UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Nanotechnology Innovation—Two Aspects

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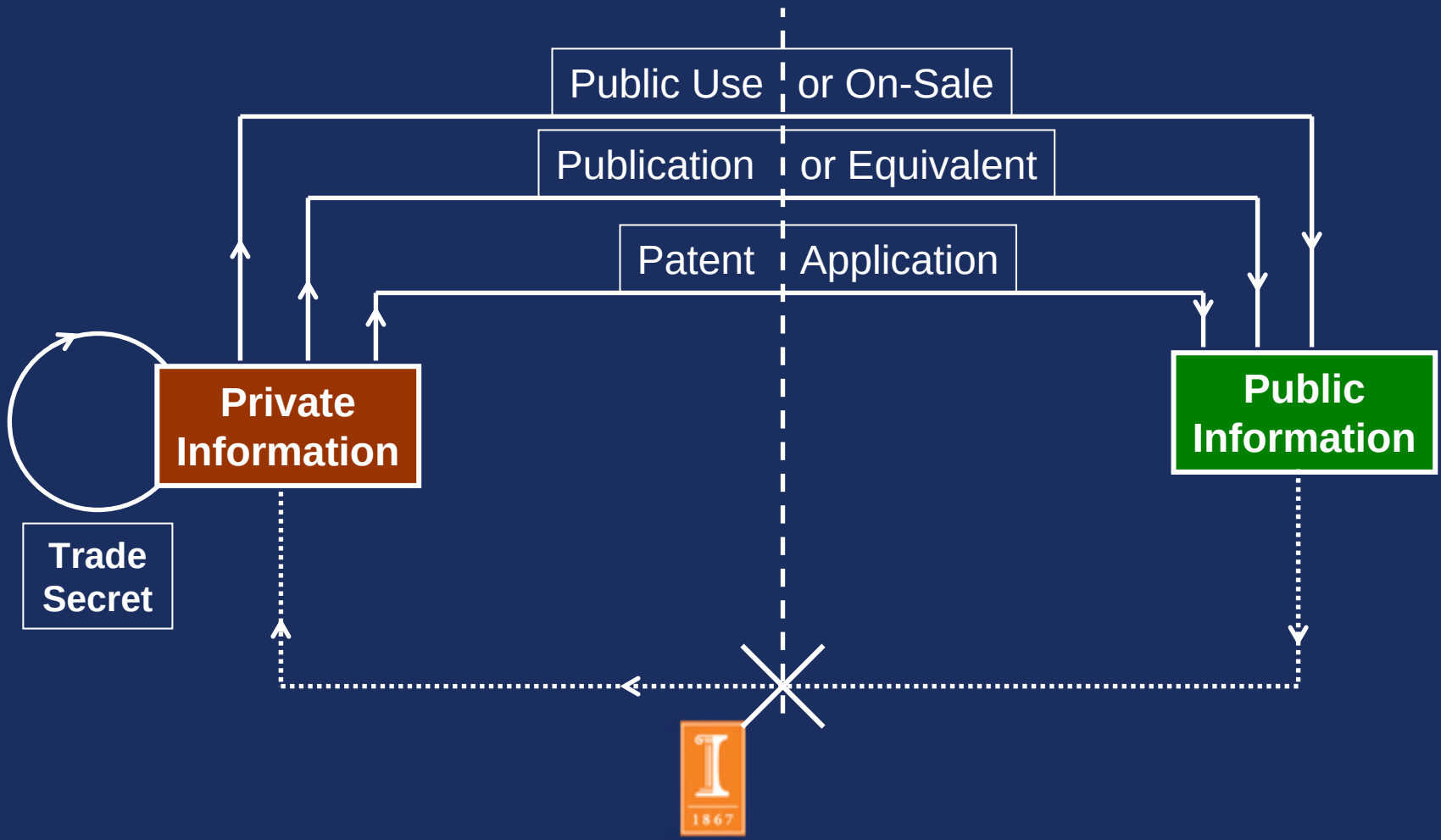
Outline—Two Aspects

- Patent Institutions and Patent Policy—granting patents commensurate with innovation
- Value-Sensitive Design—developing nanotechnology products to vindicate societal preferences

What is Nanotechnology?

- Nanotechnology is the understanding and control of matter at dimensions of roughly 1 to 100 nanometers, where unique phenomena enable novel applications—NNI definition
- Intersection of physical, chemical, and life sciences
- Unusual definition, not a bright line
- Encompasses “everything”—carbon nanoparticles, quantum dots, but also protein vaccines, peptides, viruses; indeed, all integrated circuit technology, anything molecular, and most of biotechnology

Public/Private Divide in the Patent System



Patent Policy—Locating Prior Art

- The NNI definition is narrow for nanotechnology “prior art” purposes
- The U.S. Patent Office created a preliminary classification for nanotechnology—Class 977
- Identifying and retrieving relevant prior art is difficult
- Mapping the patent and prior art landscape, without expert knowledge, is quite impossible
- Absence of common terms and definitions compound the problem; patentee is her own lexicographer
- Extensive, sloppy “nano” marketing not helpful

Patentability

- Nanotechnology patent claims:
  - Claim the property or
  - Claim the physical size
- Does the novel and non-obvious characteristic or property arise from the size?
- Does scaling down from the “bulk” result in unusual size-dependent features?
- Even if the nanotechnology invention is novel, is it unpatentable because it is inherent?

Patentability—Inherency

- Claimed feature is *not* explicitly disclosed in the prior art, but it is inherent to the prior art
- Inherency doctrine must be re-examined
- Fed. Cir. has held that the missing descriptive matter must be necessarily present in the prior art; not a matter of possibilities and probabilities
- Patent Examiner must reasonably support his determination that the allegedly inherent characteristic necessarily flows from the prior art teachings
- Inability to locate and appreciate the import of the relevant prior art and the multidisciplinary nature of nanotech makes it difficult to meet the burden of establishing inherency

Patentability Standards

- Obviousness after KSR v. Teleflex; is there a "reason to combine" prior art from different nanotech disciplines?
- There are increasing concerns about "patent thickets"
- Shakeout in post-issuance litigation—expensive option, creates incentives for strategic behavior
- Perhaps, patent reform will address some of these concerns

Patent Policy Reform

- Nanotechnology—a case of localized knowledge
- Create incentives for patentees to disclose relevant prior art
- Bring third-parties—competitors, improvers and the like—in the same shoes as the inventor, into the picture, perhaps through post-grant patent oppositions

Value-Sensitive Design (VSD) in Nanotechnology

- Nanotechnology, like all technologies, is not value-neutral; reflect the choices and incentives faced by the creators
- VSD focuses on the direct and indirect stakeholders, the nature of the technology, and takes a holistic view of the design process
- Can incorporate societal concerns, such as privacy, while encouraging widespread adoption of the technology

Value-Sensitive Design (VSD) in Nanotechnology—Examples

- RFID tags
- Microchips containing health information
  - e.g., individuals with disabilities in emergency situations
- Need to conduct technology assessments and case studies
- Need to improve our conceptual and theoretical understanding

In short…

- There is much that we can do to empower the patent system to deal with nanotechnology inventions
- In turn, there is much that nanotechnology innovators can do to accommodate our concerns and preferences