The University of Manchester
Manchester
Business School

DEMAND BASED INNOVATION POLICY TRENDS – CONCEPTS – CHALLENGES

Key Lecture

1st EU-SPRI Early Stage Career Research Conference , Manchester 20.09.2011

Jakob Edler

Manchester Institute of Innovation Research

MANCHESTER 1824

Purpose

- Conceptual background of demand based innovation policy
- Discussing some concrete challenges (it is not a silver bullet)

Structure

1. Current discourse and action
2. Demand and innovation
3. Policy Rationales
4. Typology
5. Challenges (policy – strategic intelligence)
6. Conclusion

1. Current policy discourse and action

- Most EU countries: innovation policy supply side dominated
- As *innovation* policy discourse: started around 2003-2005: Kok-Report, Aho Report, EU procurement studies, UK White Paper, German High Tech Strategy…
- Challenges driven (innovation policy to solve future problems)
- "Demand based innovation policy": more and more part of national strategies:
  - OECD 2011: Concept and plenty national approaches (rhetoric…(?))
  - TRENDCHART 2011: analysis of national approaches (some urge..)
  - Most explicit: Finland demand driven innovation, China (public procurement...)
  - Further interest:
    - Studies/enquiries in UK, Austria, Germany, Finland, Estonia....
    - OMC NET ERA PRISM (small EU countries, public procurement...)
    - Demand based innovation policy regarded as *most important area* to learn for policy makers by Trendchart Users (July 2011)
  - Demand conditions increasingly ecognised as important as Framework Conditions for innovation systems more generally (e.g. UK study on WFC, 2009, 2010 (WEF reports))

1. Current policy discourse and action

- But: any country having a strategic approach that is successfully implemented? Only in some areas, selected instances, but not as innovation policy strategy
  - Green procurement
  - Some success stories in public procurement more generally but most not designed as innovation policy)
    - Baltic city regions study
    - „Fraunhofer“ study
    - UNDERPINN study
  - First full scale „test“ of integrated DBIP measure: Lead Market Initative EU 2007
- Flaws in conceptualisation and strategic intelligence
- Mostly: focus on *public* demand and neglect the link to other demand policies – and the challenges to deliver
- Neglect of systemic view on supply conditions (ironically...)

2. The meaning of demand for innovation

- Demand for innovation: signal to market to acquire new product / service on the basis of a need/want for a certain price
- Importance of clear market signals to producers (reduction of uncertainty, Schmookler 1962, Mowery/Rosenberg 1979, Guerzoni 2007)
- Ability and willingness to absorb and use innovation is key requirement of dynamic, attractive markets and competitiveness of firms (Porter 1990, Edquist/Hommen/ Tsipouri 2000, Anderson 2007).
- Users as source of innovation (co-production, input of ideas, lead users etc., von Hippel 1986…)

2. The meaning of demand for innovation

- Two forms of demand spurring innovation
  - *Demand triggering innovation*: asking for new products / services (new functions, more efficient…)
  - *Demand being responsive to existing innovation*: absorbing, adopting, using, accepting innovations

- Empirically
  - Problematic demand conditions *main* hampering factor for firms (various studies, e.g. BDL 2003)
  - Demand side policies seen – by firms – to be highly relevant (Inno-Barometer, various years)

3. The theoretical discourse – rationales for Demand Based Innovation **Policy**

In the wake of practical interest: conceptual and strategic gaps

- System of Innovation Approach includes – conceptually – demand, but does not take into account the role of policy as regards demand for innovation
- Innovation *Policy* (IP) *analysis* has almost fully neglected demand based IP until recently (exemption e.g.: Edquist et. al., technological procurement)
- Discussion of Role of Demand based Innovation Policy needed

Demand based IP: expanded to market introduction and diffusion

"…to induce innovation and/or speed up the diffusion of innovation through

- *increasing the demand for innovation,*
- *define new functional requirement for products and services and/or*
- *improve user involvement in innovation production (user-driven)*

- Important: much of those policies / programmes are done outside the innovation policy realm (energy efficiency...)

3. The theoretical discourse – rationales for Demand Based Innovation Policy

(1) a set of (*market and system) failures* – market entry and diffusion hampered:

- information asymmetries (producers do not know preferences, users do not know *potential* innovations),
- lack of interaction between (lead) users and producers of innovations
- technological path dependencies (lock in, trajectories)
- lack of capabilities and willingness to use new technologies (switching costs)
- high entry costs (in areas with a high potential for network effects)
- lack of awareness and articulation (consumers and policy makers)

➢ Idea: public action can overcome various kinds of bottlenecks and induce/ accelerate market introduction and diffusion.

3. The theoretical discourse – rationales for Demand Based Innovation Policy

(2) demand based policy can be understood as a means to contribute to tackle *societal challenges and serve societal needs* (as pursuit in policies other than innovation policy)

(3) demand orientation as a means for *industrial policy*: to give local producers incentive and edge in competition, e.g. deliberate creation of lead markets (dominant designs, global producers etc.)

The University of Manchester
Manchester
Business School

4. A Typology of demand based measures

Public demand

Support of private demand

Regulation, standards

Systemic

The University of Manchester
Manchester Business School

4. A Typology of demand based measures

Instrument	Role of State	Method of Functioning
1. Public demand		
General procurement	Buy and use	State actors consider innovation in general procurement as main criterion (e.g. definition of needs, not products, in tenders)
Strategic procurement (technology-specific)	Buy and use	State actors specifically demand an *already existing* innovation in order to accelerate the market introduction and particularly the diffusion..
		State actors stimulate deliberately the *development* and market introduction of innovations by formulating new, demanding needs.
Co-operative procurement	Buy / use moderation	State actors are *part of a group of demanders* and organises the co-ordination of the procurement and the specification of needs. Special form: *catalytic* procurement: the state does not utilise the innovation itself, but organises only the private procurement
2. Support for private demand		
Direct support for private demand		
Demand subsidies	Co-financing	The purchase of innovative technologies by private or industrial demanders is directly subsidised
Tax incentives	Co-financing	Amortisation possibilities for certain innovative technologies
Indirect support for private demand: information and enabling (soft steering)		
Awareness building measures	Informing	State actors start information campaigns, advertises new solutions, conducts demonstration projects (or supports them) and tries to create confidence in certain innovations (in the general public, opinion leaders, certain target groups)
Voluntary labels or information campaigns	Supporting Informing	The state supports a co-ordinated private marketing activity which signals performance and safety features.
Training and further education	Enabling	The private consumers or industrial actors are made aware of innovative possibilities and simultaneously placed in a position to use them.
Articulation	**Organising discourse**	Societal groups, potential consumers are given voice in the market place, signals as to future preferences (and fears) are articulated and signalled to the marketplace.

4. A Typology of demand based measures

Instrument	Role of State	Method of Functioning
3. Regulation of demand, support of standardisation		
Regulation of product performance and manufacturing	Regulating, (economic incentives and "command and control"	The state sets norms for the production and introduction of innovations (e.g. market approval, recycling requirements). Thus demanders know reliably what certain products perform and how they are manufactured. Smart regulation to leave freedom to choose technologies, but changing the incentive structures for those choices (e.g. quota systems)
Regulation of product information		
Usage norms		The state creates legal security by setting up clear rules on the use of innovations (e.g. electronic signatures)
Support of innovation-friendly private regulation activities	Moderating	The state stimulates self-regulation (norms, standards) of firms and supports / moderates this process and plays a role as catalyst by using standards
Standards to create a market	Moderating, organising	State action creates markets for the consequences of the use of technologies (emission trading) or sets market conditions which intensify the demand for innovations
4. Systemic Approaches		
Integrated demand measures	Combination of various roles	Strategically co-ordinated measures which combine various demand-side instruments
Integration of demand- and supply-side measures	Combination of various roles	Combination of supply-side instruments (R&D programmes) and demand-side impulses for selected technologies or services.

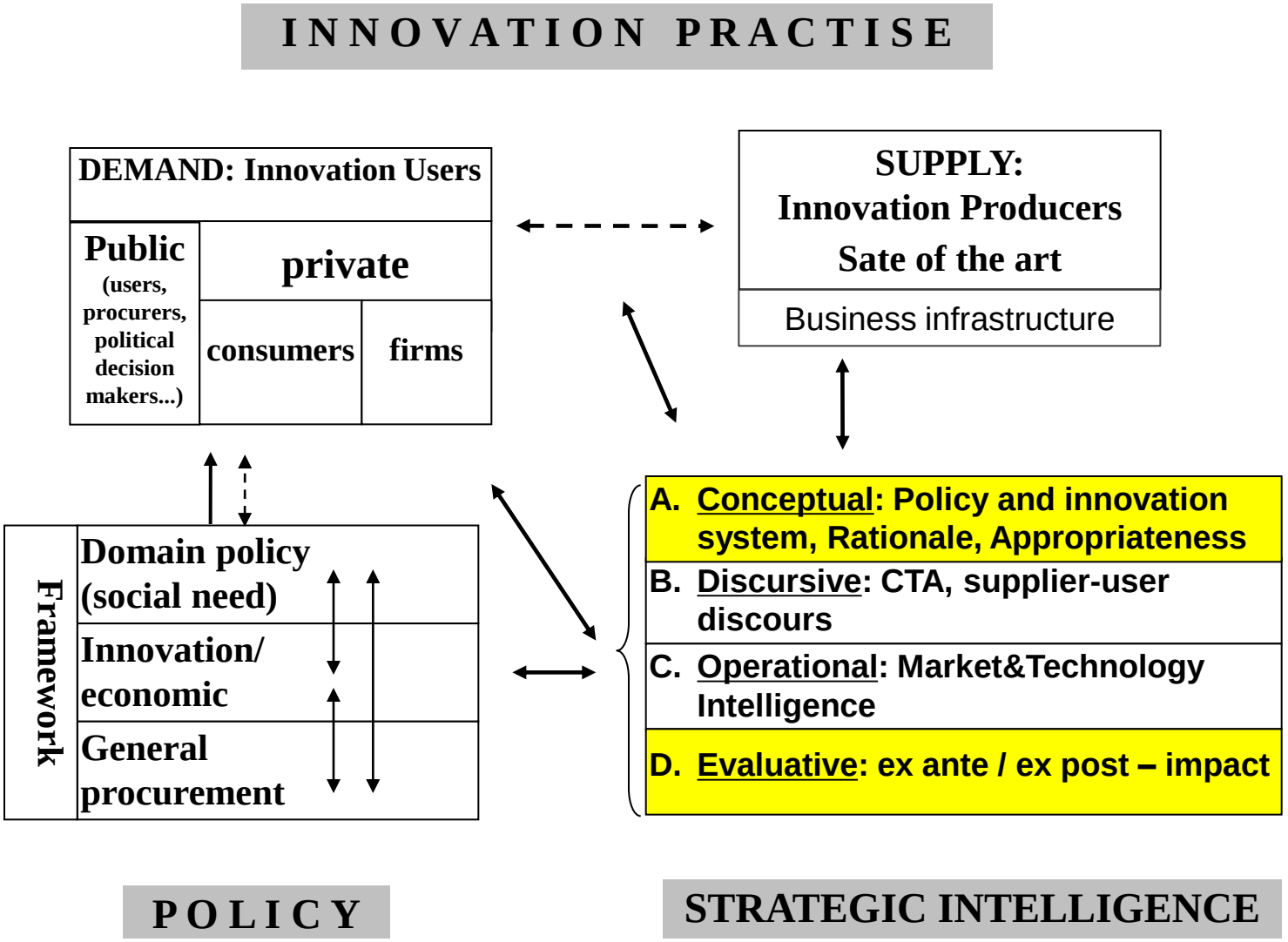
The University of Manchester
Manchester
Business School

5. Challenges for DBIP

A. High demand for *strategic intelligence* and *conceptual knowledge* based on:
   - lack of sound justification of public action: what is the "failure"?
   - Over-complexity

The University of Manchester
Manchester
Business School

5. Challenges: Strategic Intelligence



The University of Manchester
Manchester Business School

5. Challenges for DBIP

A. High demand for *strategic intelligence* and *conceptual knowledge* based on:

- Lack of sound justification of public action: what is the "failure"?
- Over-complexity – functions of strategic intelligence
  - **Operational/Conceptual:** Understanding demand conditions: assumption about user preferences, capabilities and readiness (bottlenecks?) ; public – private, latent – manifest, domestic - foreign
  - **Discursive:** Construction / articulation of (private) demand: a new paradigm in many ways, policy learning needed (esp. sectoral ministries) – and time dimension
  - **Operational**
    - Technology "readiness": What is the technology? Where are we on the *innovation cycle*?
    - Understanding supplier readiness: can they really deliver?
    - Complementary supply chain conditions, supporting business infrastructure, skills...
    - Defining the sector or technological area to target vs. to spur radical new solutions from elsewhere? Picking winners (diffusion) vs defining requirements?
  - **Expecting/Assessing impacts**? Economic and societal (Blind et al 2009, Edler et al 2011)
    - Area delineation (needs/functional, technological, markets)?
    - Attribution and timing
    - Understanding the „logic chart" of effects: indirect might do!
    - Indicators?

5. Challenges for DBIP

B) Often underestimated: potential dysfunctional effects

- Who benefits? if demand satisfaction is seen as industrial policy:

  Innovation effect (better service, societal goal …)

  vs.

  regional / local economic support (support second best to realise contract at home, e.g. German toll system)

- National Champion Policy **vs.** International Firms (Bombardier – Siemens in UK)
- SME disadvantaged in public procurement (little power in negotiations, interactions, UK: Glover Report)
- Over-dependency on specialised suppliers (very innovative, very dependent if no broader market develops)

5. Challenges for DBIP

C) Specific *public* procurement challenges:

- Vertical: coordination top down and bottom up (public procurement):
  - Political decision
  - Operative policy responsibility: secure delivery of policy
  - Technical conduct (e.g. the procurer): „cost“ of searching and failure
  - Users – implementation
- Horizontal coordination
  - Cross policy areas: innovation / economic policy - sectoral policy (- procurement policy / regulation) – fiscal policy
  - build up of critical mass – teaming with other cities/ regions/ countries
- High entry costs for innovations (public money): efficiency gains through innovations under-estimated
- Capabilities (procurers, commissioners, internal users, citizens)
- Procurement regulations (or their perception)
- Complex risk-benefit distribution:
  - Risk management and real cost-benefit in the public arena (life cycle costing)
  - Understanding needs and functional requirements
  - Incentive structures: risk- benefit mismatch!

The University of Manchester
Manchester Business School

6. Summary: Critical Factors Demand Based IP

- **Current approaches**: underdeveloped in most dimensions, dis-crediting of DBIP
- **General**
  - Strategic **integration** of innovation into *other* public policy (where needs are defined)
  - **Combination** and **coordination** of sectoral policy aims and innovation
  - Horizontal and vertical **coordination** / strong leadership
  - Build up of **expertise within** public policy-making
- **Public Procurement**
  - **Risk** with the state
  - **Patience** and backbone
  - Industry as **partner** – early interaction needed (long-term more important than short term)
  - **Functional** targets (Performance), life cycle costs ("m.e.a.t.")
  - **General** upgrading of capacity
- **Systemic** Approaches
  - The right timing
  - Combination with other demand and supply measures: complication of the mix
  - Talk about future aspirations, not innovation and economic effects
- **Analysts**: enlightening rather than raising quick fix hopes

ANNEX 1

Lead Market – The Logical Concept

Example: Lead Market Initiative of the EU: Concept development (Edler, Blind, Georghiou, Uyarra 2009)

- **Lead Market**: in six areas in Europe a mix of policy instruments in order to create better demand and demand conditions for innovative products, so that the market in Euorpe is one step ahead of global market, and triggers such a global market that can be served by European firms (*lead* market)

- Combination of **different instruments** (public procurement, standards, other legislation and complementary actions).
- **Six target markets**: eHealth, recycling, renewable energy, sustainable construction, protective textiles and bio-based products.
- defined around '**broad market segments**' , not picking winners (different kinds of innovations can flourish).
- All linked to wider **societal needs** (sustainability, efficient and effective health care etc.)
- Commission sees a **strong economic potential** within Europe that can be realised through concerted, coordinated and flexible action

The University of Manchester
Manchester Business School

Example of impact rationale of DBIP: Lead Market Initiative

Revised Lisbon Agenda:
Innovation for growth, creation of jobs

LMI objectives

LMI activities

Immediate effects

Intermediate effects mid term

Intermediate effects long term

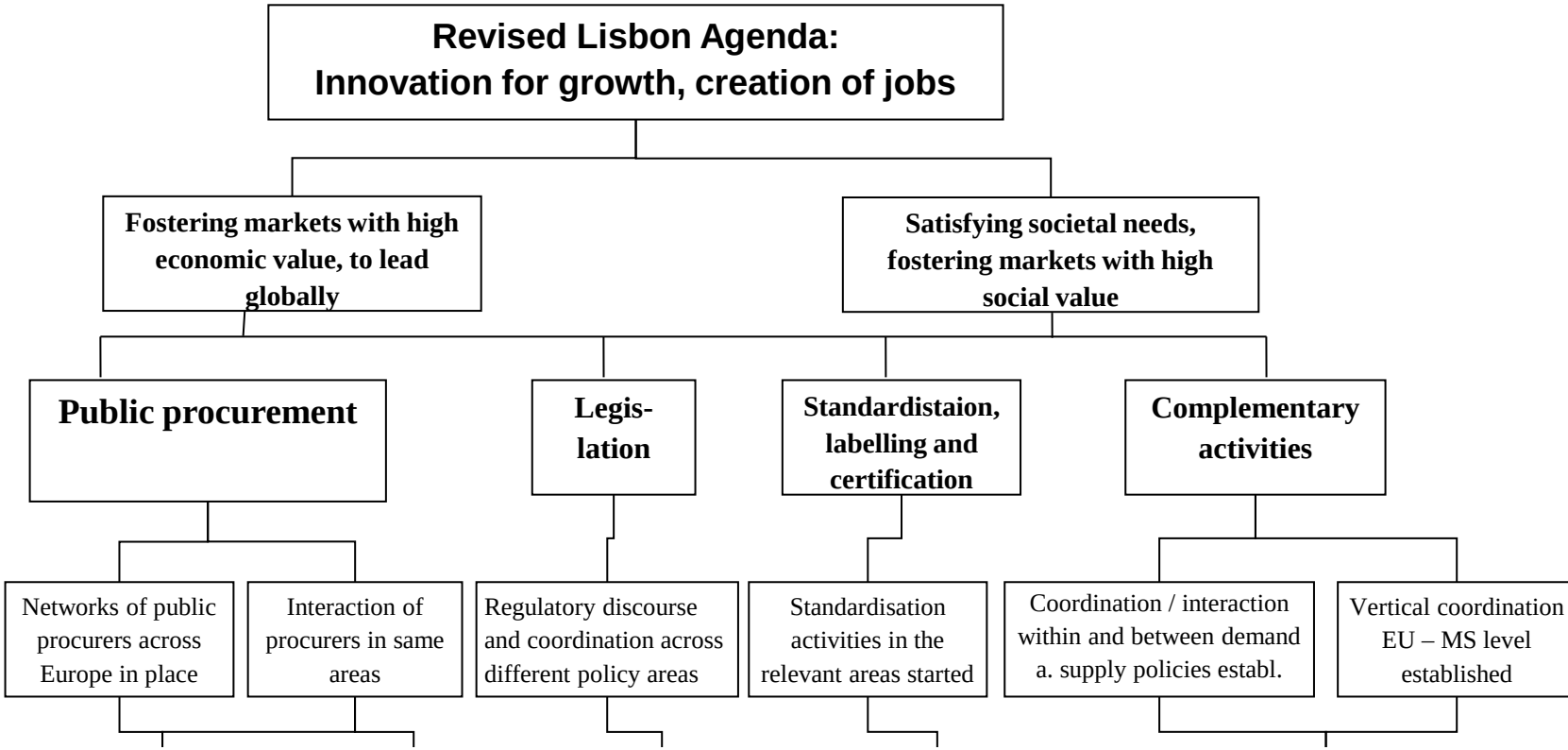
- **Increase in innovation input and output of firms**
- **Private demand for innovations has been triggered**
- **Leading edge regulation implemented in Europe, spreading globally**
- **New standards used and diffused (also in public procurement) spreading globally, compliance by industry**

Ultimate effects

- Growth in the defined markets (volume, jobs, firms)
- Increased global market share of European actors
- Progress in tackling societal challenges
- Public service more efficient and effective
- Lessons learned for applications in

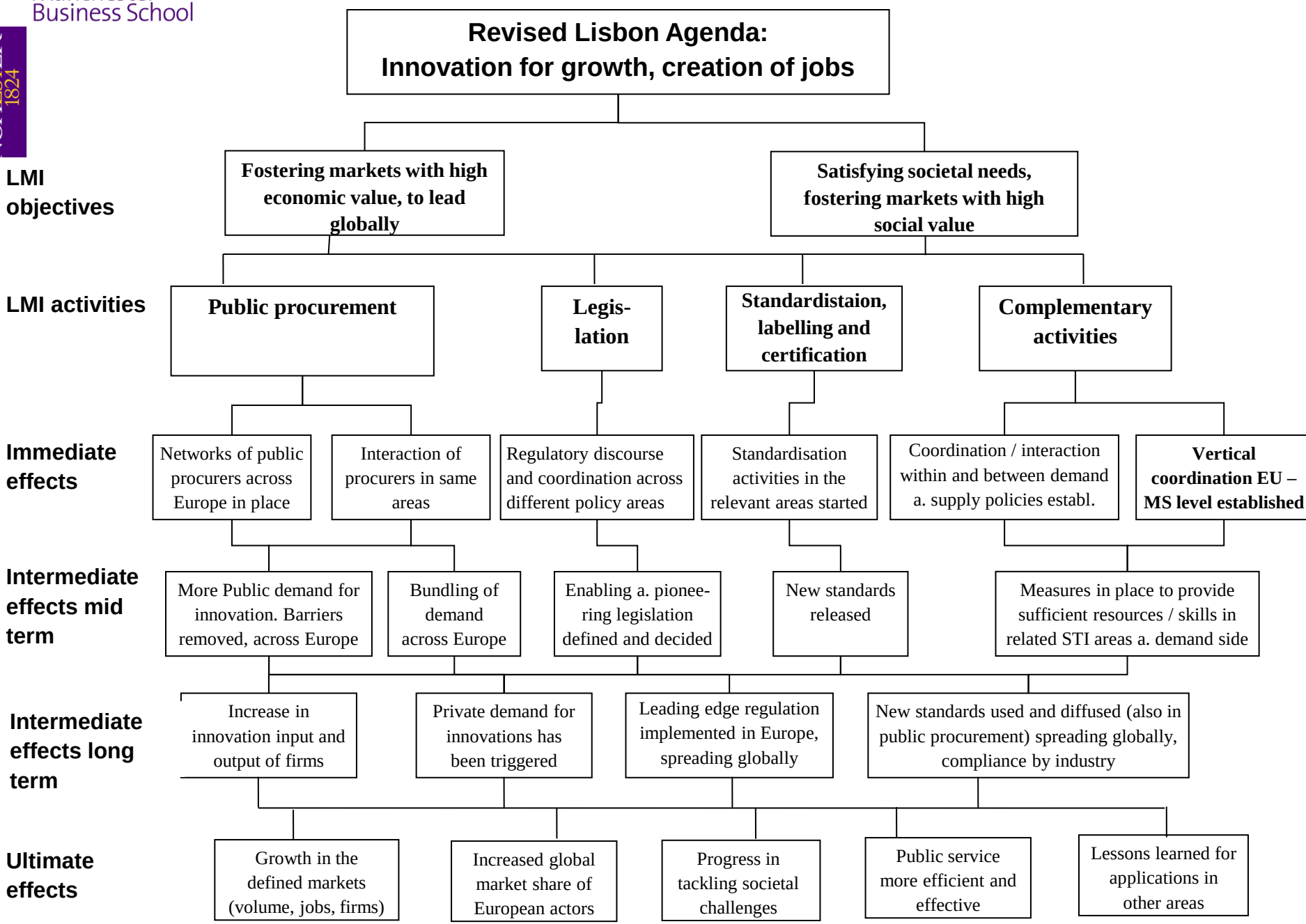
The University of Manchester
Manchester Business School

Example of impact rationale of DBIP: Lead Market Initiative



The University of Manchester
Manchester Business School

Example of impact rationale of DBIP: Lead Market Initiative



Lead Markets characteristics (can policy deliver?)

- high tendency to (quick) acceptance of innovations (demand advantage, transfer advantage):
- critical mass of demand (within Europe *and* potentially abroad)
- good framework conditions for rapid learning and adaptation processes for suppliers
- pioneering regulations
- adequate technological and productive competence in the entire valued added chain and supporting services
- specific, innovation-driving problem pressure (or high significance of clear political goals) (demand advantage)
- Readiness to pay higher initial price: high per capita income and/or low price elasticity)

ANNEX 2

An example of a good mix

Example of a good mix:

Energy Efficiency and Innovation (Sweden)

- 30 co-operative and catalytic Procurement Programmes at national, regional, local level (NUTEK 1990s), partly continued and adjusted by STEM
- Basic idea:
  - Existing innovations (phase 4/5 in the cycle)
  - Build up of combined demand for energy efficient products (Industry and consumers)
  - Market transparency
  - life cycle approach
  - Awareness Measures (national media campaigns, labels, demonstration projects, etc.)
  - Partly supplemented with demand subsidies
  - Monitoring of the market penetration
  - STEM: user groups, articulation

Example: Energy Efficiency and Innovation (Sweden)

- Effects: Market Diffusion, Economies of scale (evaluations done)
- Lessons:
  - Technology specific mix of measures needed
  - horizontal and vertical coordination (bundling of demand)
  - Excellent market knowledge (suppliers)
  - competence to bundle demand
  - Organisation of demand articulation

Annex 3

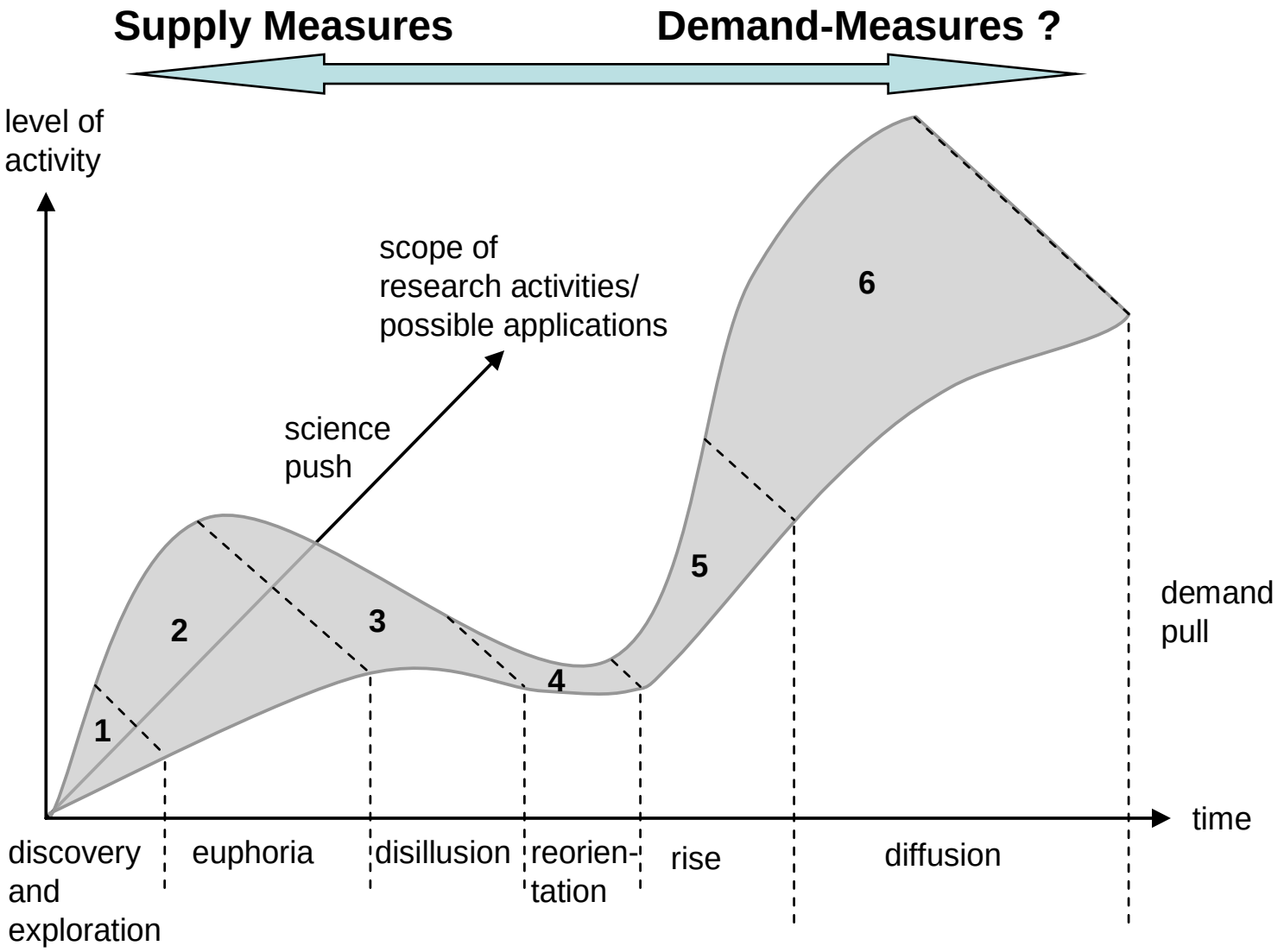
The right mix and timing

some thoughts and illustrations

using the innovation cycle approach

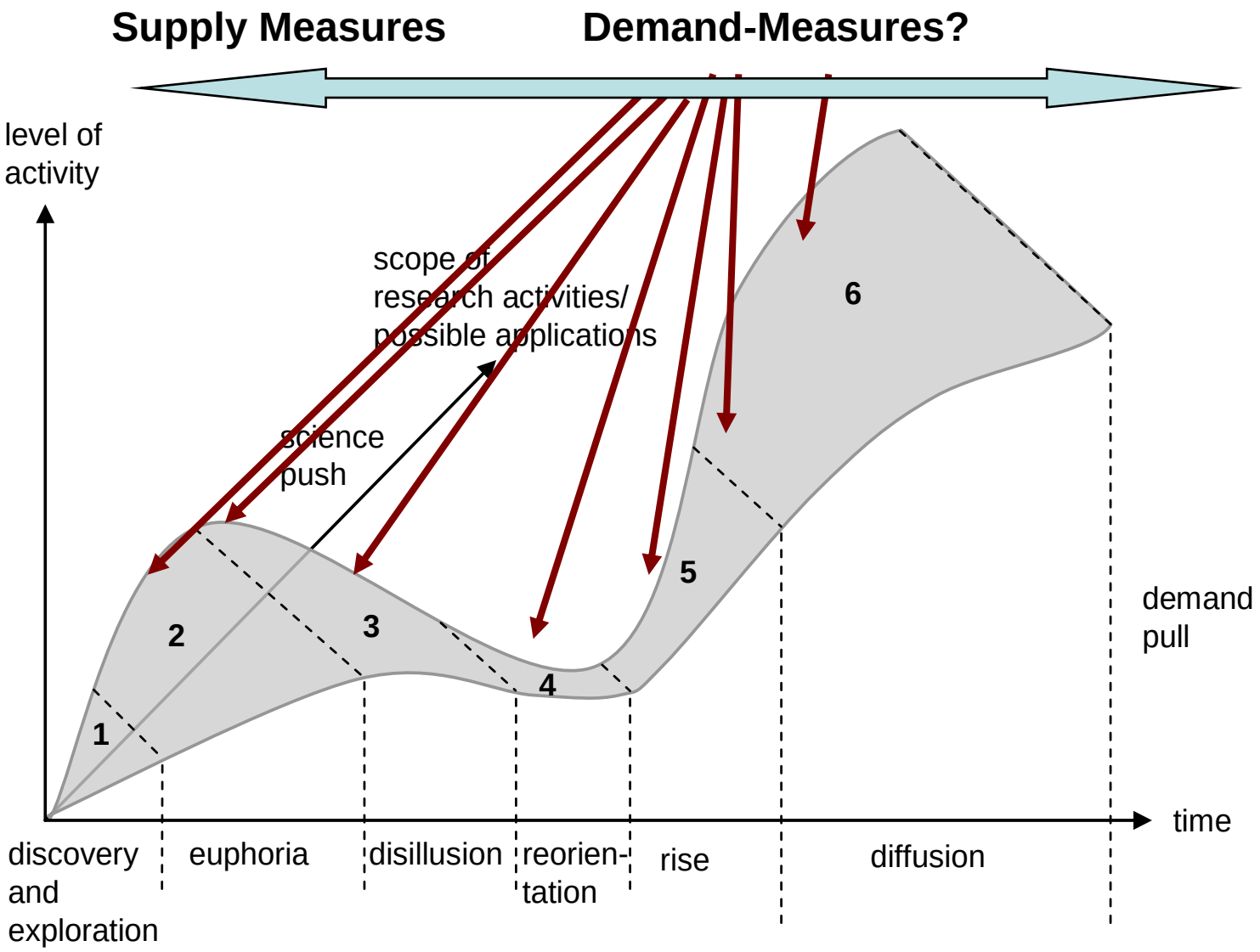
The University of Manchester
Manchester Business School

Finding the right entry into the innovation cycle



The University of Manchester
Manchester Business School

Finding the right entry into the innovation cycle



The right demand measure at the right time

(*illustration* only, no mentioning of adequate supply measures here)

1. Discovery and exploration
   - disciplinary and interdisciplinary research investigates the opportunities for the new technological principals.
     - In principle issues are in supply
     - *Need driven definition of new demand for new technology / application*
2. Euphoria about the new technological possibilities among the growing community of scientists and applied researchers (stage 2).
     - Danger: technology success taken for granted
     - *Constructive technology assessment / foresight (technological and demand)*
3. Sobering up: Several options turn out to be either technically or economically unfeasible. Therefore, research activity in these areas is reduced or stops altogether (stage 3).
     - Strongly supply oriented: get it right
     - *Check demand - keep up public awareness*
     - *Demonstration project to raise awareness and build trust*

The right demand measure at the right time

4. Reorientation (stage 4):
   - only those actors with the greatest endurance or radical new approaches contribute to the reorientation of the technology's development
     - Again strong support on supply side, but
     - *Focused user involvement (lead user, key user)*
     - *Focused technology assessment – lead market testing*
     - *Early public procurement (if public need)*
5. Critical industrial breakthroughs. The breakthrough which is the fastest to achieve market acceptance shapes the future handling of the technology (dominant designs) (stage 5).
     - Strong shift to demand side:
     - *Very technology specific mix, clear choice*
     - *Lead market policy, combination of mix of demand measures: regulation, subsidies if needed/desirable, procurement, catalytical procurement, broad awareness measures, training etc.*
     - *Potential PPP?*
6. Diffusion (stage 6), applications expand again because economies of scale result in a price reduction and allow new application areas and low cost markets to be tapped.
     - Shift to broadening, but :
     - Think of next generation (supply again!)

The University of Manchester
Manchester
Business School

MANCHESTER 1824

Annex 4

Understanding your demand situation

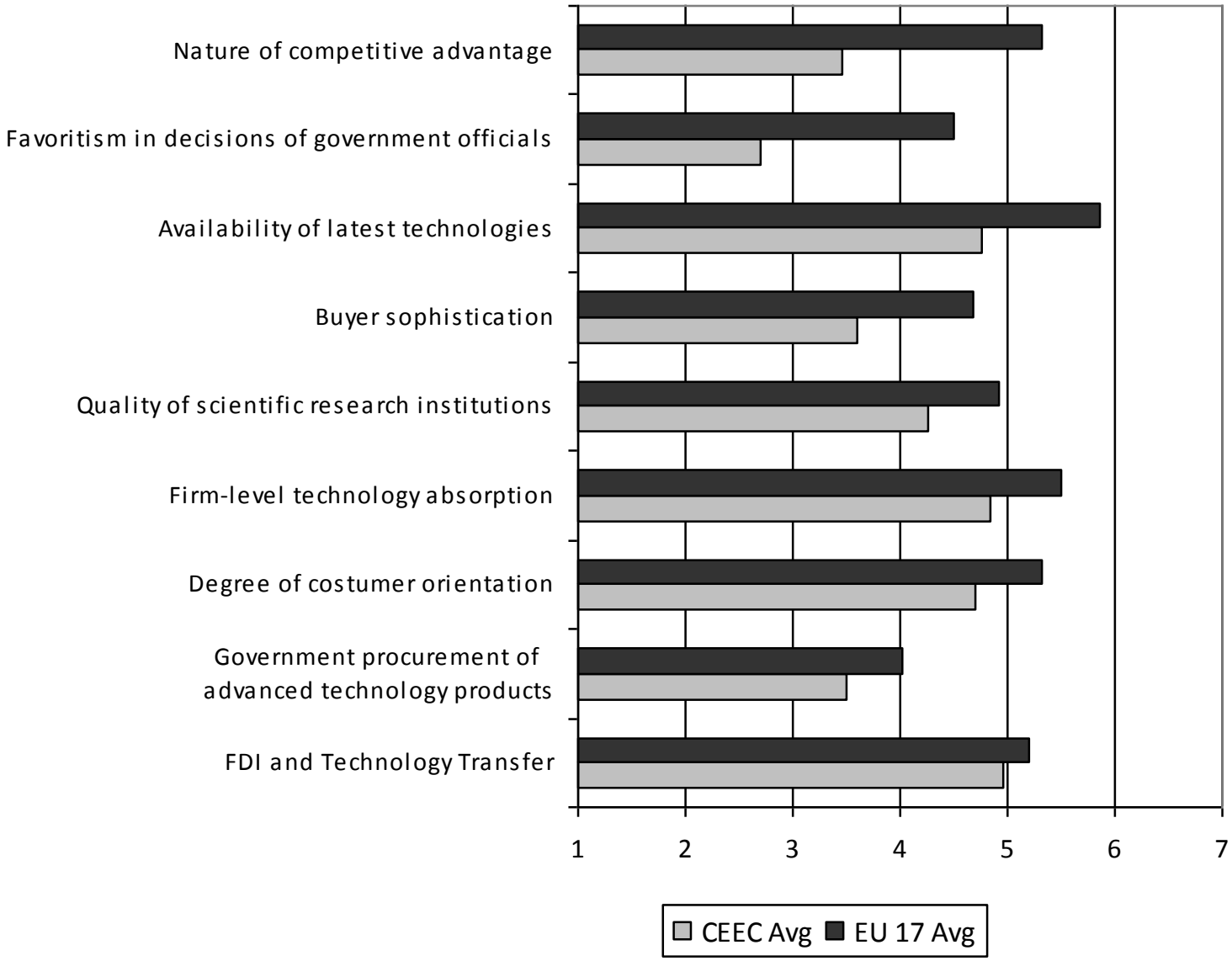
The University of Manchester
Manchester Business School

Understanding demand conditions – despite a lack of sophisticated indicators (Source: World Economic Forum)

Variable	Description
Demand conditions	
The nature of private demand	
Buyer sophistication	Buyers in your country make purchasing decisions (1 = based solely on the lowest price, 7 = based on a sophisticated analysis of performance attributes)
Firm-level technology absorption	Companies in your country are (1 = not able to absorb new technology, 7 = aggressive in absorbing new technology)
Role of public demand	
Government procurement of advanced technology products	In your country, government procurement decisions result in technological innovation (1 = strongly disagree, 7 = strongly agree)
Favouritism in decisions of government officials	When deciding upon policies and contracts, government officials in your country (1 = usually favour well-connected firms and individuals, 7 = are neutral)
Selected key framework conditions characterising the market and the nature of demand satisfaction*	
Nature of competitive advantage	Competitiveness of your country's companies in international markets is primarily due to (1 = low-cost or local natural resources, 7 = unique products and processes) Note (JE): signals the overall assessment of sophistication of markets
Degree of costumer orientation	Customer orientation: Firms in your country (1 = generally treat their customers badly, 7 = are highly responsive to customers and customer retention) Note (JE): signals how suppliers react or would react to an upgraded, more sophisticated demand for innovation
Availability and use of latest technology	In your country, the latest technologies are (1 = not widely available or used, 7 = widely available and used) Note (JE): indicates the lack of technology within the country (no matter from which origin) and thus is a (weak) proxy for technological sophistication
FDI and technology transfer	Foreign direct investment in your country (1 = brings little new technology, 7 = is an important source of new technology) Note (JE): shows the degree to which companies from abroad actually fill the gap of technology supply in the countries; in terms of demand oriented policies technology transfer through FDI is obviously preferable to import, see main text for further explanation
Imports as a percentage of GDP	Imports as a percentage of GDP (hard data, not WEF survey)[1] Note (JE): shows how much the countries rely on products / services produced abroad when satisfying their demand

The University of Manchester
Manchester Business School

Demand conditions are quite different
The example of the CEE vs. rest EU



4. A simplified tpology of demand based measures

1) Public Demand / Procurement
   - General procurement
   - Targeted Areas, State as Lead User of Innovations
2) Support of private demand
   - Cooperative and catalytic procurement
   - Demand subsidies (Tax, feed in-tariffs etc.)
3) Enable / Marketing
   - Adjustment of training programmes, curricula etc.
   - Awareness Measures
   - Labelling / Marketing (eco-labels)
4) Regulation
   - Norms for product information
   - Norms as for performance of products and services
   - Legal security for usage of new products/services (electronic signature)
5) Demand construction / articulation
   - Various forms of (interative strategic intelligence/private and even public demand)
6) Systematic Approaches:
   - Combination of demand measures
   - Plus: combination of supply and demand, e.g. Lead Markets (e.g. ambitious regulations in connection with support programmes)

4. Challenges in public procurement: various **risks** within public administrations

- High level policy maker in the relevant sectoral department(s):
  - risk of failure to deliver new service, improved service, initial costs
- Innovation Policy makers:
  - Who benefits (economic spill over for other constituencies??)
- Specialised public procurer:
  - risk of having to invest a more expensive solution with no rewards for better service, capability
- Finance ministries, actors responsible for budgets:
  - costs, failure to appreciate benefits
- Internal, administrative end users:
  - risk of failure to learn and adapt or to manage new interface with end beneficiaries, risk of being made redundant
- Supplier: Market risk – does it spill over to broader, private market?

The University of Manchester
Manchester Business School

Lember / Kalvet: Public Procurement for Innovation and Technology. Discussion by J. Edler

- Very important for the current debate - potentially
- Tackles an issue that is high on the agenda with a lot of false policy learning and simplified assumptions in the policy arena
- Thought provoking paper
- Topical to try to systematise further the innovation procurement debate

Major achievement

- Categorisation of innovation procurement „policies“ and activities
- Idea valid, important
  - because of difference between (1) making general procurement more prone to innovation on one end of the spectrum (not incremental, not architectural) and (2) systematic policy to change the technological trajectories of sectoral systems (it seems) on the other hand.
  - to expand to R&D procurement can make sense
- An empirical exploration to analyse one type of the policy in one type of innovation procurement cases (R&D driven) in one specific country.

Clarify purpose and entry points for the article

- P. 3 sets the wrong tone, those questions are not taken up again later on, they are too diverse and distract from the real merit of the paper
- not clear who is targeted / criticised: policy or analysts or both

- **Purpose** of the article can be spelled out clearer:
  - Develop a new taxonomy of PPI policies (and activities?),
  - to forget about the uniform and mixed up way it is often treated
  - using ESTONIA as one example to characterise one type and its shortcomings, make that more explicit, so that we know what the case represents.
  - Future not only for ESTONIA, but for the way we think about public procurement policy types

The „policy“ taxonomy

The taxonomy itself could work in principle, but

- it is underdeveloped,
  - e.g. the PCP schemes (R&D procurement) need more explanation to understand the link to innovation uptake, upsides and downsides.
  - sometimes not so clear where you draw the line, conceptually, not all R&D procurement is directly geared to create an innovation?
- The interplay with other policies in the various policy types? Often this only works with serious supply side measures etc.
- Distinction between *policy* (set of measures with an overarching societal objective) vs. *concrete individual activity* within this policy, this is blurred.
- A table of common shortcomings/challenges of those approaches would be good

The innovation policy rhetoric trap

- Your argument throughout is the **economic one**, who benefits, innovation procurement as economic policy for the **local context mainly** (e.g. p. 4: “specific and unique way how to organize and manage public intervention into economy”, also p.12),
- You **shortly mention** that PPI is done for better services and challenges (p. 6) but this is then **forgotten**.
- Within this frame of thinking you develop a host of arguments why public procurement for innovation often fails (in its **economic** ambition).
- But:
  - why not stress the innovation dimension in its effects for the buyer?
  - why not make clear that daring, leading edge demand has spill-overs into the economy that inevitable have local effects – immediate and indirect?

The University of Manchester
Manchester Business School

The empirical case

Interesting:

- One country (focus)
- the data on involvement of R&D organisation and its relative decline
- Interview programme

- But: **make clear what it represents**: a certain type of public procurement of innovation, with R&D content AND with R&D done in research organisations (within what policy type, R&D procurement?).
- How can you generalise?
- **Puzzle**:
  - You claim Estonia is a **no policy** country (with individual, idiosyncratic "successes" but overall a fall in daring technology procurement).
  - But then: you **assess the country against the demands of innovation procurement policy** that is **more pro-active, not a "no policy"**, e.g. page 17
  - "Could not find traces of systematic use…", so this confirms your starting assumptions of no policy, did anybody claim they have one?
  - **Clarify the policy and economic context**: is there an ambition stated or not, are there claims to use PPI etc.?

Methodologically:

- You interview success cases, but find bottlenecks and shortcomings
- Clarify how you derive at those findings on the basis of your methodology,
- Further methods to be used? Survey of firms / procurers?
- The small country context (see **ERA PRISM!)**

The outlook (future strategy)

- "One could conclude, taking into account the nature of available policy options and possible challenges, that states should start off by experimental single projects…" which then leads to a **pathway to "policy for all seasons"**?
- Your recommendations are again very much geared towards the immediate local content question – which can kill innovation.
- You could also think more systematically about the linkages of local companies with global players (maintenance, service, supply chain….)

Suggestions

- Your types help a lot, but
  - BETTER conceptualisation of the pre-conditions for each type to succeed,
  - the challenges for each type and then
  - match it with the situation of Estonia
- This allows better generalisations: match of policy type, pre-conditions and needs

The University of Manchester
Manchester
Business School

MANCHESTER 1824

Future strategy

- **Small country disadvantage and advantage could be exploited a bit more (look at the ERA PRISM project)**
- Some special opportunities: more centralised structures, less players, better ways of upgrading public administration, niche market opportunities, focusing
- Disadvantage: small scale – less incentives, subcritical foresight and other strategic intelligence, economic structures (lack of capacity and competition)
- Make this more explicit, give more context to the Estonian situation, too many implicit assumptions about Estonia