Universities, Patents and Innovation: What's in it for the entrepreneur?

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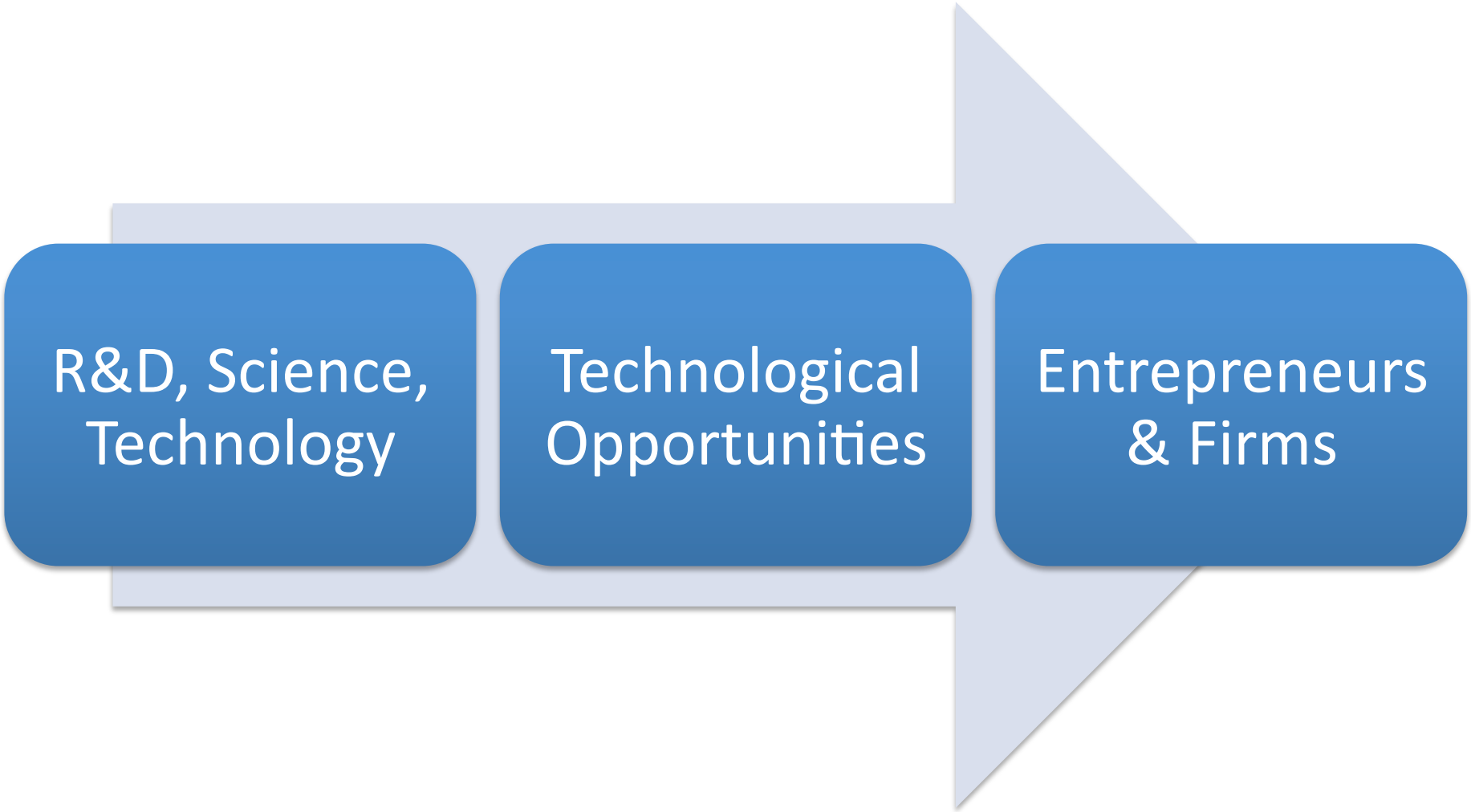
Entrepreneurs are affected by external knowledge creation, diffusion, exploitation



What's in it for the entrepreneurs?

- Entrepreneurial opportunities are driven partly by technological opportunities
- Technological opportunities usually seen as driven by R&D, science, technology
- **Matters how you set up the 'innovation economy'**
  - Because: How many technological opportunities that are created close to, but outside, the firm will affect the likelihood of starting a firm and the venture's performance
  - Knowledge organizations will affect the creation of technological opportunities
  - Universities are one actor affecting entrepreneurs

The Realities of the Swedish Knowledge Economy: Published Results and Interpretations

1) What works and what must be solved in Sweden?

What has been proven empirically about Sweden?

* Swedish academics POSITIVE to commercialization
* Swedish model already performs BETTER THAN US in patenting by academic
* Academic patents are NOT ‘market for technology’

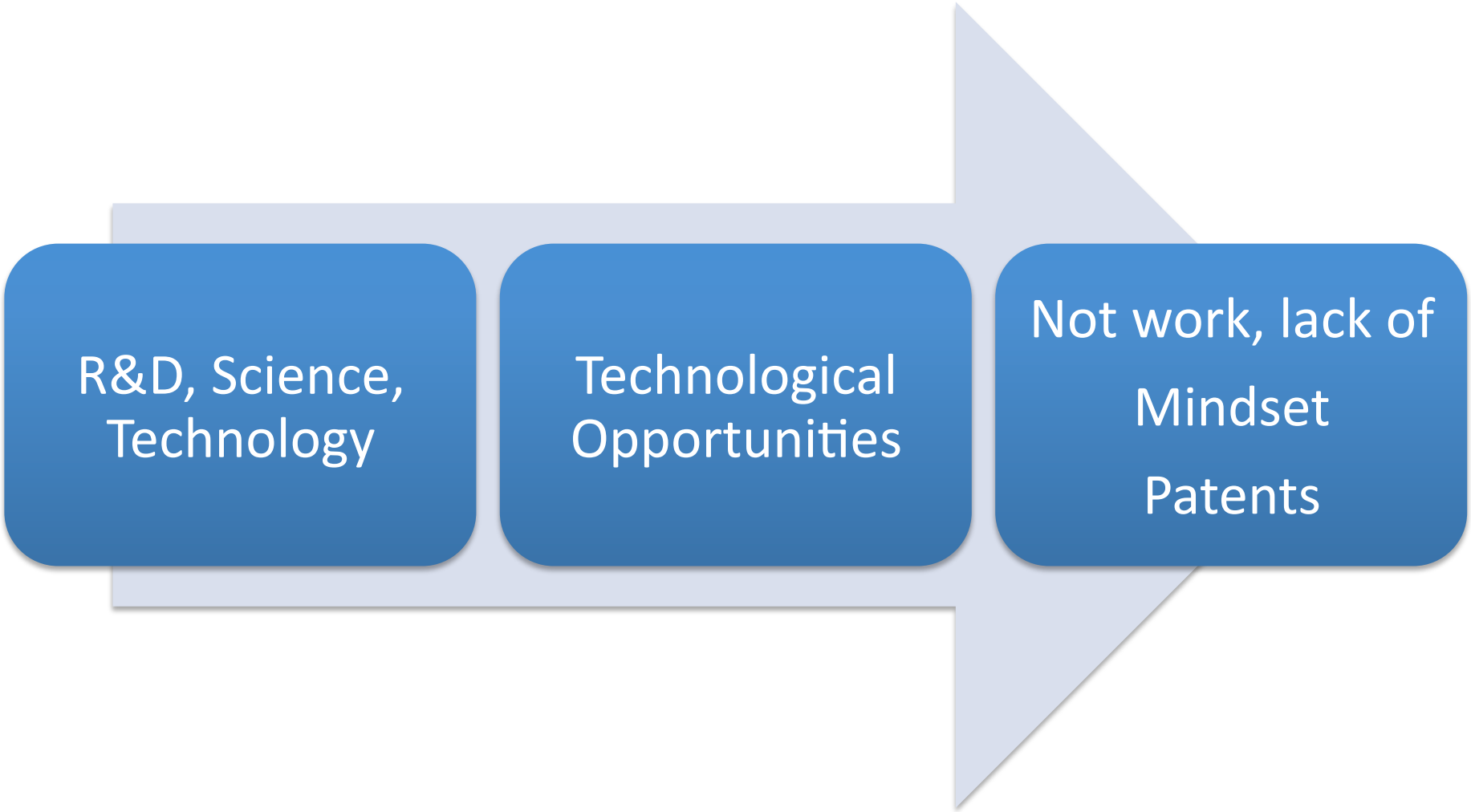
2) Wrong evidence circulating

3) Rethinking the model: How do these knowledge processes affect entrepeneurs and their opportunities in Sweden?

1) Common idea that Sweden has difficulties when it comes to innovation

- Misguided slogan of 'Swedish paradox' (Edquist and McKelvey 1991, then many others)
- **Swedish paradox**
  - Sweden (and EU) are good at R&D but bad at innovation in firms in certain high tech industries
  - Sweden is good at science but bad at commercialization
  - Sweden does fine on the R&D indicators, but lacks science and product innovations, and an entrepreneurial mindset

Not work: universities a) lack of entrepreneurial mindset and b) lack of patents



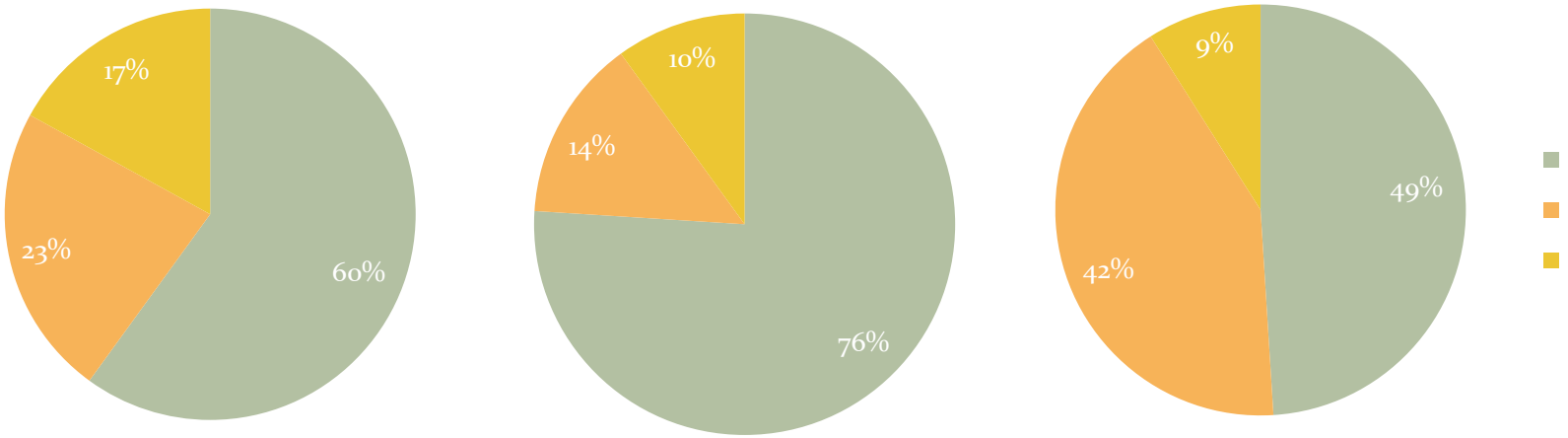
Solve it through 'Entrepreneurial mindset'

- Idea that stimulate entrepreneurship if 'make academics become entrepreneurs' or else 'make them interact with industry because they are bad at it'
- **Swedish paradox: How to solve it**
  - the Swedish innovation economy would work better, if universities became 'entrepreneurial'
  - The reason Sweden is bad at innovating is that universities are bad at start-up companies and/or bad at interacting with companies

a)What Has Been Proven Empirically about Sweden? In 'Entrepreneurial mindset'

- Several authors claim this is the problem, but little empirical evidence or international comparisons
- **New evidence: Survey of academics in science & engineering**
  - Bourelos et al CJE, 2012
  - Sent to academics in all Swedish university departments in: Fluid mechanics, Inorganic chemistry, Wood technology, Computer science, Biotechnology, Automatic Control

Opinions and Attitudes:
Gray-green means positive
Circles for Patents, Commercialization, Spin-offs

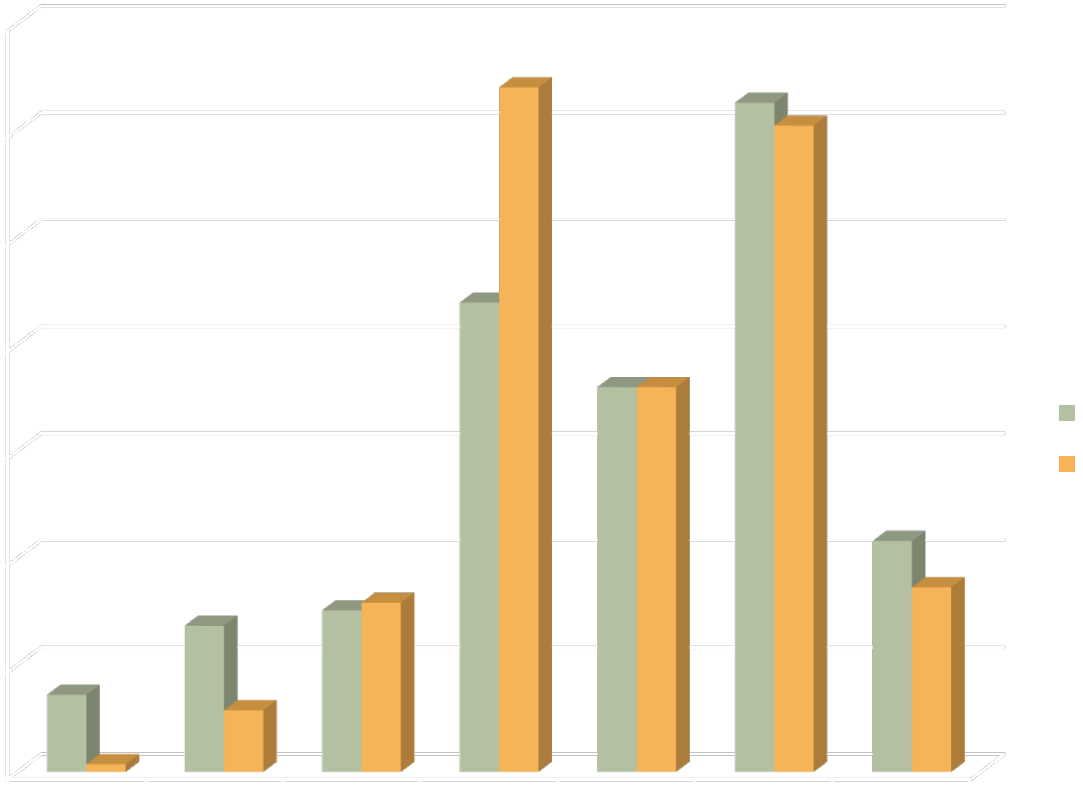


Patenting research results:

Personal view vs research group view

From negative to positive

Gray-green is individual; yellow is group

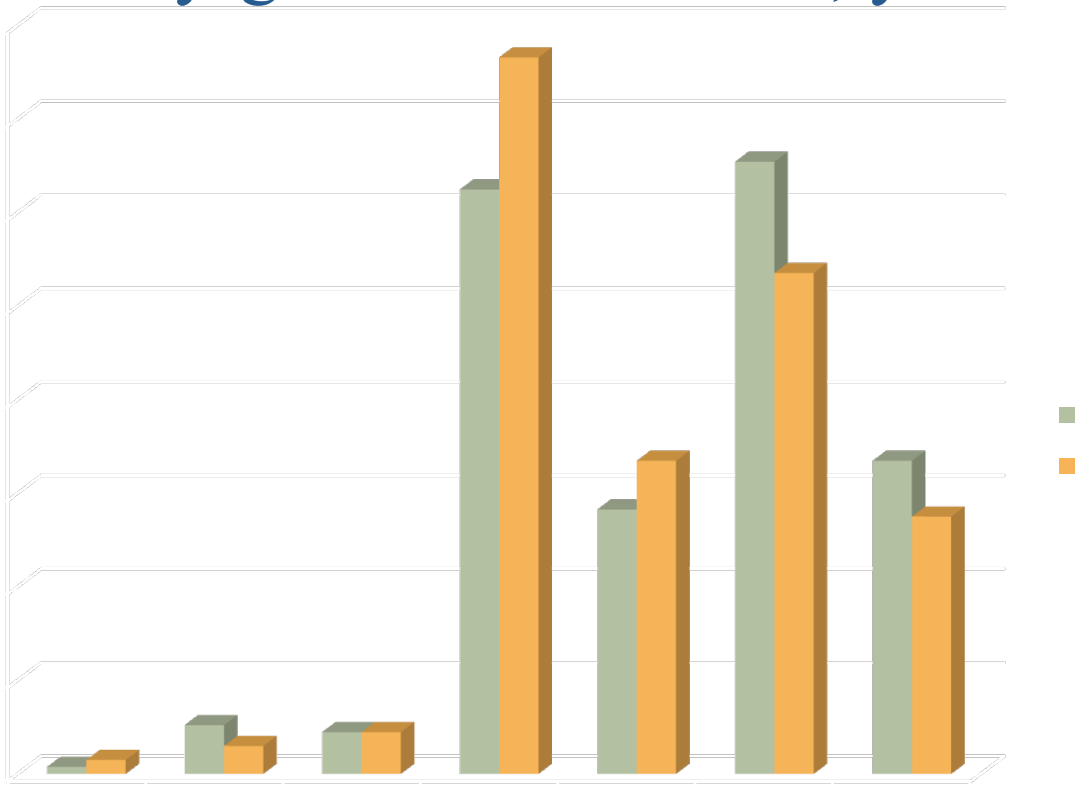


Founding a company:

Personal view vs research group view

From negative to positive

Gray-green is individual; yellow is group



What do we learn tell us about the 'Entrepreneurial mindset'

- **Survey of academics in science & engineering**
  - Swedish academics are positive to all aspects of commercialization
  - Econometrics: Science excellence goes hand in hand with commercialization
  - Econometrics: University support structures also positive:
  - What matters is particularly courses (not technology transfer offices) => Individual skills as entrepreneurs matter most

b) Solve it through 'Academic Patents'

- Idea that if Swedish academics take more patent/IPR or Swedish universities own more, than this stimulates entrepreneurship
- **Swedish paradox: How to solve it**
  - the Swedish innovation economy would work better, if they increase patent/IPR at Swedish universities
  - The reason Sweden is bad at innovating is that universities are bad at patenting (don't understand the value)

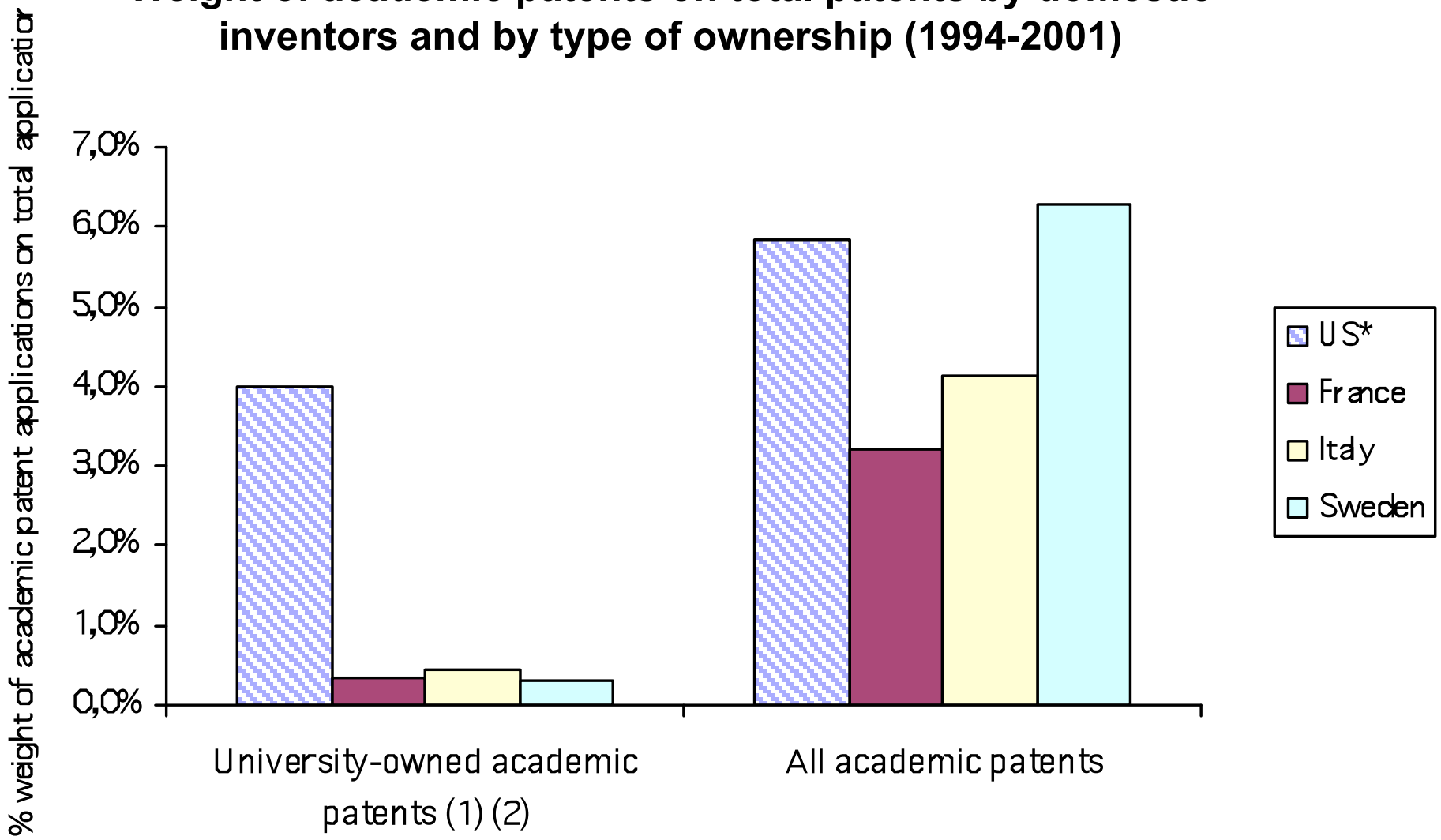
What Has Been Proven Empirically about Sweden? In 'Patents'

- Several authors and agencies claim lack of academic patents is the problem: Misguided empirical evidence
- One problem is methodological. Assume academic patents don't exist, because they only check if university owns patent.
- Another is assumptions. Assume true, given the 'paradox' and people's interest in IPR, what is called 'markets for technology'
- **Academic patents, studied at level of individual university researchers**

Actually: Next Slide on Academic Patents Demonstrate

- Comparison of USA, France, Italy, and Sweden:
  - *Left side: Europe way behind USA,* if you analyze university-owned patents
  - *Right side: Sweden is even better than the USA*, if you analyze all academic patents
- Lissoni, Llerena, McKelvey, Sanditov 2008 in *Research Evaluation* (an A journal)
  - New European dataset: Comparative study of Italy, Sweden and France of academic patents, analyzed at level of individual researchers

Weight of academic patents on total patents by domestic inventors and by type of ownership (1994-2001)

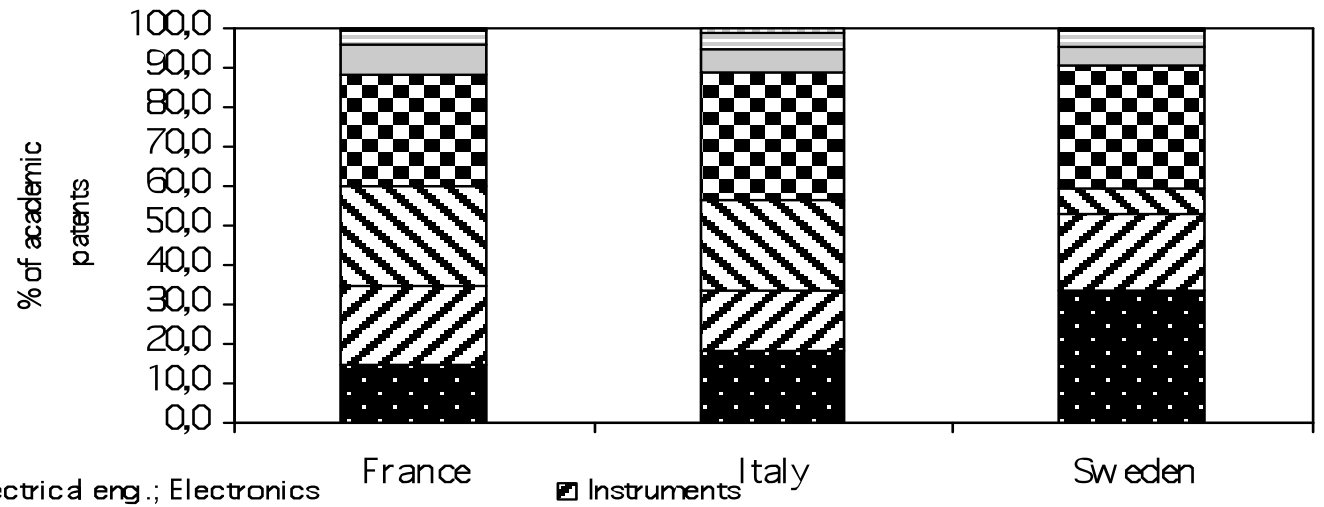


(1) US univ-owened patent include no-profit organizations (4,2% of tot obs); all data include co-assigned patents (source: Thursby et al., 2006)

(2) Estimate of weight of univ-owned patents in 1999, from Mowery and Sampat (2006)

Moeover, Academic Patents in Very Few Fields (Engineering, Biotech)

Figure 2. Technological distribution of academic patent applications*, by country; 1994-2002



* Ac. scientists active in 2004 (Italy, Sweden) or 2005 (France

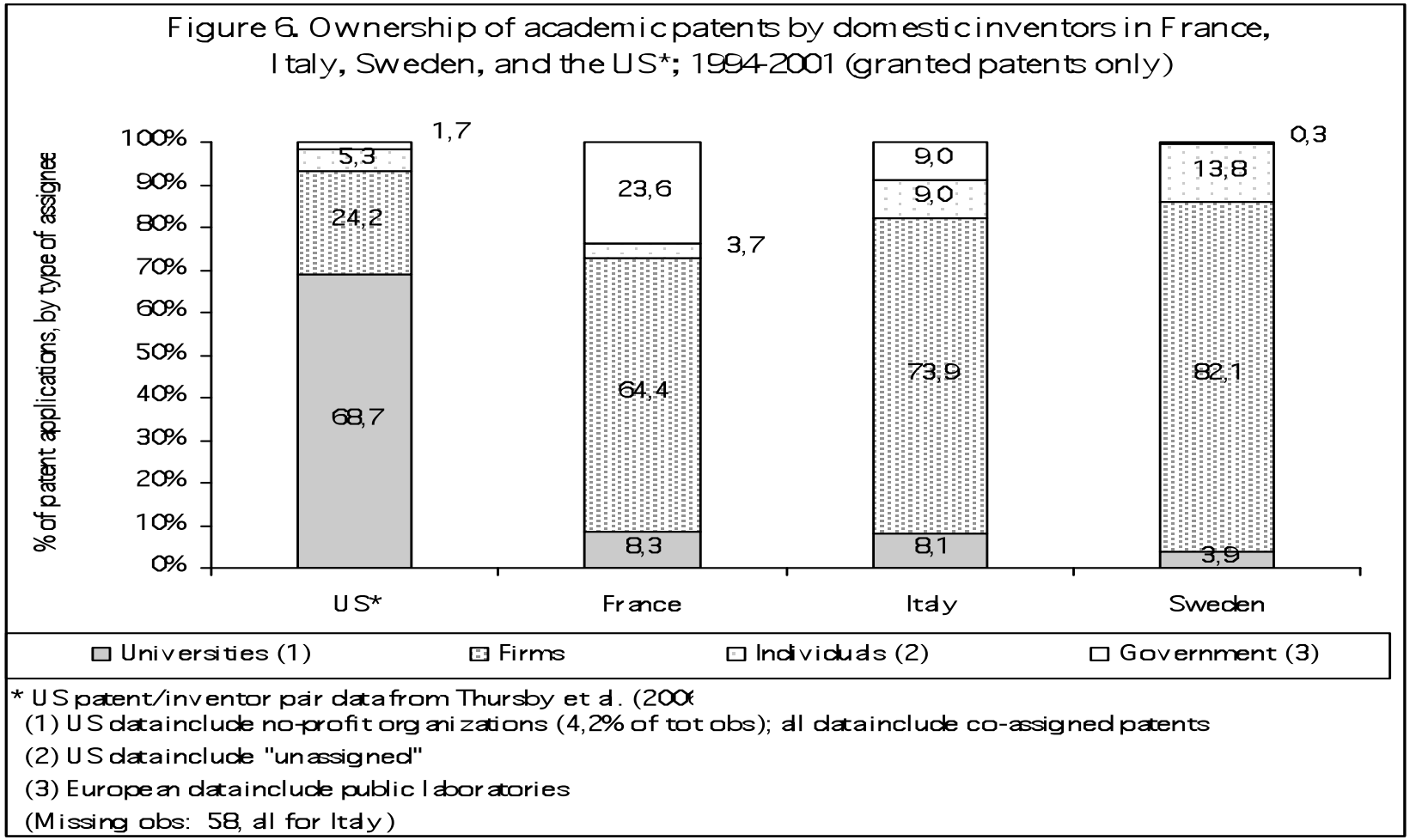
Patents do lead to opportunities

- Europe: Companies tend to own (and use) the academic patents for innovation (PATVAL)

Next slide from Lissoni et al shows:

- Around 80% of Swedish academic patents are assigned ownership to companies.
- Difference in ownership of patents by companies in Europe (France 65%; Italy 74%; Sweden 82%) and the USA 24%

Ownership of Academic Patents: US, France, Italy and Sweden



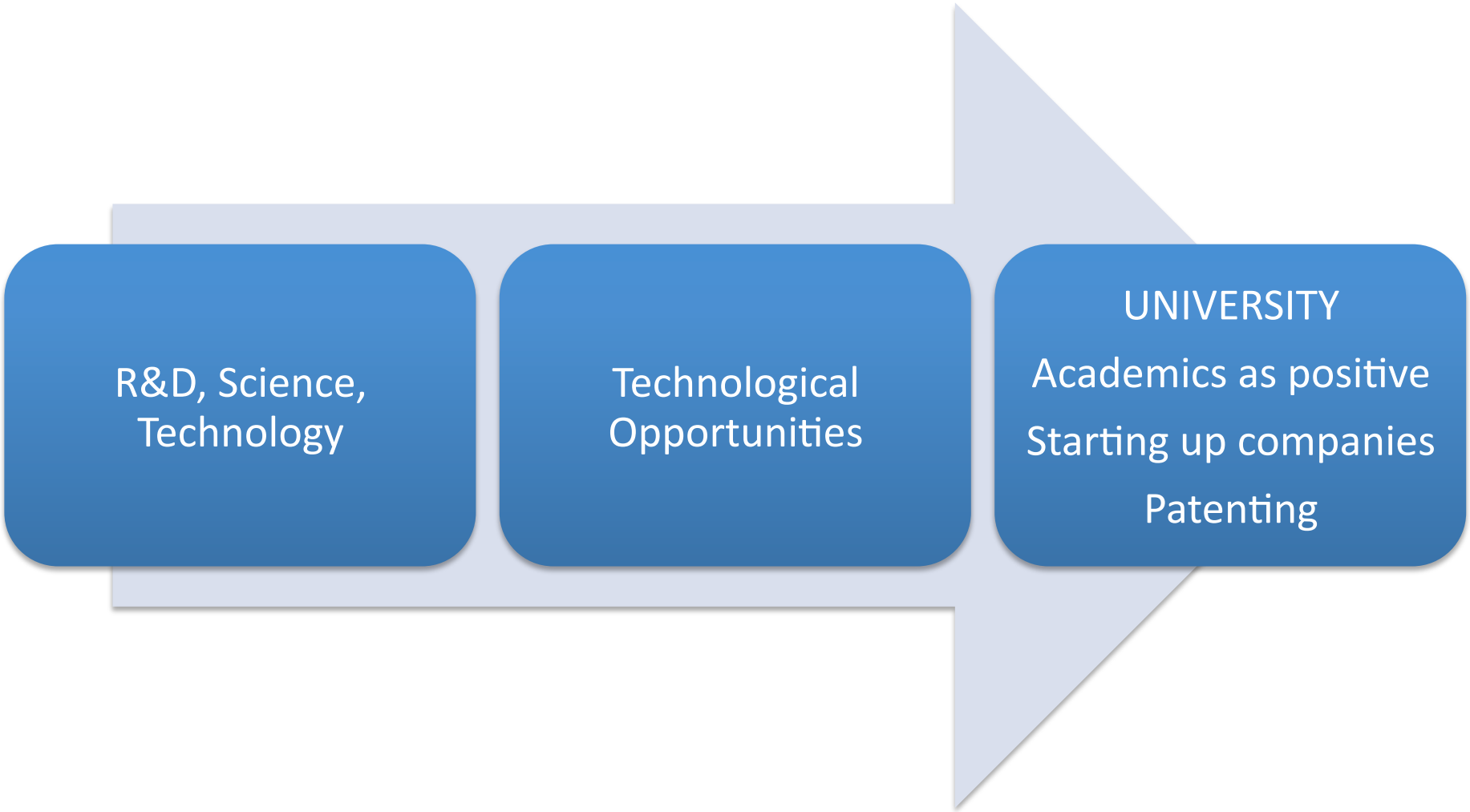
Lissoni, Llerena, McKelvey & Sanditov (2008)

What know about academic patents is that

Swedish R&D model to opportunities works

- Somewhat better than average in relation in terms of academic patents (4-6% of total)
- Average in relation to US and better than Europe in terms of academic start-up entrepreneurial companies
- Very well for transfer of patents to large firms, through technological opportunities
- Relevant to very few fields

2) Evidence shows that wrong ideas about Sweden circulating



Evidence contradicts what ‘we think we know’. Instead:

- Swedish university model performs LIKE USA AND BETTER THAN EUROPE in academic entrepreneurial firms and BETTER in impact on business innovation
- Swedish university model performs BETTER THAN LIKE USA in academic patents
- So, we need NEW MODELS AND NEW THINKING needed to manage universities for academic engagement with industry

So: IPR is an American Solution to an American Problem

- IPR can be improved in Swedish universities, but this will lead to small improvements on the margin
- Incorrect to take an American problem and American solution and imitate in Sweden
- Faulty problem-formulation of what needs to be 'fixed' in Sweden
  - Usually based on slogans, bad data, incomplete analysis
  - Historically, much Swedish policy has been more nuanced (though STU, Nutek, Vinnova)

So: academic patents are not a ‘market for technology’

Market for technology : Focuses upon patent (technology) as unit for sale; distance relationship

- **Interpreting this Evidence:**
- No evidence that university is ‘primary mover’, developing basic knowledge that transfers out to firms
- Large and small firms take academic patents to exploit their existing (core) technological areas
- Academic patents are instead the result of a complex collaborative structure (in Sweden)
- Patents are simply a minor part of our model of networks, people and competencies

Why need different way of thinking?

- **Past – and many still are**
  - Trying to find simple, measureable outcomes
  - Trying to analyze, based on incorrect data
  - Misunderstand firms' large impact on Science, R&D and technology
  - Misunderstand the role of the university
- **Need to rethink and pose new question:**
  - How do these knowledge processes affect entrepeneurs and their opportunities in Sweden?

3) How do these knowledge processes affect entrepeneurs and their opportunities in Sweden?

- **It ain't linear for the entrepreneurs**
  - Sources of opportunities are less important than the fact that technological opportunities are created
  - Technological opportunities must be 'translated' through many other activities, like applications, market knowledge, business processes
- **Firms create technological opportunities**
  - Firms' competencies and core technologies sets much of the overall direction and rate of academic patenting for the country
  - Large firms set much of the overall agenda

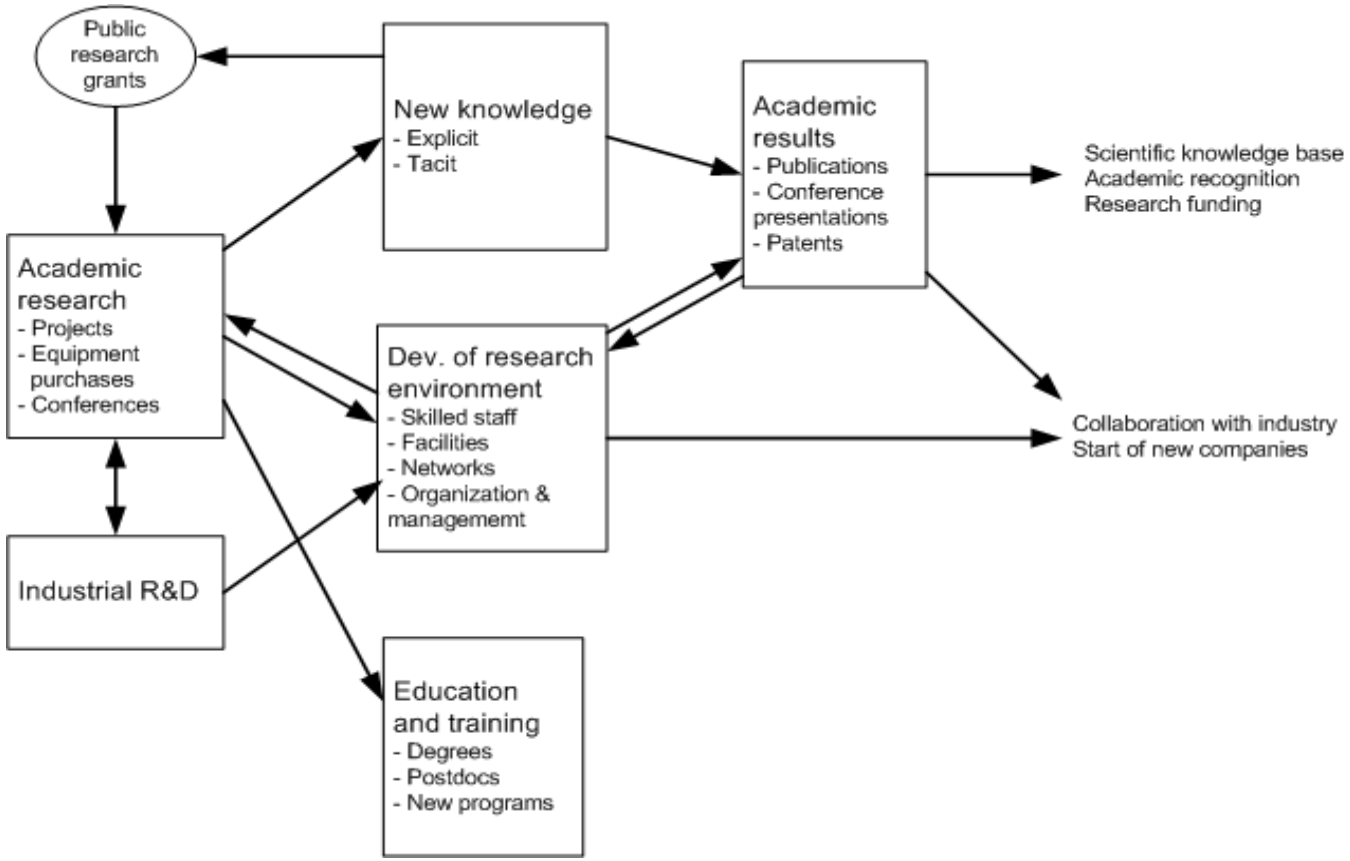
Firms' competencies matter, and influence universities and opportunities:

- **Technological opportunities often driven by firms:**
  - Firms have 'absorptive capacities', 70-80% of R&D
  - Many firms want universities to do 'problem-solving', 'equipment', ideas – not products
  - Primarily large firms set agenda for academic patents (50% of total to 5 firms)
  - In 90% of the cases, firms are interested in academic patents mainly in their core technological profile (Ljungberg & McKelvey 2012 I&I)
  - Still, entrepreneurial firms are started up at a reasonable rate in Sweden, as compared internationally

Universities play a limited and very different role

- Academic engagement with industry:
  - involves multiple paths of influencing competencies, networks and people
  - requires open boundaries, to network with other academics, large firms, & entrepreneurial firms
  - demonstrates specific model of interaction, which is very powerful to bring together applied and basic research to solve new problems
  - suggests that major firms interested in universities only if they solve specific problems and/or do top research

Model of how universities affect knowledge (Laage-Hellman et al, VINNOVA 2009)



What's in it for the entrepreneur? (And society?)

Maybe attractive today – but the future?

Possible opportunities develop but time consuming

- Unexpected ideas arise, as research progresses
- But sometimes nothing seems directly relevant

People matter most

- Hiring graduates
- Working with Masters and PhD students allows testing

Worries about globalisation

- Losing the large firms (production, R&D) can lead to negative long-term effects upon universities as well
- Major firms interested in universities only if they solve specific problems and/or do top research