



**Bureau
d'économie
théorique
et appliquée
(BETA)
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*"Role of Research Infrastructures for
a Competitive Knowledge
Economy" □ 29-30 June, EC Brussels*

The case of the BBMRI economic impact study

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BBMRI as a RI

RIs: facilities, resources (incl. associated human resources) or services of a unique nature that have been identified by pan-European research communities to conduct top-level activities in all fields. This covers:

- Major equipment or group(s) of instruments used for research purposes;
- Permanently attached instruments, managed by the facility operator for the benefit of all users;
- Knowledge based-resources such as collections, archives, structured information or systems related to data management, used in scientific research;
- Enabling Information and Communication Technology-based infrastructures;
- Any other entity of a unique nature that is used for scientific research.

RIs may be ‘**single-sited**’ (a single resource at a single location) or ‘**distributed**’ (a network of distributed resources), and may be at least partly ‘**virtual**’ (the service is provided electronically).

- Mix between research tools and research results
- Extreme variety of BB (size, contents, ...) and hosting actors
=> network of networks
- RI builders are also users
- Dynamics : new BB may join/be added



Evaluation of the impact of BBMRI

- work in progress : started feb 2009 - planned end : nov. 2009
- economic and health impact
- **Technopolis**
 - ex-ante evaluation
 - economic and health impact of BBMRI
 - logic model (objectives - activities - impact)
 - multi-dimensional
- **FhG-IBMT (Institut Biomedizinische Technik) Saarbrücken**
 - one case study of the biobank “EuroCryoSaar”
 - (“biobank holding” for samples coming from the FhG and from commercial and non-commercial customers)
- **BETA**
 - (part of) economic impact
 - ex-post evaluation
 - small-scale study
 - focus on BBN members: mainly effects for these members
 - adaptation/evolution of an existing evaluation method (“BETA approach”)



The original BETA approach

RD programmes (RD content - project characteristics : limited in goals, time)
especially collaborative ones

Ex. FP programmes (RD collaborative projects, public co-funding)
 European Space Agency programme (large infrastructure / technical
 projects, public procurement)
 Material Ireland (private/public funded technical centers)
 French national programme for SMEs (refundable grants)
 CERN (Research infrastructure)

Sampling (participants / projects)

Micro evaluation and sum up of results at sample level

Data collection based on direct interviews

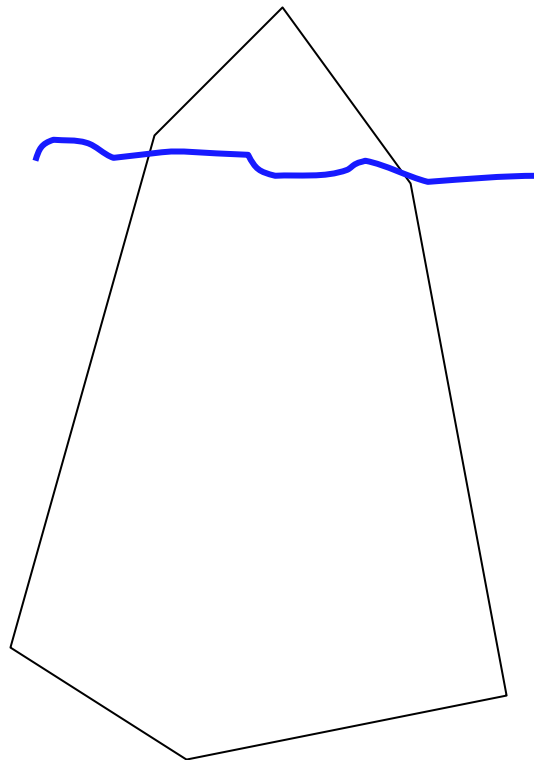


- **Effects** : for participants only
 - Direct effects : fit with objectives
 - Indirect effects** : beyond objectives - various learning effects affecting other activities than those related to evaluated activities
 - scientific and technological
 - networking, relational
 - organisational changes (internal)
 - methods, modes of management
 - reputation
 - critical mass
- **Identification of effects / learning processes** (intra & inter partners)
- **Quantification** :
 - products/services sales, cost reductions, new research projects, revenues from licenses etc
 - proxy value for knowledge assets (patent, staff)
 - "coefficient of influence" : very seldom 100%, minimal estimates



EUREKA 2006 : the "Iceberg" Model

Survey + Case studies - partly based on BETA approach



Sales of innovative product

Reduced process cost

Licence income

Firm strategy, organisation and method learning

Use of technology in other parts of the business

New contracts/networks & prestige

Employment, competences and training

Spillovers to non participants

Use and social benefits

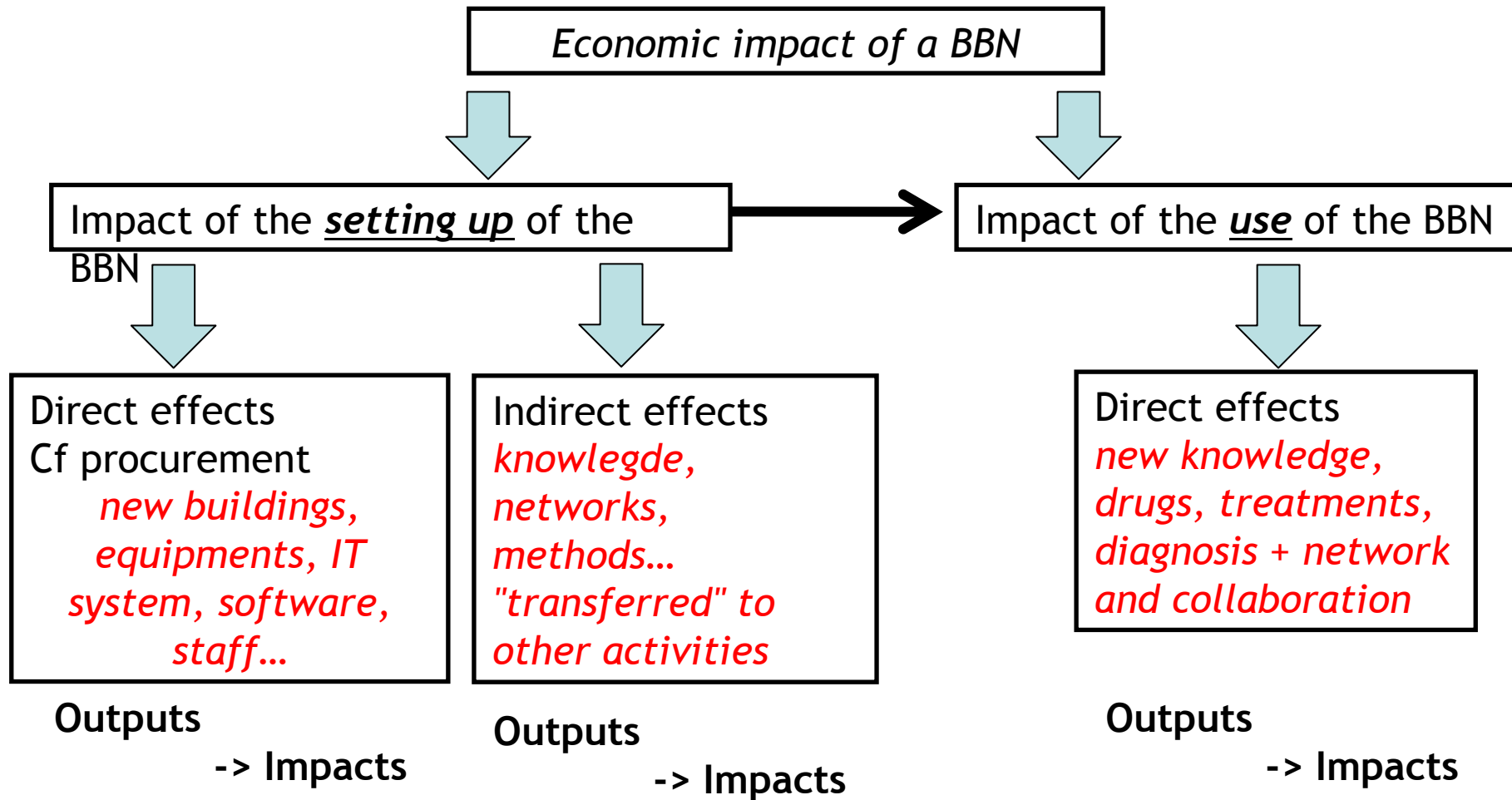


BETA approach in BBMRI evaluation :

exploratory work=> study not on BBMRI directly but on some existing BBNs, with a view of designing evaluation approach and tools, testing feasibility and exploring potential futur impacts in the case of BBMRI



TYOLOGY OF EFFECTS

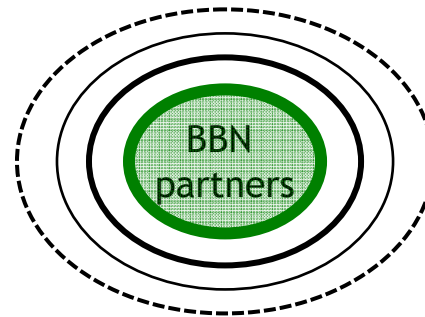




Outputs (outcomes).....> Impacts

indicators

indicators



Key points :

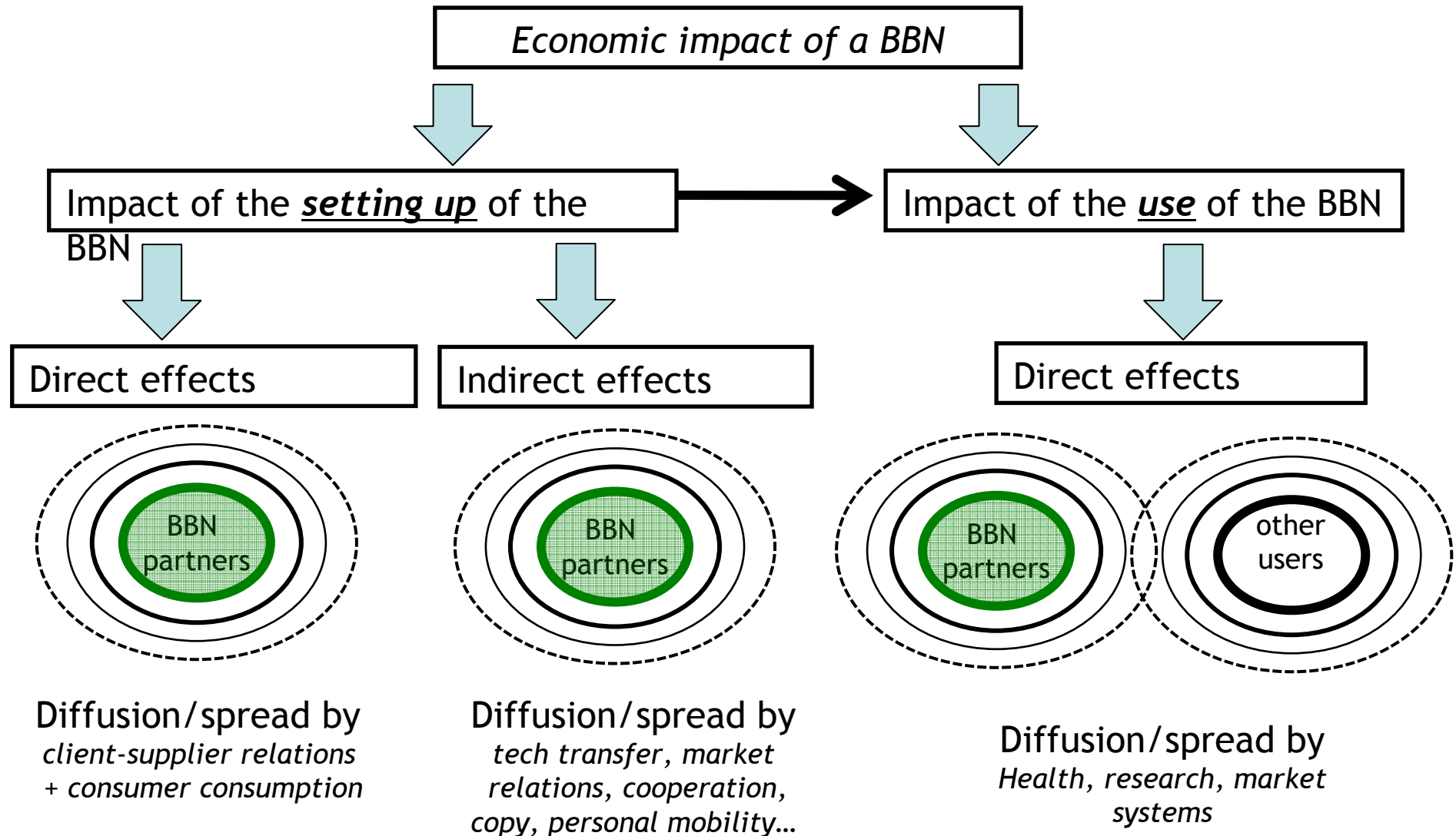
PROPAGATION of effects (short term -> long term,
 participants -> non participants, micro -> meso -> macro)
SEPARABILITY among factors generating effects (project
 fallacy, complementary assets for innovation, between
 partners if collaborative projects...)



Need of models, theoretical background (actors,
 relation between actors, time horizon, positive vs
 negative effects=normative reference...)

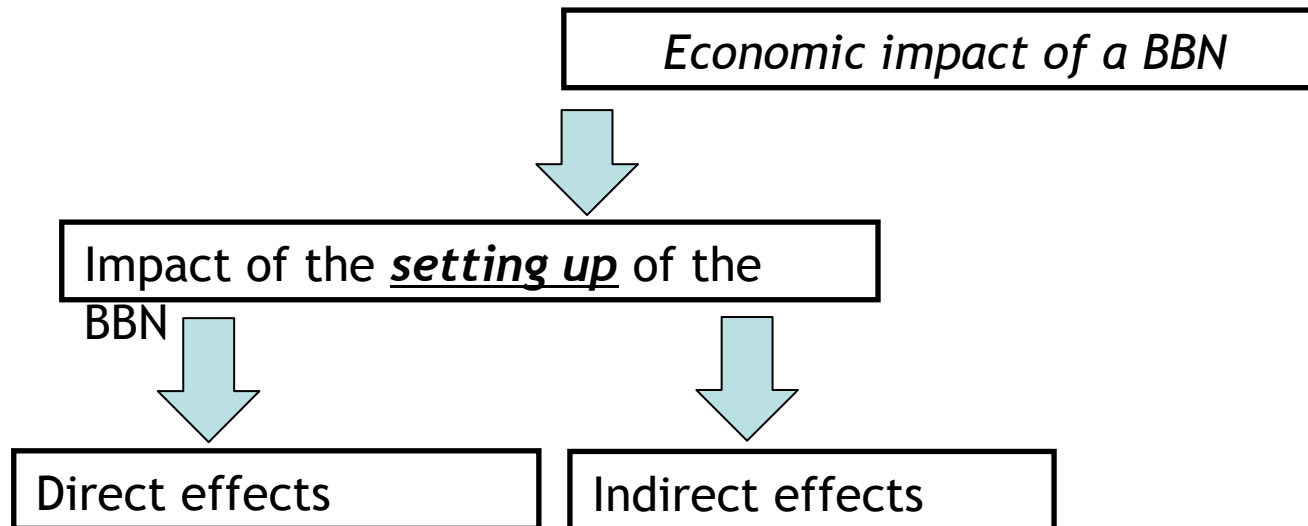


ACTORS AFFECTED/COVERED BY THE EVALUATION



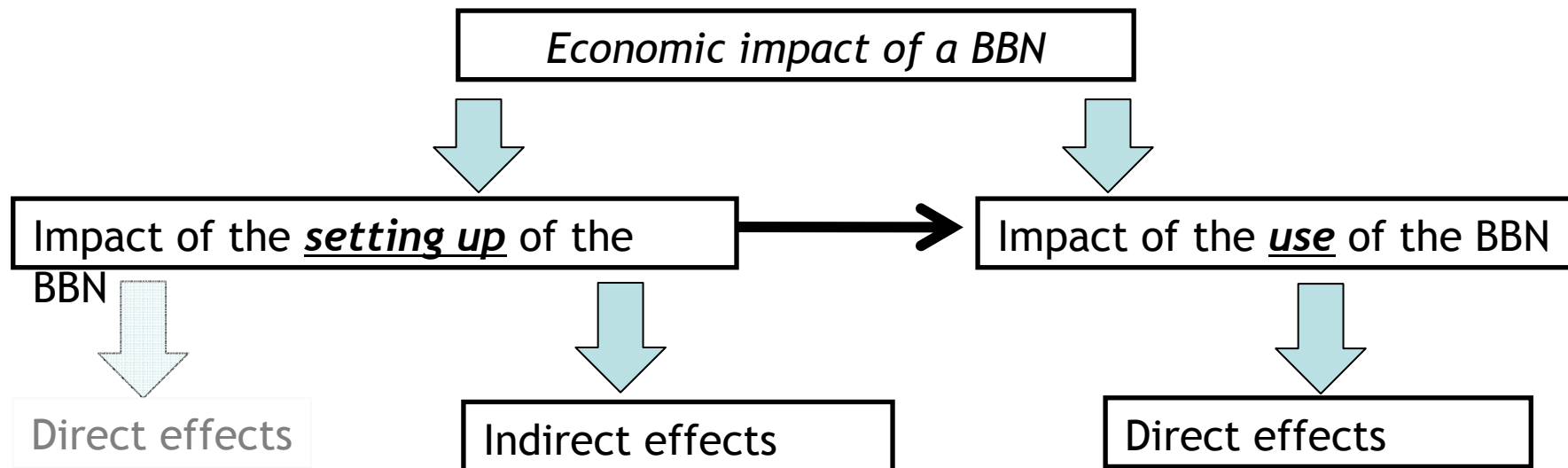


DYNAMICS - PHASE 1



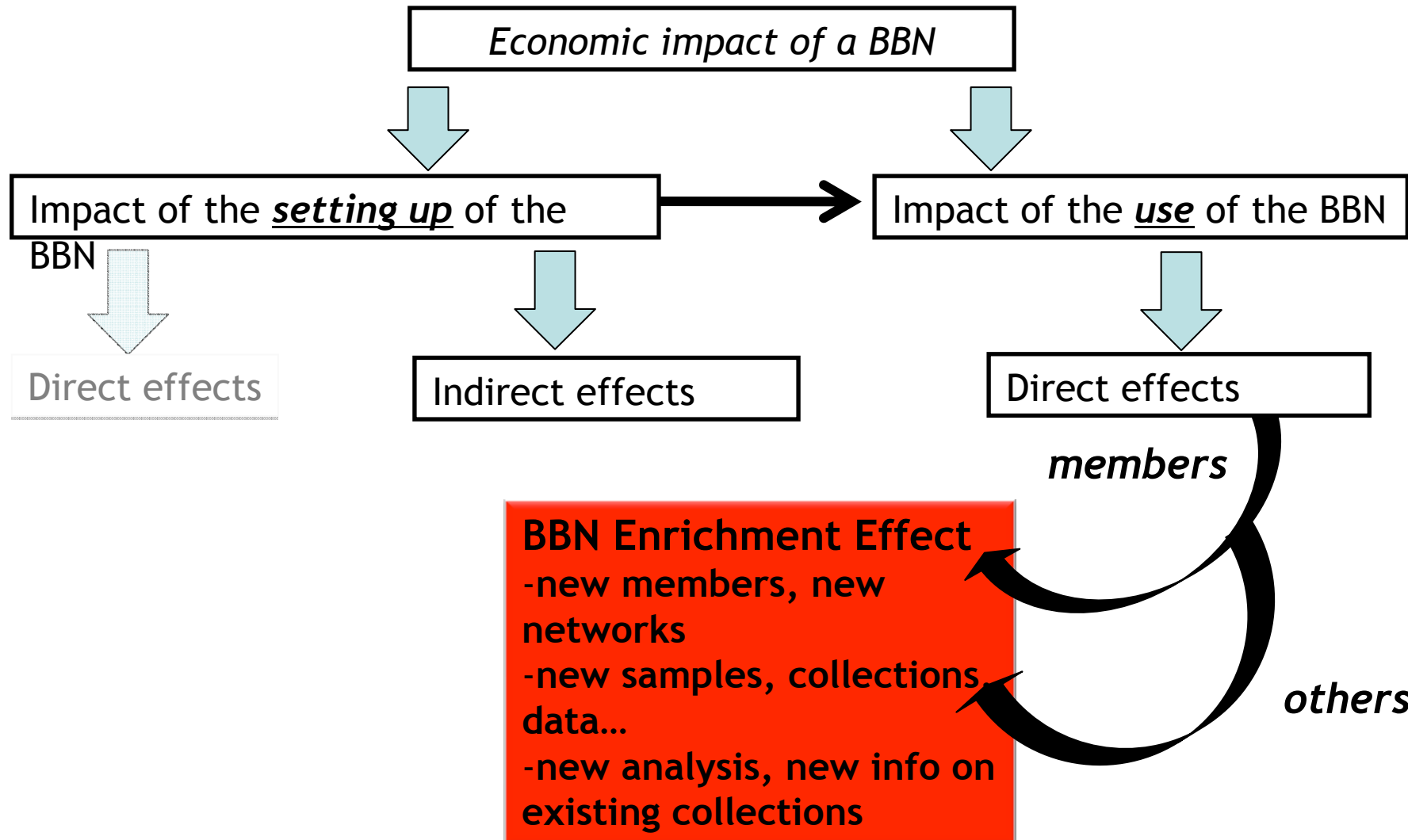


DYNAMICS - PHASE 2



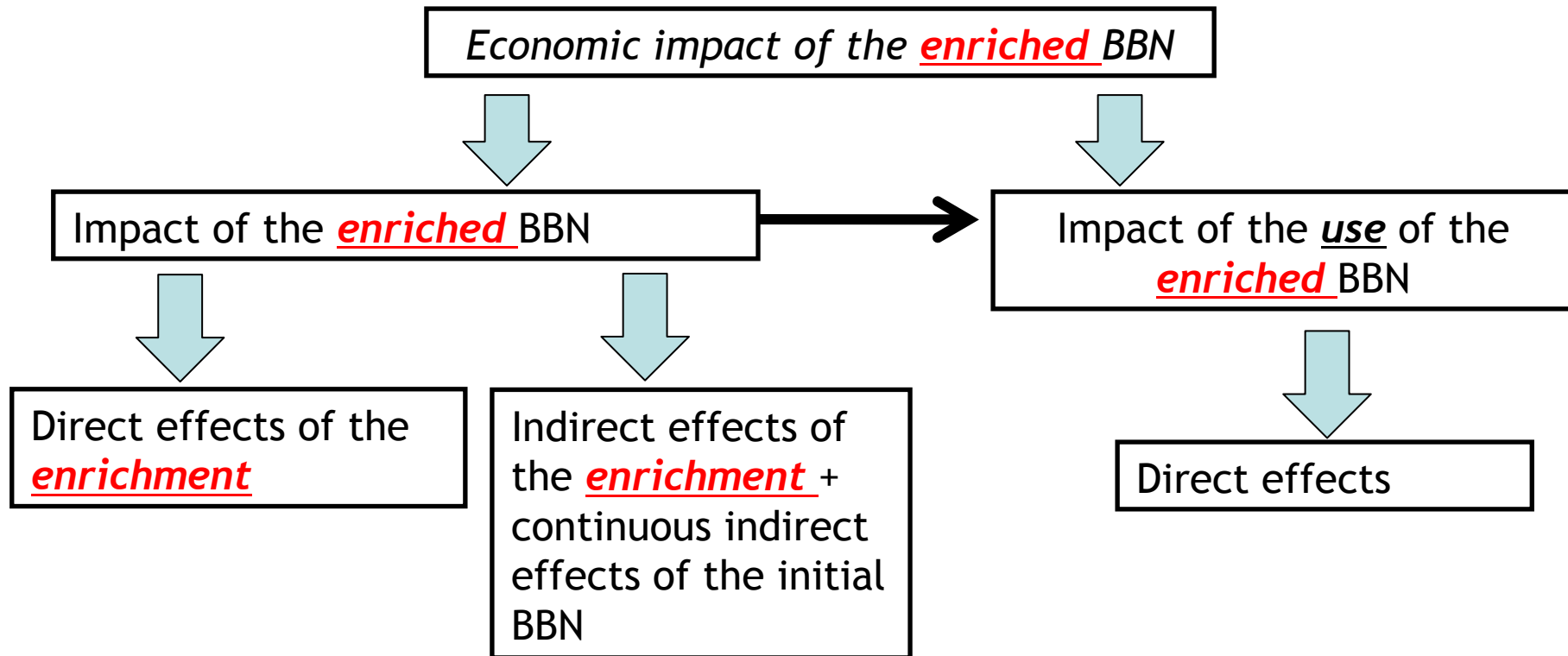


DYNAMICS - PHASE 2



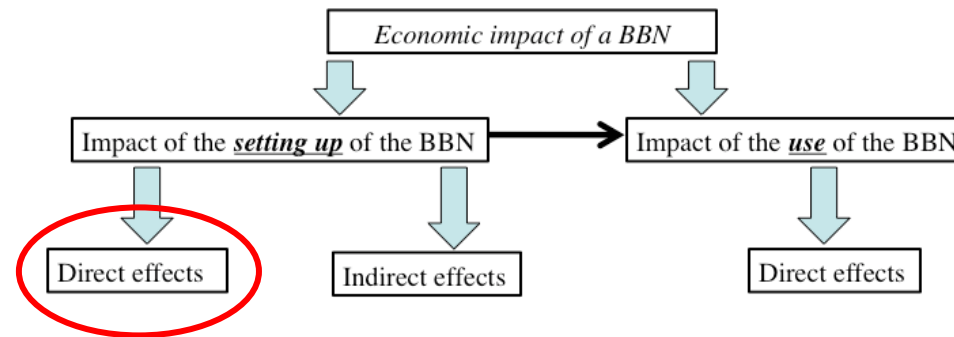


DYNAMICS - PHASE 3





IDENTIFICATION OF EFFECTS / INDICATORS

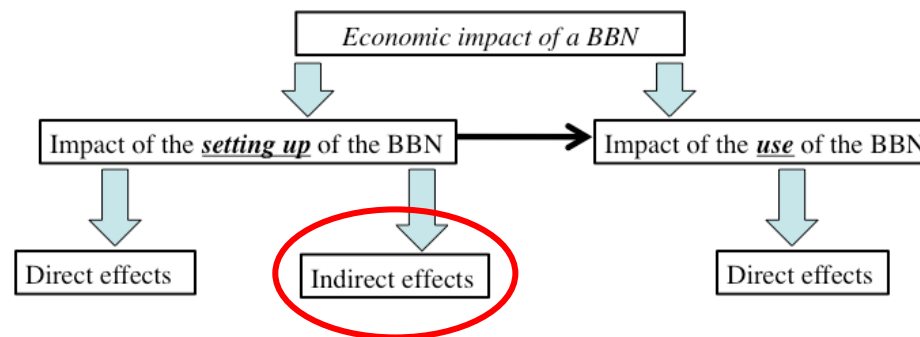


Not a comprehensive studies - a few typical examples

- *which new infrastructures have been set up (buildings, special rooms, and special equipments for storing-handling-analyzing-duplicating-protecting, information system,...)*
- *who has done the work : partners itself, external companies*
- *how much was subcontracted*
- ...



IDENTIFICATION OF EFFECTS / INDICATORS



Core of original Beta approach

Typology of indirect effects:

- Technological effects
- Network effects
- Reputation effects
- Organization and method effects
- Competences and training effect

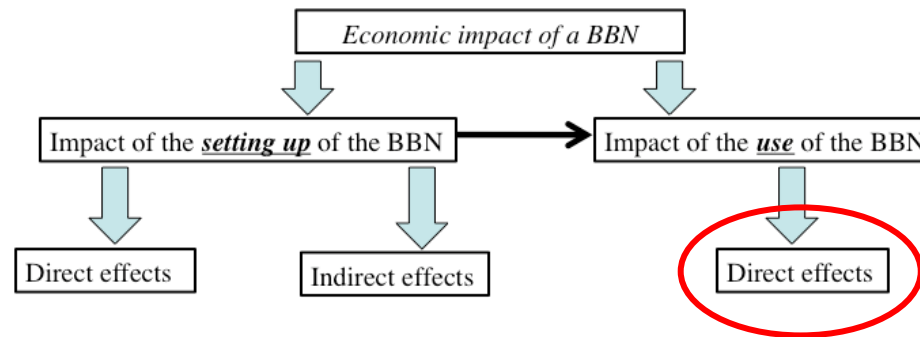
Various ways of quantification:

- Sales
- Cost reductions
- Proxy values (IPR, competences)



The evaluation approach

IDENTIFICATION OF EFFECTS / INDICATORS



Three broad families of effects :

Standard research outputs

Knowledge generation & transfer

Partnering and collaboration

Three ways of quantification :

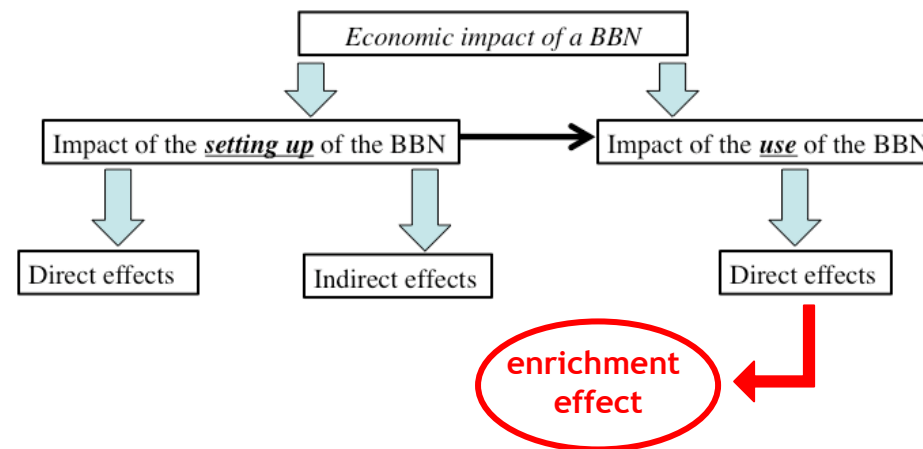
Revenues generation

Extension of scope of research activities

Collaboration activity



IDENTIFICATION OF EFFECTS / INDICATORS



- Information on the results of research
- Information on the analysis/research performed
- new information on the existing collections
- enhancement of the IT system
- enhancement of access/sharing procedures
- new data, samples, collections added
- new members
- new networks





SOME PRELIMINARY HYPOTHESIS ABOUT RESULTS

H1 magnitude of effects : effects from BBN are smaller than the effects from BB as such, especially direct effects of the setting up of the BBN; BUT the enrichment effect is mostly (if not only) provided by BBN

H2 geographical dimension : effects (especially direct) of the setting up of the BBN have important regional or local dimension; effects from the use of the BBN have a broader dimension

H3 dynamics : indirect effects of the enrichment of the BBN will be decreasing as the BBN is enriched, as "BB technology" is maturing
effects of the use of the enriched BBN will be increasing, as the BBN is more attractive to old as well as new users

H4 timeframe : effects of the setting up of the BBN are in the short term; effects of the use of the BBN (for BBN members) are spread along time; effects of the use of the BBN (for the rest of society) are in the long term



ACCESS RULES AND IMPACT EVALUATION

degree of rivalry - generic vs. specific scope of use - costs of investment/maintenance - enrichment potential/"network externalities"

Incentives / diffusion / learning dilemma



Choice between four models

Exclusive access. restrict as much as possible the access to BBN via secrecy, data withholding or strong intellectual property rights. Non contributors excluded from using the data and sample collected.

Open access (possibly at a fee). keep access to BBN open, which means available to all those who wish to use it.

Copyleft type solutions. Keep access to BBN, under the condition of granting-back research results to the "common pool", in order to prevent risks of free riding and of fragmentation of BBN (cf FLOSS).

Hybrid solution (different levels of protection). Access to BBN differentiated according to criteria such as: *level of implication, type of user, type of research, type of data and samples, type of sector or fields of use...*



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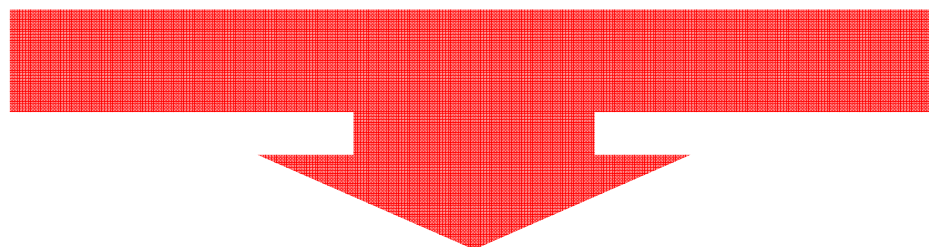
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Hybrid solution (different levels of protection)



What influence on the effects ?



SELECTION CRITERIA

2/3 "deep" case studies - 3/4 "light" case studies (all on existing BBN)

requirements

diversification

Age	> 3 years old
Content	Human data and samples
General purpose	Research (with or without care)
Aim	Network of Population biobanks Network of thematic biobanks Mix of population and thematic biobanks Network of fragmented, diverse collections
Geographical coverage	International network (EU) : partners from several countries National: partners from a given EU country Regional: partners situated in the same region
Biological material	Genetic material Tissues Serums and liquids
Size	Large number of partners and/or samples Small number of partners and/or samples
Evolution of size	Increasing number of partners and/or samples Stable number of partners and/or samples
Funding	Public funding (national, EU, or regional subsidies) Private funding via not-for-profit foundations or charities Private funding directly from companies
Access rules	Explore 4 basic properties and/or 4 models



SAMPLING

	"large case" 3/4 members as planned							
	"small case" focus on 1/2 members							
	large or small case ?	EPIC/E3N	TWIN Gene	GA2LEN	Eurobiobank	INCa	CRB TOURS	SWEDISH National biobank program
Aim	Network of Population biobanks		OK					OK
	Network of thematic biobanks			OK	OK	OK		
	Mix of population and thematic biobanks	OK	OK					
	Network of fragmented, diverse collections						OK	tbc
Geographical coverage	Internat.: partners from several countries (EU)	OK	OK	OK	OK			
	National: partners from a given EU country					OK		OK
	Regional: partners located in the same region						OK	
Biological material	Genetic material	OK	OK	probably	OK	probably		OK
	Tissues incl blood	OK	tbc	tbc	OK	OK	OK	OK
	Serums and liquids		tbc	tbc	tbc		OK	OK
Size	Large number of partners and/or samples	OK	OK	OK	OK			
	Small number of partners and/or samples					OK	OK	OK
Growth dynamics	Increasing	OK		OK		tbc		
	Stable				OK		tbc	tbc
Funding	Public funding (national, EU, regional subsidies)	OK	OK	OK	OK	OK	OK	OK
	Private funding via NFP foundations / charities	OK	tbc			tbc		OK
	Private funding directly from companies	OK	tbc					



- No one-size-fits-all evaluation method, BETA approach is only one piece of the puzzle

- Evaluating RI :

 - locus of infrastructure, research tools, research output, research projects, learning processes => separate processes / evaluation ?

 - intangible infrastructure : knowledge base, opportunities for collaborative activities

 - long term perspective : room for ex-ante, monitoring, ex-post (various timelags)

 - importance of management of RIs (rules of access, expertise/services associated...) in generating impacts

 - importance of evaluation framework (logic model, typology of effects, patterns of creation and diffusion of effects, and indicators...) right at the beginning