Innovation and IP
Europe at a crossroads
• US / EU economies are similar in size
• US > EU equity by 2x; 14x when it comes to VC (21x seed; 8x later stage)
• US > EU debt by 3x
• Situations differ widely between EU Member States
• EU has fragmented markets
• The problem is particularly acute for SMEs
• US has structural advantages: 1945 exclusion from Trade agreements + key European technologies neutralised
• Cultural aspects. Risk appetite. 33% of US SME financing comes from individuals vs. 9% in EU
Public funding and subsidiarity

- EU Public Funding supported by innovation is mostly national
  Eg.
  - EU Framework programme 90/10
  - However much more in terms of marginal spending → disproportionate influence on research topics
  - Basic flaws : apply now to fund future programmes
  - Bureaucracy : Control
European technology angelism

• Post-1945 Structural Disadvantages
  • US Post – 1945 Exemptions
    • Eg. SMEs in Public Procurement
  • Key Technologies
    • Eg. Radar, Cryptography, Brain exodus
  • Foremost: EU Fragmentation

• EU as US / Asia incubator?
Technology dynamics and waves

• Europe is static, rule-based: disruptive inventions by definition fall outside rules – impose new paradigms
• Lacks a sense of technology dynamics / timing / cycles
• GSM, graphene, Galileo
• Digital strengths: share, live together (Balablacar, airbnb)
IP Leakages are crippling

• EU Patent: Lost time → in the end did we get the right patent system?
• IP and Bankrupcies
• The Finnish play it right: See Nokia
• Other EU leaders
  • L’Oreal
  • Phillips
  • KU Leuven
IP : Crippled innovation
• Brands - OK
• Copyrights / coding – Ok
• Patents are the main problem
• It is a dog eat dog world out there: secrecy is on the rise

Patents increasingly used for signaling / Tech partnerships
Identification – Protection
Incumbents
Different means to secure innovation
- Patent (design, utility model, plant)
- Copyright/software
- Trade secret

![Figure 2.1 Protecting innovation: techniques preferred by UK Firms](chart.png)

Source: Hughes and Mina (2010), from UK Innovation Survey

Evolution of Google filed US patents
Revelation of IPR usefulness

+ acquisition of 20 000 Motorola patents for 12,5 Bn$ in 2012
Another well-known study of appropriability mechanisms was conducted by Cohen et al. (2000). The authors analysed the responses of a survey questionnaire sent to 1,478 R&D labs in the US manufacturing sector in 1994.

### Why Small Firms Choose Non-Patent Mechanisms to Protect Innovations:

- **“High enforcement costs (74%)**
- **Competitors can legally invent around most patents (72%)**
- **Portfolio of patents is too expensive to maintain (61%)**
- **Rapid changes in technology limit patent protection (57%)**
Les deux faces de Janus

Double nature of patents

• IP as Protectionism. Eg. Venice. OECD discussions today

• IP as Vector of Innovation / common good. Eg. Enlightenment ; US Constitution

• Patent inflation – inventive steps

• Offices are conflicted
Crystallization and debate during the 19th century

Patent system is born in Renaissance Italy. First patent law: Venice 1474
Royal privilege and Mercantilist vision (reward, attract skills, protect local, substitute imports): The British statute of monopoly of 1623, Patentes royales in mid 16th century in France.
France patent law of 1791 consider intellectual property a natural right of individual as any other type of property and has a strong influence among European countries and Latin America.

In the US the constitution of 1787 states « The Congress shall have the power... to promote the progress of science and useful Arts by securing for a limited time to authors and inventors the exclusive rights to their respective writings and discoveries ». Patent act of 1790. Creation of the USPTO in 1836.

German states adopt laws early in the century (Prussia 1815), then it was adopter a single law for the entire Zollverein in 1842, and in 1877 for the Reich. Creation of the Deutche Patentamt (Patent Office) in 1891.

In Japan successive laws were decided and withdraw : 1871, 1885, 1899, 1920...
Essential concepts were introduced during this time : quality of patent, first to invent/fist to file, grace period, compulsory licence if reasonable conditions are offered, judge control

Patent controversy was however very vivid about the effect on progress (« un outrage à la liberté et l’industrie », M. Chevalier (French economist), and even drove to the abolition of the Dutch patent system in 1869.
But this controversy faded after 1875 for three reasons: the continuous expansion of patent system in a growing number of countries, a growing number of inventions filed in industrial innovation domains (T. Edison filed mote than 1000 patents) international pressure for harmonization of the patent systems.
Maturity: international harmonization 19th-20th century

Century of trade expansion and international expositions drive to the Paris Convention of 1883, joined by UK in 1884, US in 1887, Germany in 1903: national treatment where foreigner are treated the same way as they are nationals (< reciprocity) / priority application (worldwide protection during one year).

Creation of WIPO in 1967 (Paris Convention has been revised six time and integrated in the UN system).

The Patent Cooperation Treaty was signed in 1970 and implemented in 1978. PCT offers an international patent examination procedure which allows to file one application before WIPO.

Integration in the GATT/WTO system with the TRIPS (Trade related IP) agreement in 1994

Europe: creation of EPO in 1973. On going adoption of unitary patent and the unitary court of justice?
Global value chains
The transformation of industrial processes: the globalization of the value chain

- On average worldwide, the import content of a product has risen from 20% 20 years ago to 40% today and is expected to reach 60% in 20 years (Pascal Lamy).
- “Many of our most used goods and services are “made in the world”. The foreign content of “Korean” and “Chinese” electronic goods exported in 2009, for example, was around 40% (Oxford Martin report)
Figure 1.2. Global value chains: From apparel to electronics

http://dx.doi.org/10.1787/9789264189560-en
The rise of knowledge networks and markets (KNMs) as enablers of open innovation: the example of life sciences (OECD)

KNMs include a broad range of existing initiatives whose purpose is to improve access to widely distributed biomedical knowledge resources in order to facilitate further innovation. The goal is to improve the circulation (sharing, trading or joint production) of disembodied knowledge (inventions, IPR, software, data, know-how) between independent parties using various vehicles (commercial transactions like licensing, spillovers, joint facilities, special interfaces, individual mobility, mergers and acquisitions, direct investment). The purpose of a knowledge network or market thus is to foster the more efficient use of knowledge and to enable cumulative innovation.

Examples of collective systems (i.e. KNMs) for innovation in the biosciences

- **Data registries and repositories**: *e.g.* NIH GenBank, The Cancer Genome Atlas, Global Biological Resources Centre Network (GBRCN). Virus Pathogen Bioinformatics Resource Centre, Patients-like-me.com
- **Platform technologies and tools**: *e.g.* Sage Bionetworks, BioBricks foundation, GSK medicines for malaria platform
- **Consortia and public-private partnerships**: *e.g.* Innovative Medicines Initiative, Biomarkers Consortium
- **Pools, clearinghouses and exchanges**: *e.g.* GSK Neglected Tropical Diseases pool
- **Prizes, on-line auctions, brokers and citizen science**: *e.g.* Innocentive, Prize4Life, Foldit
A four-phase process model for inbound open innovation

1. Obtaining
2. Integrating
3. Commercializing
4. Nonrecursive paths

Profiting from external innovations

West, Joel and Bogers, Marcel, “Profiting from External Innovation: A Review of Research on Open Innovation,” September 13, 2011
Academics’ collaboration

Figure 1.27. International collaboration networks in science
Internationally co-authored documents, 2011 and 1998 (whole counts)

1998

2011

Note: The position of selected economies (nodes) exceeding a minimum collaboration threshold of 10,000 documents is determined by the number of co-authored scientific documents published in 2011. A visualisation algorithm has been applied to the full international collaboration network to represent the linkages in a two-dimensional chart on which distances approximate the combined strength of collaboration forces. Bubble sizes are proportional to the number of scientific collaborations in a given year. The thickness of the lines (edges) between countries represents the intensity of collaboration (number of co-authored documents between each pair). The positions derived for 2011 collaboration data have been applied to 1998 values. New nodes and edges appear in 2011 as they exceed the minimum thresholds.

Back to the middle ages? Inventors’ corridors rather than clusters?
Do regions play a role in attracting talent?

One striking aspect of immigration, and particularly skilled immigration, is that migrants tend to concentrate in specific geographical areas within countries. For example, the share of skilled foreign-born individuals in the UK and France in 2000 was estimated at 8.8% and 9.8%, respectively; in contrast, 28% of London residents and 23% of Paris residents were foreign-born (Freeman 2006). In particular, immigrant inventors appear to cluster in metropolitan areas, thus contributing to the spatial concentration of inventive activity.
### Table 4: Inventor immigration rates by technology field, 2006-10

<table>
<thead>
<tr>
<th>Field of technology</th>
<th>Immigration rate (%) 1996-2000</th>
<th>Immigration rate (%) 2006-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical engineering</td>
<td></td>
<td></td>
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<tr>
<td>Electrical machinery, energy</td>
<td>5.2</td>
<td>7.2</td>
</tr>
<tr>
<td>Audio-visual technology</td>
<td>6.2</td>
<td>9.5</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>7.5</td>
<td>11.9</td>
</tr>
<tr>
<td>Digital communication</td>
<td>9.7</td>
<td>15.2</td>
</tr>
<tr>
<td>Basic communication processes</td>
<td>9.2</td>
<td>16.0</td>
</tr>
<tr>
<td>Computer technology</td>
<td>9.6</td>
<td>13.4</td>
</tr>
<tr>
<td>IT methods for management</td>
<td>8.0</td>
<td>10.5</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>7.0</td>
<td>12.1</td>
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<tr>
<td>Instruments</td>
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<td></td>
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<tr>
<td>Optics</td>
<td>6.5</td>
<td>7.0</td>
</tr>
<tr>
<td>Measurement</td>
<td>7.0</td>
<td>9.8</td>
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<tr>
<td>Analysis of biological materials</td>
<td>13.9</td>
<td>13.8</td>
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<tr>
<td>Control apparatus</td>
<td>5.3</td>
<td>7.0</td>
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<td>Medical technology</td>
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<td>8.3</td>
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<td>Chemistry</td>
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<td>Organic fine chemistry</td>
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<tr>
<td>Biotechnology</td>
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<td>14.6</td>
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<tr>
<td>Pharmaceuticals</td>
<td>11.3</td>
<td>14.6</td>
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<tr>
<td>Macromolecular chemistry, polymers</td>
<td>7.2</td>
<td>10.2</td>
</tr>
<tr>
<td>Food chemistry</td>
<td>7.9</td>
<td>11.2</td>
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<tr>
<td>Basic materials chemistry</td>
<td>7.6</td>
<td>11.4</td>
</tr>
<tr>
<td>Materials metallurgy</td>
<td>5.7</td>
<td>7.7</td>
</tr>
<tr>
<td>Surface technology, coating</td>
<td>5.9</td>
<td>8.1</td>
</tr>
<tr>
<td>Micro-structure and nano-technology</td>
<td>13.0</td>
<td>18.3</td>
</tr>
<tr>
<td>Chemical engineering</td>
<td>6.5</td>
<td>9.0</td>
</tr>
<tr>
<td>Environmental technology</td>
<td>4.6</td>
<td>7.3</td>
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<tr>
<td>Mechanical engineering</td>
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<tr>
<td>Handling</td>
<td>4.5</td>
<td>5.1</td>
</tr>
<tr>
<td>Machine tools</td>
<td>3.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Engines, pumps, turbines</td>
<td>4.4</td>
<td>6.1</td>
</tr>
<tr>
<td>Textile and paper</td>
<td>5.1</td>
<td>6.8</td>
</tr>
<tr>
<td>Other special machines</td>
<td>5.0</td>
<td>6.4</td>
</tr>
<tr>
<td>Thermal processes and apparatus</td>
<td>4.3</td>
<td>5.2</td>
</tr>
<tr>
<td>Mechanical elements</td>
<td>3.8</td>
<td>4.1</td>
</tr>
<tr>
<td>Transport</td>
<td>3.9</td>
<td>4.3</td>
</tr>
<tr>
<td>Other fields</td>
<td></td>
<td></td>
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<tr>
<td>Furniture, games</td>
<td>4.7</td>
<td>5.0</td>
</tr>
<tr>
<td>Other consumer goods</td>
<td>5.4</td>
<td>5.3</td>
</tr>
<tr>
<td>Civil engineering</td>
<td>4.4</td>
<td>7.7</td>
</tr>
</tbody>
</table>

**Wipo, 2011 report**
Source: oecd, open innovation
The relationship between migration and innovation has become a major focus of research by academics and policymakers alike. The key factor driving this development is the observation that high-skilled migrants decisively contribute to innovation outcomes, to the international diffusion of knowledge and, ultimately, to the economic growth of nations.

In some of the largest migrant-receiving countries (e.g., the United States of America (US)), immigrants are overrepresented among the most skilled workers. While immigrants account for about 12% of the entire US labor force, they account for 25% of US scientists and engineers, 50% of US PhDs, 60% of post-doctoral students, and 26% of US-based Nobel Laureates (Black and Stephan, 2008; Kerr, 2009).
Different means to secure innovation
- Patent (design, utility model, plant)
- Copyright/software
- Trade secret

Evolution of Google filed US patents
Revelation of IPR usefulness

Figure 2.1 Protecting innovation: techniques preferred by UK Firms

Source: Hughes and Mina (2010), from UK Innovation Survey

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Another well-known study of appropriability mechanisms was conducted by Cohen et al. (2000). The authors analysed the responses of a survey questionnaire sent to 1,478 R&D labs in the US manufacturing sector in 1994. why small firms choose non-patent mechanisms to protect innovations:

- “High enforcement costs (74%)
- Competitors can legally invent around most patents (72%)
- Portfolio of patents is too expensive to maintain (61%)
- Rapid changes in technology limit patent protection (57%)”
Is there a role in all this for public policy?
Commercialization and open science are not necessarily irreconcilable and could instead be envisioned as complementary elements of a more holistic innovation framework.

- Facilitating the mobilization, sharing, or exchange of patents is increasingly important to promote innovation in this globalized and well-networked world, where the circulation of ideas and technologies is essential to innovation. In the context of open innovation, patents are expected to play a role as a means for transferring ideas and technologies from one entity to another” (Guellec, Yanagishawa, OCDE, 2009)
Government and industrial research

German firms are the first to conduct research activities: Bayer, Hoechst, BASF, AEG, Siemens

Between 1919 and 1936, U.S. manufacturing firms established over a thousand industrial research laboratories. The number of scientists employed in research laboratories increased tenfold between 1920 and 1940, from 2,775 to 27,777. (Research and Development in the United States since 1900, Steven W. Usselman, School of History, Technology, and Society, Georgia Institute of Technology, November 2013)

The WW2 see a period of growing commitment of the federal government to research and science. (Cf the Manhattan Project): the New Frontier doctrine. “Scientific progress is one essential key to our security as a nation, to our better health, to more jobs, to a higher standard of living, and to our cultural progress.” "New frontiers of the mind are before us, and if they are pioneered with the same vision, boldness, and drive with which we have waged this war we can create a fuller and more fruitful employment and a fuller and more fruitful life.”-- FRANKLIN D. ROOSEVELT November 17, 1944

Vannevar Bush (founder of National Science Fondation) advisor of the President propose a new vision that came to be known by the title “Science – The Endless Frontier” (1945). In his report Bush advocate for a reseparation of the parties and the establishment of a new division of labor, in which academic researchers generated “basic” knowledge that diffused to more practically-oriented teams in industry and the military, who would develop applications. The vision came to be known as the linear model of innovation. But National Science Fondation was only created in 1950 – which allows the development of specialized agencies

The Military-Industrial-University Complex 1940-1960
The federal share of research spending grew from 54% in 1953 to 65% in 1960. Eisenhower in his farewell address of 1961 raised concerns about what he characterized as a military-industrial-university complex

Post 1960 : shifting to private sector
Federal funding spiked upward during the Reagan defense buildup of the early 1980s, but funding from private sources increased even more rapidly, as corporations responded to government incentives offering tax credits for funds spent on R&D. The federal share dropped steadily to a low of just 25% in 2000. Federal investment in basic research was accompanied by new policies intended to encourage the commercialization of results. The Bayh-Dole Act of 1980 enabled universities to retain patent rights for innovations resulting from federally-funded research
The new landscape

- **Expanded role of public institutions and public funding** in the innovation process
- **Small entrepreneurial firms** contribute disproportionate numbers of major innovations - the diminishing role of the largest corporations as sources of innovation
- Innovations stemming from **collaborations** with spin-offs from universities and federal laboratories make up a much larger share.
- Expanding role of interorganizational collaborations in producing award winning innovations.

*Venture capital* has became an integral part of the innovation system in leading OECD countries, and combined with increased labour mobility, the result has been a larger role for small and medium sized enterprises (SMEs) in the industrial innovation systems of these countries.

Fred Block, Department of Sociology, University of California, Davis
Matthew R. Keller, Department of Sociology, Southern Methodist University May 2011

---

Figure 3.9. Public research has shifted towards universities
R&D expenditure as a % of GDP, total OECD, 1981-2014

The new vision of public intervention

- The existence of a market failure is not sufficient reason to legitimize the public intervention. It must also be shown that the State can do better than the market and specify the mechanisms of its intervention.

  It is on the basis of these findings that a new conception of innovation policy emerges gradually, based on an "incentive logic" rather than a "quantitative logic". Wherever possible, the government will try to complete the market and improve its functioning rather than replace it. It will play on the reaction capabilities of the agents rather than bypass them.

- Rather than raising the amount of research for a given level of social return, the state can raise the actual social return on existing research through regulatory measures and institutional innovations. It costs less and can be more efficient. One way of achieving this goal is to develop knowledge transfers: the mobility of public researchers to the private sector, the creation of companies by public researchers, the interest in patents for these researchers, research collaborations between the public and the private sector. Different measures have been taken to encourage cooperation between firms (European framework programs, Eureka, Sematech in semiconductors in the United States, MITI programs in Japan). These co-operatives allow the internalization of externalities upstream, while safeguarding downstream competition.

(from D. Guellec)
A Strategy for American Innovation: Driving Towards Sustainable Growth and Quality Jobs

History should be our guide. The United States led the world’s economies in the 20th century because we led the world in innovation. Today, the competition is keener; the challenge is tougher; and that is why innovation is more important than ever. It is the key to good, new jobs for the 21st century. That’s how we will ensure a high quality of life for this generation and future generations. With these investments, we’re planting the seeds of progress for our country, and good-paying, private-sector jobs for the American people.”

- President Barack Obama, August 5, 2009

Executive Office of the President
National Economic Council
Office of Science and Technology Policy

Innovation for Sustainable Growth and Quality Jobs

- Catalyze Breakthroughs for National Priorities
  - Unleash a clean energy revolution
  - Support advanced vehicle technology
  - Drive breakthroughs in health IT
  - Address the “grand challenges” of the 21st century

- Promote Competitive Markets that Spur Productive Entrepreneurship
  - Promote American exports
  - Support open capital markets that allocate resources to the most promising ideas
  - Encourage high-growth and innovation-based entrepreneurship
  - Improve public sector innovation and support community innovation

- Invest in the Building Blocks of American Innovation
  - Restore American leadership in fundamental research
  - Educate the next generation with 21st century knowledge and skills while creating a world-class workforce
  - Build a leading physical infrastructure
  - Develop an advanced information technology ecosystem
EU Horizon 2020

• In general, it is a problem that the European construction calls for dramatic declarations to build support for European STI policy. It contrasts with Japan and the US where less is said and more is done.

• The framework programs have been used as instruments to promote European integration and there is no doubt that the programs have had an enormous effect in terms of building research collaboration of a lasting kind across Europe.

(Oxford Handbook)
1. Funding long-term, higher-risk research Innovation for global challenges
2. Enabling the Next Industrial Revolution
3. Addressing common challenges through international co-operation in science and innovation
4. Raising the quality of science
5. Promoting excellence
6. Nurturing talent and skills
7. Investing in scientists and engineers
8. Promoting student exchanges
9. Facilitating researcher mobility
10. Promoting collaboration in innovation among firms
11. Supporting business innovation
12. Fostering entrepreneurship
13. Empowering society with science and technology
Rise of IoT: “The number of connected devices in and around people’s homes in OECD countries will probably increase from 1 billion in 2016 to 14 billion by 2022. By 2030, it is estimated that 8 billion people and maybe 25 billion active “smart” devices will be interconnected and interwoven in one huge information network” (OECD, 2015b).
“KETs are knowledge and capital-intensive technologies associated with high research and development (R&D) intensity, rapid and integrated innovation cycles, high capital expenditure and highly-skilled employment. Their influence is pervasive, enabling process, product and service innovation throughout the economy. They are of systemic relevance, multidisciplinary and trans-sectorial, cutting across many technology areas with a trend towards convergence, technology integration and the potential to induce structural change.”
TOP 5 TECHNOLOGIES

1. Electrical machinery, apparatus, energy
   - 14,897 (+10.8%)

2. Computer technology
   - 14,684 (+18.9%)

3. Digital communication
   - 14,059 (+11.3%)

4. Medical technology
   - 11,920 (+4.8%)

5. Measurement
   - 7,952 (+5.8%)

TOP 15 PCT APPLICANTS

The Japanese company Panasonic Corporation was the largest filer in 2013.
WHO FILED THE MOST PCT PATENT APPLICATIONS IN 2013?

FILINGS UNDER THE PATENT COOPERATION TREATY (PCT)

TOP 10 COUNTRIES

USA
+10.8%

Japan
57,239

China
43,918

Germany
41,516

Republic of Korea
12,366

France
17,927

6 France
7,899

7 UK
4,665

8 Switzerland
4,367

9 Netherlands
4,196

10 Sweden
3,960

205,300
Number of applications

+5.1%
Growth in 2013
### Global Researcher Views of Leading Countries in R&D by Research/Technology Area

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<td>Sweden</td>
<td>Switzerland</td>
<td>South Korea</td>
<td>South Korea</td>
</tr>
</tbody>
</table>

*Source: Battelle*
Result in more complex innovations

More radical business model changes combine knowledge from unrelated fields. Companies pull in expertise from industries and fields that have never been related previously to the current industry to which the small firm belongs.
Navigating the deep oceans of IP

The tools have largely improved:

- Large Data
- Cartography

Can they keep up with IP inflation?

Chinese translation?
Network of critical references in telecommunications in 2005
Tech mapping
PATENT THICKETS AND ANTI-COMMONS

Plethora of overlapping property right block single property exploitation
The financial sector: In search of Holy Grail
Part croissante de la valeur des actifs immatériels dans la valeur des entreprises S&P 500 Index Stock

Source: Ocean Tomo
Growth of intangible

Graphique 2 : le développement des actifs immatériels aux États-Unis
Parts de l’investissement physique (en bleu) et immatériel (en rouge) dans les investissements des entreprises non agricoles aux États-Unis (en %)

Source: Mackie, 2009

S&T 500 Index stock

Source: Ocean Tomo
Patents and financial assets

Cash Flow

IP Markets

Know How intensive

Valorisation

Maturation

Standalone IP
Patent explosion

Patent filings grew by 9.2% in 2012, representing the fastest growth in the past 18 years –

2.5 million patent filing in 2013

Number of patent filling
WIPO, 2013
Can patent pools be (part of) the answer?
Patent pools: Second Wave
# Patent pools (1856-2006)

<table>
<thead>
<tr>
<th>Early pools associated with monopolies and cartels (1856-1919)</th>
<th>More recent pools that address standardization (1995-current)</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Harrow Company - 1890</td>
<td>Bluetooth Special Interest Group (SIG) – 1997</td>
</tr>
<tr>
<td>United Shoe Machinery Company - 1899</td>
<td>OpenCable Applications Platform (OCAP) – 1997</td>
</tr>
<tr>
<td>Motion Picture Patents Company (MPPC) - 1908</td>
<td>DVD3C – 1998</td>
</tr>
<tr>
<td>Association of Sanitary Enameled Ware Manufacturers (Standard Sanitary) - 1909</td>
<td>G.729 Audio Data Compression - 1998</td>
</tr>
<tr>
<td>Standard Oil Cracking Pool - 1911</td>
<td>MPEG-4 - 1998</td>
</tr>
<tr>
<td>Association of Licensed Automobile Manufacturers (ALAM) - 1903</td>
<td>IEEE 1394/FireWire - 1999</td>
</tr>
<tr>
<td>Glass Container Association of America (Hartford-Empire) – 1919</td>
<td>DVD6C - 1999</td>
</tr>
<tr>
<td>National Lead Co. - 1920</td>
<td>Multimedia Home Platform (DVB-MHP) – 2004</td>
</tr>
<tr>
<td>New Wrinkle - 1937</td>
<td>AVC/H.264 – 2005</td>
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<tr>
<td>Line Material Co. - 1938</td>
<td>Open Invention Network (OIN) for Linux Software – 2005</td>
</tr>
<tr>
<td>Singer ‘401’ – 1956</td>
<td>UHF RFID Consortium - 2005</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pools created in response to U.S. government policy objectives</th>
<th>Recent Pools (and proposals for pools) involving biomedical and agricultural technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturers Aircraft Association - 1917</td>
<td>Pillar Point Partners (Laser Eye Surgery) – 1992</td>
</tr>
<tr>
<td>Radio Corporation of America (RCA) - 1919</td>
<td>Golden Rice Pool - 2000</td>
</tr>
<tr>
<td></td>
<td>AvgGF (Green Florescent Protein) - 2001</td>
</tr>
<tr>
<td></td>
<td>Public Intellectual Property Resource for Agriculture (PIPRA) – 2001</td>
</tr>
<tr>
<td></td>
<td>startART Licensing, Inc. – 2005</td>
</tr>
<tr>
<td></td>
<td>The SARS IP Working Group – proposed 2005</td>
</tr>
<tr>
<td></td>
<td>Essential Medical Inventions Licensing Agency (EMILA) – proposed 2006</td>
</tr>
<tr>
<td></td>
<td>UNITAID pool for AIDS medications – proposed 2006</td>
</tr>
</tbody>
</table>
Examples of pools

- **MAA, 1917**: Wright brothers held most of the essential patents on airplane manufacturing components. They were charging high royalty rates, and the time and expenses involved in litigation was causing stagnation in the airline industry at a time when the United States needed to increase its aircraft production for the war effort. To that end, an advisory panel headed by then-Assistant Secretary of the Navy Franklin D. Roosevelt recommended the formation of a patent pool.

- **The SIG** (bluetooth) does not make, manufacture, or sell Bluetooth products, but owns the trademarks and standardization documents, markets the Bluetooth brand, and licenses to more than 7,000 member companies involved in making, manufacturing, and selling Bluetooth-enabled products.

- **ETSI** (European Telecommunications Standards Institute) licenses the intellectual property rights essential to the MHP specifications. ETSI is a non-profit organization based in Sophia Antipolis, France, and established under French law for the standardization of telecommunications in Europe. The purpose of this pool is to protect patent-holders by means of a “covenant not to sue” clause, thereby promoting the manufacture of MHP-based products. 655 members from 59 countries in and out of Europe participate in ETSI’s activities, and ETSI is officially recognized by the European Commission.

- **MPEG-2** is a video compression technology that was adopted as a standard by the Motion Picture Expert Group (MPEG) International Standards Organization (ISO) in 1995. The technology reduces the number of bits in a file, thereby making videos easier and faster to transmit, and available over lower bandwidth carriers. The purpose of the MPEG-2 pool is to offer “one-stop shopping” for licenses necessary to produce MPEG-2 products.
• GE Healthcare, Biolmage A/S, Invitrogen IP Holdings, Amersham Biosciences, and Columbia University in 2001 pooled several patents related to **green fluorescent protein (GFP)**, a reporter molecule drawn from bioluminescent marine animals which allows researchers to visualize cellular proteins without using chemical dyes. The purpose of the GFP pool was to clear a patent thicket that restricted commercial use of GFPs.

• **PIPRA** is an initiative aimed at making agricultural technology more readily available for the development and distribution of subsistence crops in the developing world. To this end, PIPRA promotes the management of IP in such ways that biotechnological products are made freely available for research and humanitarian projects, and is exploring the development of a patent pool to give biotech crop researchers greater freedom to operate.

• The incentives to create **biotechnology patent pools** are similar to those in other industries. Overlapping patent claims can block the commercialization and adoption of technologies. However, there are additional motives for considering patent pools in the life sciences. Patent pools can be created for philanthropic purposes: the UNITAID patent pool focuses on making medicines for diseases such as HIV/AIDS, malaria and tuberculosis available to countries in need.
Pool Management

Long Term Evolution
Standards-Essential Patent Licensing

Via Licensing’s LTE patent pool brings together the essential LTE patents of multiple innovators into a single license offering that simplifies the licensing process, promotes transparent pricing, and creates a level playing field for all LTE licensees.

<table>
<thead>
<tr>
<th>Volume (per unit/annual reset)</th>
<th>Per Unit Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>For the first 1 to 500,000 units</td>
<td>$3.00</td>
</tr>
<tr>
<td>For units 500,001 to 2,500,000</td>
<td>$2.55</td>
</tr>
<tr>
<td>For units 2,500,001 to 5,000,000</td>
<td>$2.40</td>
</tr>
<tr>
<td>For units 5,000,001 to 10,000,000</td>
<td>$2.25</td>
</tr>
<tr>
<td>For units 10,000,001 or more</td>
<td>$2.10</td>
</tr>
</tbody>
</table>

Via Licensing’s LTE patent pool provides essential LTE IP from the following technology innovators:
• AT&T Intellectual Property II, L.P.
• Clear Wireless LLC
• Deutsche Telekom AG
• DTVG Licensing, Inc.
• Hewlett-Packard Company
• KDDI Corporation
• NTT DOCOMO
• SK Telecom Co., Ltd
• Telecom Italia S.p.A.
• Telefonica, S.A.
• ZTE Corporation
Good and bad pools

Patent pools comprising complementary patents can be welfare enhancing, because they solve the coordination problem.

On the other hand, patent pools containing substitute technologies are not, since their main objective is to soften price competition among pool members. (WIPO, 2011)

One way to differentiate beneficial pools from harmful ones is to look at the detailed provisions governing them. Two types of provisions are relevant: so-called grant backs and independent licensing rules (Lerner, J. & Tirole, J. 2004). Efficient Patent Pools. The American Economic Review, 94(3), 691-711.

- **Grant back**s commit pool members to offer future patents to the pool at no fee if such patents are deemed relevant to the patent pool.

- **Independent licensing rules** allow any pool member to license their patent outside of the pool (In anticompetitive pools, the freedom of members to license their technology independently would break the pool’s ability to fix prices above the competitive rate).
Wartime economy

Procès entre les principales entreprises de télécommunications. Source : Reuters, Aout 2011
NPEs

Table 1. The IP acquisition marketplace (illustrative) – the rise of financial/NPE buyers*

Corporation/operational funding

Institutional PE funding

Defensive patent strategy

Offensive patent strategy

Source: IAM, July 2011, change in IP market, P. Holden
“Suits brought by PAEs have tripled in just the last two years, rising from 29 percent of all infringement suits to 62 percent of all infringement suits. Estimates suggest that PAEs may have threatened over 100,000 companies with patent infringement last year alone.”

Executive office of the President, 2013
# Parties involved

source IAM

<table>
<thead>
<tr>
<th>Rank</th>
<th>Defendant</th>
<th>Number of cases</th>
<th>Rank</th>
<th>Plaintiff</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Apple</td>
<td>65</td>
<td>1</td>
<td>Acacia Technologies</td>
<td>148</td>
</tr>
<tr>
<td>2</td>
<td>AT&amp;T</td>
<td>65</td>
<td>2</td>
<td>NovelPoint</td>
<td>135</td>
</tr>
<tr>
<td>3</td>
<td>Samsung</td>
<td>52</td>
<td>3</td>
<td>Wyncomm LLC</td>
<td>129</td>
</tr>
<tr>
<td>4</td>
<td>Verizon</td>
<td>51</td>
<td>4</td>
<td>The Pacid Group LLC</td>
<td>109</td>
</tr>
<tr>
<td>5</td>
<td>Hewlett-Packard</td>
<td>48</td>
<td>5</td>
<td>Eclipse IP LLC</td>
<td>95</td>
</tr>
<tr>
<td>6</td>
<td>LG</td>
<td>44</td>
<td>6</td>
<td>Brandywine Communications Technologies</td>
<td>85</td>
</tr>
<tr>
<td>7</td>
<td>Amazon.com</td>
<td>43</td>
<td>7</td>
<td>The Tawnsaura Group LLC</td>
<td>77</td>
</tr>
<tr>
<td>8</td>
<td>Sony Corp</td>
<td>42</td>
<td>8</td>
<td>Marathon Patent Group</td>
<td>76</td>
</tr>
<tr>
<td>9</td>
<td>Toshiba Corp</td>
<td>41</td>
<td>9</td>
<td>Beacon Navigation GmbH</td>
<td>74</td>
</tr>
<tr>
<td>10</td>
<td>Dell</td>
<td>40</td>
<td>10</td>
<td>Intellectual Ventures</td>
<td>73</td>
</tr>
<tr>
<td>11</td>
<td>HTC Corp</td>
<td>39</td>
<td>11</td>
<td>Uniloc</td>
<td>66</td>
</tr>
<tr>
<td>12</td>
<td>Sprint Corp</td>
<td>37</td>
<td>12</td>
<td>Innovative Wireless Solutions LLC</td>
<td>64</td>
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<tr>
<td>13</td>
<td>T-Mobile</td>
<td>33</td>
<td>13</td>
<td>Olivistar LLC</td>
<td>60</td>
</tr>
<tr>
<td>14</td>
<td>Nokia Corp</td>
<td>33</td>
<td>14</td>
<td>Ubicom LLC</td>
<td>60</td>
</tr>
<tr>
<td>15</td>
<td>Blackberry</td>
<td>33</td>
<td>15</td>
<td>Sonic Industry</td>
<td>45</td>
</tr>
</tbody>
</table>
## Settlement vs litigation

### Table 3. Costs for cases settled without litigation

(per company in million dollars)

<table>
<thead>
<tr>
<th>Mean cost by type</th>
<th>Total Cost per company, non-litigated cases</th>
<th>Comparable Litigation Cost per company</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td><strong>All</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal</td>
<td>0.50</td>
<td>29.75 (13.89)</td>
</tr>
<tr>
<td>Licensing</td>
<td>24.59</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>4.66</td>
<td></td>
</tr>
<tr>
<td><strong>Company size</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small/medium</td>
<td>0.05</td>
<td>8.14 (7.68)</td>
</tr>
<tr>
<td>Legal</td>
<td>0.77</td>
<td>42.43 (21.22)</td>
</tr>
<tr>
<td>Licensing</td>
<td>34.40</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>7.25</td>
<td></td>
</tr>
<tr>
<td><strong>Industry</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td>0.38</td>
<td>16.35 (9.14)</td>
</tr>
<tr>
<td>Legal</td>
<td>0.56</td>
<td>36.24 (20.03)</td>
</tr>
<tr>
<td>Licensing</td>
<td>30.76</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>4.91</td>
<td></td>
</tr>
</tbody>
</table>

Note: Standard errors in parentheses. Results are for a sub-sample of 46 companies that reported full litigation and non-litigation costs. Figures are totals over 2005-11 per company, although not all companies reported all years.
History suggests that it should be possible to address these challenges.

- Similar cases occurred with patents for agricultural equipment and for railroad equipment in the late 19th century, in which there was great uncertainty about whether a valid patent had been infringed. Once these underlying conditions were changed, this business model was no longer profitable and litigation of this type fell dramatically.

- Policies such as the following: fostering clearer patents with a high standard of novelty and non-obviousness; reducing disparity in the costs of litigation for patent owners and technology users; and increasing the adaptability of the innovation system to challenges posed by new technologies and new business models; would likely have a similar effect today.
Asia
Asia rise and catch up

# Patent Filings:
- From Low to High Quantity
- From Low to High Quality
- From Domestic to Global

Source: V. Pluvinage
CHINA

Evolution of China Patent System
• 1984 China acceded to Paris Convention
• 1985 First China patent law came into force
• 1993 First amendment of China patent law
• 1993 China acceded to PCT
• 1996 China acceded to Budapest Treaty
• 2000 China acceded to the WTO
• 2001 Second amendment of China patent law
• 2007 Third amendment of China patent law started

• Current Developments
  • Court rulings – training of magistrates
  • Opening of insight into legal system (both business and other)
  • Increasing support to enforcement
  • Government support to filing of applications
And the story just began
Backup
VC Myths:
In frantic search of a new paradigm
Six Myths About Venture Capitalist, Diane Mulcahy, Harvard business review, May 2013

Myth 1: Venture Capital Is the Primary Source of Start-Up Funding
Venture capital financing is the exception, not the norm, among start-ups. Historically, only a tiny percentage (fewer than 1%) of U.S. companies have raised capital from VCs. And the industry is contracting: After peaking in the late 1990s, the number of active VC firms fell from 744 to 526 in the decade 2001–2011, and the amount of venture capital raised was just under $19 billion in 2011, down from $39 billion in 2001, according to the National Venture Capital Association (NVCA). But less venture capital doesn’t mean less start-up capital. Non-VC sources of financing are growing rapidly and giving entrepreneurs many more choices than in the past. Angel investors—affluent individuals who invest smaller amounts of capital at an earlier stage than VCs do—fund more than 16 times as many companies as VCs do, and their share is growing.

Myth 2: VCs Take a Big Risk When They Invest in Your Start-Up
VCs are often portrayed as risk takers who back bold new ideas. True, they take a lot of risk with their investors’ capital—but very little with their own.

Myth 3: Most VCs Offer Great Advice and Mentoring
A common VC pitch to entrepreneurs is that the firm brings much more than money to the table: It offers experience, operational and industry expertise, a broad network of relevant contacts, a range of services for start-ups, and a strong track record of successful investing.
Myth 4: VCs Generate Spectacular Returns
We found that the overall performance of the industry is poor. VC funds haven’t significantly outperformed the public markets since the late 1990s, and since 1997 less cash has been returned to VC investors than they have invested. A tiny group of top-performing firms do generate great “venture rates of return”: at least twice the capital invested, net of fees.

Myth 5: In VC, Bigger Is Better
In fact industry and academic studies show that fund performance declines as fund size increases above $250 million. We found that the VC funds larger than $400 million in Kauffman’s portfolio generally failed to provide attractive returns: Just found out of 30 outperformed a publicly traded small-cap index fund.

Myth 6: VCs Are Innovators
Any innovation in financing start-ups, such as crowdfunding and platforms like AngelList and SecondMarket, has come from outside the VC industry. The story of venture capital is changing. Entrepreneurs have more choices for financing their companies, shifting the historical balance of power that has too long tilted too far toward VCs. Entrepreneurs will enjoy a different view as they move from the backseat into the driver’s seat in negotiating with VCs. An emerging group of “VC 2.0” firms are going back to raising small funds and focusing on generating great returns rather than large fees. And the industry’s persistent underperformance is finally causing institutional investors to think twice before investing in venture capital. As a result, VCs will continue to play a significant, but most likely smaller, role in channeling capital to disruptive start-ups.
To boldly go
Recent initiatives are being launched

PCTxs is a fully searchable, auto-populating, internet based marketplace for the sale or license of available National Phase patent application rights for International Patent Applications around the world. PCTxs may also be used for non-PCT applications and non-published PCT applications.
New Patent Purchase Program

The Industry Patent Purchase Program (IP3) formed by Allied Security Trust, can best be described as a patent marketplace. The goal is to buy patents from owners and then offer them for sale to companies such as Google, Adobe, IBM, Verizon and others. The IP3 is also targeting patents in industries such as automotive, cloud computing and communications.

“Our IP3 program is a first of its kind industry program designed to give sellers an easy way to access the secondary market by streamlining the process of selling patents,” said CEO of Ast, Russell W. Binns Jr in a press release. “At the same time, it alleviates many of the problems associated with the secondary market by providing a safe, transparent and rapid process for all parties.”

AST announced the results last week for the Industry Patent Purchase Promotion (IP3): IP3 made 56 offers to purchase 107 active patent filings at an average price per family of $96,000. The total expenditure was over $5.3 million with the purchase prices ranging from $10,000 to $325,000.
Creation of a market place by a reference IP review in October 2015

Vendors already online: Google, Hewlett-Packard, Rovi, Philips, AT&T, Freescale, Harman, NEC, Sony, Deutsche Telekom, Boeing, Rambus, IBM, Intel...
Other initiatives under development

- “Strengthen our national capabilities to commercialise IP...establishing dedicated commercially-oriented entities that are focused on the commercialisation of IP
- Significantly grow the community of IP and commercialisation experts
- Develop a standardised IP protocol »

China: a growing network of IP funds and marketplaces

Chinese Government has Promoted IP Marketplaces for Transformation of Innovations

- At the beginning of 2016, the biggest fund of its kind nationwide—a government-led intellectual property fund “Beijing key industry intellectual property fund”—with a total planned capital of 1 billion RMB ($153.3 million) was launched
- NAST (National Achievements of Science and Technology; www.nast.org.cn):
- CTEX: China Technology Exchange (www.ctex.cn) was set up by MOST, the State Intellectual Property Office, the Chinese Academy of Sciences, and Beijing Municipality. Supported by three platforms, i.e., on-line technology trading platform (www.ctexml.com, claimed to be the largest platform in China), CTEX has satellite offices nationwide and 168 collaborating members.
- CATTC (China-ASEAN Technology Transfer Center; www.cattc.org.cn)

Regional:
- NTEM (Northern Technology Exchange Market (www.ntem.com.cn): was set up by Tianjing Municipality
- STEE (Shanghai Technology Transfer & Exchange; www.stte.sh.cn)

Private:
- TIPEI (Tianjing Binhai Intellectual Property Exchange International; www.tipei.net);
- Ruichuan IPR Funds, founded in April 2014, is a complex organization with government involvement corporation investment (Xiaomi, TCL, Kingsoft), and professional operation (Zhigu Corp., specialized IP service firm). The fund is expected to reach a few hundred millions (RMB)
IoT: an imperative need for a market mechanism

Avanci: Ericsson and Qualcomm’s patent pool

Looking to speed time to market for “Internet of Things” products, Ericsson announced a new virtual marketplace for patent licensing across potential IoT verticals ranging from industrial applications to connected cars. The company said the goal of the new marketplace, which will be operated by an independent party, is to simplify access to standardized technology. In an interview with RCR Wireless News, Alfalahi said the goal is to create a “one-stop licensing platform” for IoT.

[link to article]

Qualcomm, Ericsson, ZTE, KPN, InterDigital and Sony
A first attempt to set up such a supermarket is the ‘Librassay® – Molecular Diagnostic Patent Supermarket’ (related to the molecular diagnostics industry), which is established by MPEG LA at the end of December 2012

https://www.librassay.com/
But these initiatives remain partial and limited

• Auctions serve as a (useful) demonstration but not as regular market
• Pools work only on standard
• Aggregators and funds are reserved to members and have either a limited scope or a financial return goal
• Open platform
  • offer too few patents and no possibility to bundle patents
  • no price fixation
  • No due diligence or validity guarantee

The patent market planet remains an archipelago without common rules that ensure the exchange to be “safe, transparent and rapid”
BANKING INITIATIVES
"If the borrower defaults, the loan will be partially underwritten by the Singapore government, thus the liquidity of the patent assets on default is minimized"
Intellectual Property Financing Scheme

The government has recently introduced an initiative, Intellectual Property Financing Scheme (IPFS), to further inculcate innovation and increase productivity. The initiative of RM200 million in financing will be offered solely by MDV. The scheme will enable companies with IP rights (IPRs) to use their IPRs as an additional source of collateral to obtain funding and spur more investments for companies with technology capabilities, in turn encouraging innovation. The scheme will also help alleviate the difficulties that several technology-focused companies face when attempting to seek funding from financial institutions.

The key features of the scheme are as follows:

- Leveraging on MDV’s strength as an innovative technology financier
- Financing of up to RM10 million or 80% of valued IP, whichever is lower
- 5 years financing tenure (inclusive of a grace period of up to 12 months)
- 2% p.a. interest/ profit equalization payment
- 50% guarantee provided by the Government of Malaysia and administered by Credit Guarantee Corporation Malaysia Berhad
- Applicable for all MDV financing products (except post-shipment)
- Discounted guarantee fee of 0.5% per annum
- Basic Requirements:
  - Registered & Valued IP
  - Meets MDV product criteria

Download brochure here

CHINA: “IP pledge financing” programme followed in 2008. According to China IP News, only 6 years later in 2014, SIPO reported that Chinese companies had secured over £6 billion GPB in patent-backed loans since the programme launched.

http://www.iam-media.com/blog/Detail.aspx?g=481b76b6-637f-427f-b8d6-78d06cece504
“In summary, patent-backed debt finance has arrived in Asia and lenders in the UK and around the world should sit up and take notice” (Banking on IP? UK"PTO)
Securitisation

Legislation Study on Patent Securitization

Mei-Hsin Wang (Fellow of Royal Society of Chemistry, UK/Associate professor, Intellectual Property Office, Graduate School of Materials Science, National Yunlin University of Science & Technology)


Different types of innovation
The traditional classification: product, process, new market, marketing, organizational

<table>
<thead>
<tr>
<th>Innovation modes</th>
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</thead>
<tbody>
<tr>
<td>Mode 1: 'IP/technology innovating'</td>
</tr>
<tr>
<td>Mode 2: 'Marketing based innovating'</td>
</tr>
<tr>
<td>Mode 3: 'Process modernising'</td>
</tr>
<tr>
<td>Mode 4: 'Wider innovating'</td>
</tr>
<tr>
<td>Mode 5: 'Networked innovating'</td>
</tr>
</tbody>
</table>

Existing (one-dimensional) typologies are being challenged by new approaches to developing innovation typologies which explicitly focus on the multidimensional facets or aspects of innovation strategies/routines
(i) IP/technology innovating which contains at its core IPRs, and in many countries this is complemented by in-house R&D and new-to-market activities;
(ii) marketing based innovating which includes forms of product innovation, leaning towards new-to-firm imitating, with marketing expenditures for the introduction of innovations;
(iii) process modernising which links process innovations with equipment spending and training;
(iv) wider innovating with combinations of management and business strategy changes, including new sales and distribution methods; and
(v) networked innovating involving bought-in R&D or licences and formal collaboration and leaning towards accessing information from universities.

Innovation varies across sectors – but also with definition

State of innovation, 2016, Thomson Reuter (measure by patent)
12 countries. Just two countries account for 73 percent of the list — Japan and the US — making them the major innovation hubs of the world. The perennial countries of France, Germany, South Korea, Netherlands, Sweden, Switzerland, Ireland and Taiwan are joined this year by mainland China for the second time and Finland for the first.

Figure 1: Composition of the 2016 Top 100 Global Innovators

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>39%</td>
</tr>
<tr>
<td>Japan</td>
<td>34%</td>
</tr>
<tr>
<td>France</td>
<td>10%</td>
</tr>
<tr>
<td>Germany</td>
<td>4%</td>
</tr>
<tr>
<td>Korea</td>
<td>3%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>3%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2%</td>
</tr>
<tr>
<td>China</td>
<td>1%</td>
</tr>
<tr>
<td>Finland</td>
<td>1%</td>
</tr>
<tr>
<td>Ireland</td>
<td>1%</td>
</tr>
<tr>
<td>Sweden</td>
<td>1%</td>
</tr>
<tr>
<td>Taiwan</td>
<td>1%</td>
</tr>
</tbody>
</table>

Source: Clarivate Analytics

Figure 2: 2016 vs 2015 Top 100 Global Innovators – Representation by Country

2016, Top 100 global innovators, Clarivate Analytics
The cluster effect
Reconciling the Firm Size and Innovation Puzzle

US Census Bureau Center for Economic Studies Paper No. CES-WP-16-20
Anne Marie Knott, Carl Vieregger, 3 Apr 2016

Since Schumpeter, there has been a long-standing debate regarding the optimal firm size for innovation. Empirical results have settled into a puzzle: R&D spending increasing with scale while R&D productivity decreases with scale. Thus large firms appear irrational. We propose the puzzle stems from the fact that product and patent counts undercount large firm innovation. To test that proposition we use recently available NSF BRDIS survey data of firms R&D practices as well as a broader measure of R&D productivity. Using the broader measure, we find that both R&D spending and R&D productivity increase with scale — thus resolving the puzzle. We further find that while large firms and small firms differ in the types of R&D they conduct, there is no type whose returns decrease in scale — there are merely types for which the small firm penalty is less severe.

“Although these companies came from across the country and from all sectors of the economy, they had one important factor in common: they were far more likely to be innovative, and the research shows that their innovation was a source of growth.”
Conquering strategies: the tool of patent filing to expand market share
Biotech exchange platform

Librassay®
Patent Licensing Supermarket

• Goals
  o Remove patent obstacles
  o Enable researchers, laboratories and testing companies to design comprehensive diagnostic tests
  o Make such tests widely available to the public
  o Enable market/clinical practice to set the standard

• Same goals apply to research tool manufacturers

• Solution: a new licensing model that facilitates technology dissemination and use, and balances benefits to society with rewards to IP owners

Librassay® - What Is It?

• A web-based store of molecular diagnostic and research tool patent rights

• Supports molecular diagnostics, personalized medicine, and research tool industries

• Customizable Supermarket: users select what they need to design multiplex tests and research tools (including whole genome/exome)