for students, followed by business...
then <u>the ability of UBC to contribute to the mission of the HEI in third place</u> with the lowest benefits perceived for society.

1 Indirect outcome (society)

2 Direct outcome (actors)

3 University-Business Cooperation (UBC) types

4 Influencing factors

| Situational factors | Barriers | Drivers | Benefits |

5 Supporting mechanisms

6 Key stakeholders

Finding: The higher the perceived personal benefits of UBC, the higher the extent of UBC carried out
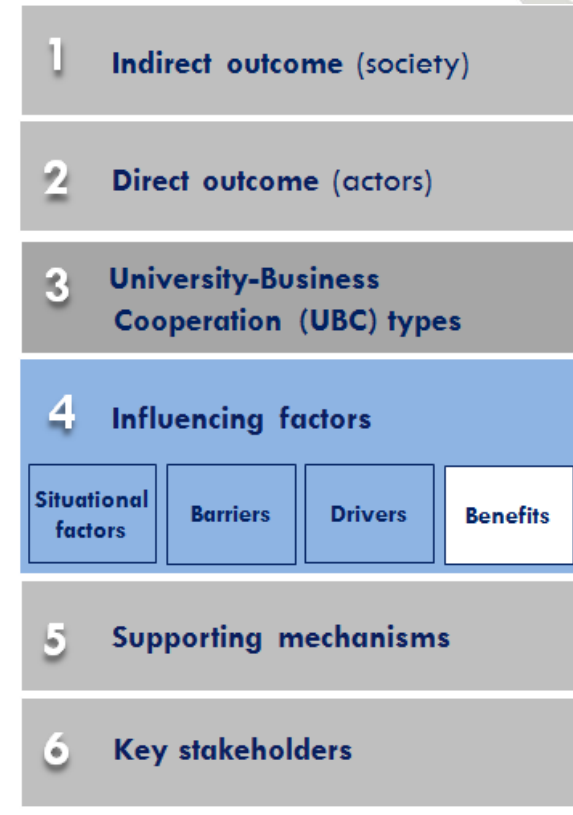
<u>ACTION</u>: In order to encourage UBC, the right incentives need to be in place

Perceived benefits

4d

Perceptions of high benefits & incentives drive UBC

The perception of self-benefit is a major factor in UBC.

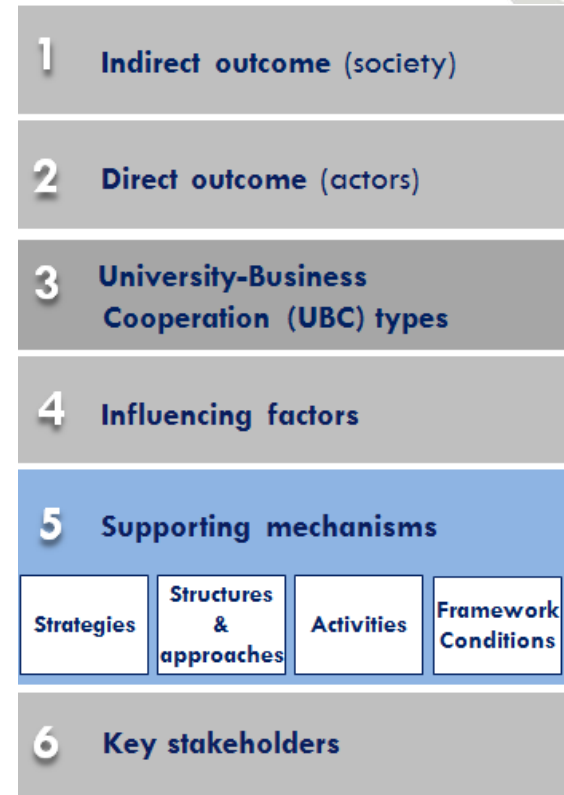The higher the perceived benefits, the higher the extent of UBC carried out.

DEVELOPMENT

The development of the mechanisms supporting
UBC in Europe from the most developed to least are:
1. _Operational activities_ (5.4),
2. _Structures and approaches_ (5.1),
3. _Strategies_ (4.9), and
4. _Framework conditions_ (4.5).

Scale: 1 - 4 = low ; >4 - 7 = medium ; >7 - 10 = high

Finding: The UBC supporting mechanisms that
are easier to implement (e.g. activities) are
more developed than those (e.g structures)
that are more difficult (costly, time-consuming)
to implement

1	Indirect outcome (society)
2	Direct outcome (actors)
3	University-Business Cooperation (UBC) types
4	Influencing factors
5	Supporting mechanisms

| Strategies | Structures & approaches | Activities | Framework Conditions |

| 6 | Key stakeholders |

ACTION   A greater focus on strategies (especially implementation strategies) is required

5. SUPPORTING MECHANISMS

IMPACT

It was found that the impact of the *Supporting Mechanisms* on European UBC is (from the highest to lowest):
1. *Strategies (58%)*
   (especially implementation strategies)
2. *Operational activities (53%),*
3. *Structures and approaches (52%),* and
4. *Framework conditions (40%).*

Finding: It was found that having a dedicated:
1. strategy,
2. program,
3. agency, and/or
4. responsible person
has a substantial impact on the extent of European UBC.

1	Indirect outcome (society)
2	Direct outcome (actors)
3	University-Business Cooperation (UBC) types
4	Influencing factors
5	Supporting mechanisms
	Strategies / Structures & approaches / Activities / Framework Conditions
6	Key stakeholders

Finding: It was found that those mechanisms with the highest impact are the least developed ones so a refocus is needed
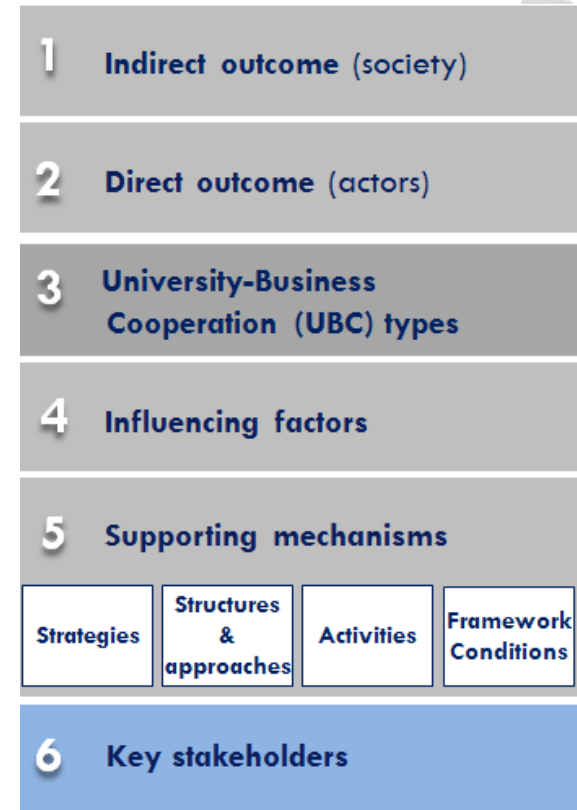
Supporting mechanisms

5

The creation and development of supporting mechanisms are critical for UBC

The UBC supporting mechanisms that are easier to implement, are much more developed than those that are more difficult to implement.

Some supporting mechanisms have a higher impact in UBC than others!

29

6. STAKEHOLDERS

Stakeholder	Explanation
Governments	Includes all levels of governments ranging from regional or national to international involved in supporting and developing UBC
HEIs	HEI representatives include: 1. University management 2. University professional working with business 3. Academics (incl. professors, researchers and lecturers)
Business	Business is considered in a broad sense in the study to include: 1. Privately and publicly owned organisations, 2. Non-government organisations, 3. Not-for-profit organisations
Intermediaries	Intermediaries in UBC can be understood as those organisations not necessarily owned or managed by either the Government or HEI that facilitate UBC. These include: chambers of commerce, business associations, investor groups and regional development agencies.

1 Indirect outcome (society)

2 Direct outcome (actors)

3 University-Business Cooperation (UBC) types

4 Influencing factors

5 Supporting mechanisms

| Strategies | Structures & approaches | Activities | Framework Conditions |

6 Key stakeholders

ACTION The development of a well-connected, proactive and supporting UBC stakeholder community is crucial for developing UBC

Stakeholders

6

The presence a of prosperous, well-connected, proactive and supporting UBC stakeholder community is crucial for developing UBC

UBC stakeholders include: the triple helix of governments, HEIs and business as well as their intermediaries

UBC ECOSYSTEM MODEL > Detailed

1 Indirect outcomes

Economic development
Contribution to society generally

2 Direct outcomes

Outcomes
Contribution to students, academics, HEIs and business

3 University-Business Cooperation types

| Collaboration in R&D | Academic mobility | Student mobility | Commercial-isation of R&D results | Curriculum development & delivery | Lifelong learning | Entrepren-eurship | Governance |

4 Influencing factors

Benefits | Drivers & Barriers | Situational Factors

5 Supporting mechanisms

Strategies | Structures & approaches | Activities | Framework Conditions

6 Key stakeholders

HEIs
Mngt. | KTPs | ACAD

Business

Government
EU | Nat. | Local

UBC ECOSYSTEM > Relationships explained

3 University-Business Cooperation types

University-Business Cooperation

| Collaboration in R&D | Academic mobility | Student mobility | Commercial-isation of R&D results | Curriculum development & delivery | Lifelong learning | Entrepren-eurship | Governance |

**4** Influencing factors

NB. Relationships scientifically tested using the hippo data are marked in green (a factors relationship with the extent of UBC is proven) and red (a factor relationship on the extent of UBC is not proven)

Benefits   Drivers   Barriers   Situational Factors

5 Supporting mechanisms

Strategies   Structures & approaches   Activities   Framework Conditions

HEIs
Mngt.   KTPs   ACAD

Business

Government
EU   Nat.   Local
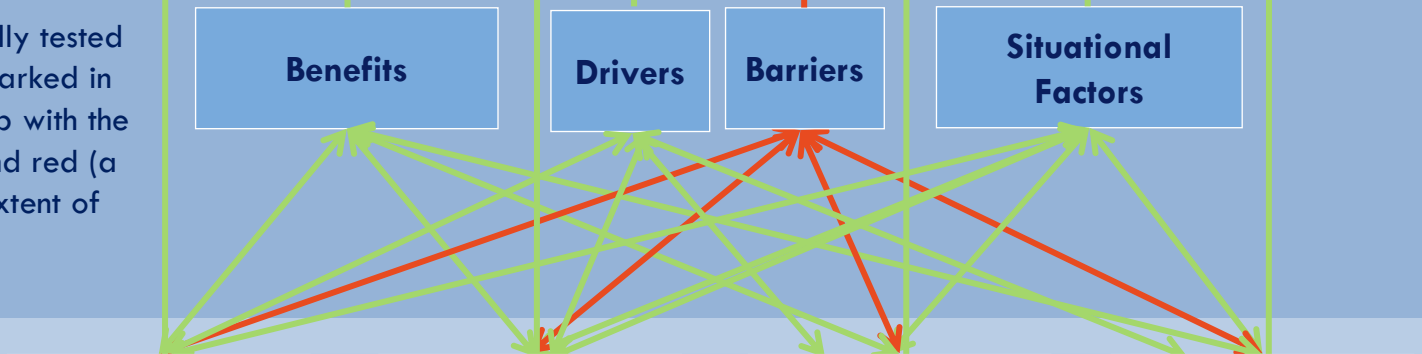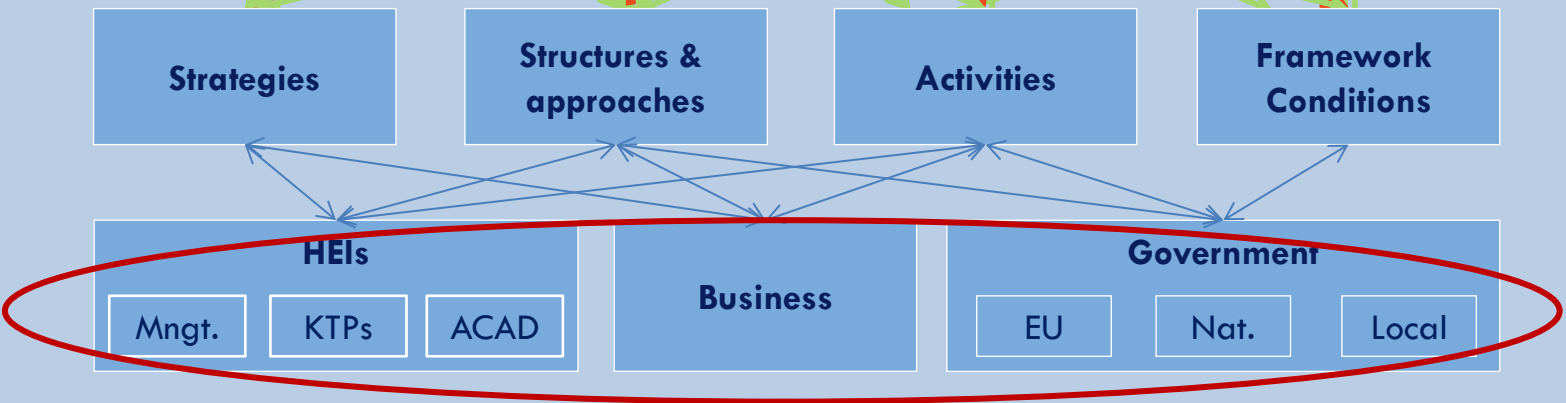
6 Ecosystem Elements (and their key findings)

1. UBC is <u>vital in creating a knowledge society</u>

2. UBC provides <u>direct outcomes</u> for students, HEIs, academics and businesses

3. Those UBC types with more <u>direct, measurable, and promotable benefits are the most developed</u> (e.g. collaboration in R&D, mobility of students)

4a. Situational factors (e.g. age, faculty) <u>help to explain UBC but</u> there is little that can be implemented from these results

4b. <u>Lack of funding and excess of bureaucracy</u> at all levels (HEI, national, European) are the highest barriers to UBC

4c. <u>Personal relationships drive UBC.</u> It's a people game!

4d. European academics perceive <u>low benefits from UBC</u>. Perceptions of high personal <u>benefits & incentives are motivators of UBC</u>.

5. The <u>creation and development of supporting mechanisms</u> (especially those with the highest impact) are critical for UBC

6. In the UBC ecosystem, the <u>multiple actors need to work cooperatively</u> and in a coordinated manner

BENCHMARK

...universities in your region
...your university!

Using the State of European University-Business Cooperation (HIPPO) study results, decision makers, managers and practitioners involved in UBC can benefit from receiving:

1. a benchmark in terms of UBC of your <u>organisation, institution, sector, region or country</u> against others.
2. a clear picture of progress in efforts to increase UBC,
3. proactive areas of focus for increasing UBC,
4. the required information to advance UBC within their region or institution

Provided to your organisation in the form of a report and/or presentation.

Please contact <u>davey@apprimo.com</u>

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