The importance of IP to your research

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Agenda

Part I:
1. What is IP?
2. Overview and relevance to research
   Quiz

Part II
3. The Patent system

4. Q&A
1. What is Intellectual Property?

– Creations of the human mind

– A song/poem you wrote, a new invention of how to use biofuel to power cars, a dance performance, a painting, a movie, an eye-catching logo/brand, an eye-appealing chair or jewelry etc…

– Why is there a need to protect?
  • Statutory recognition to moral & economic rights of creators in the creations and rights of public in accessing those creations,
  • Promote creativity and dissemination and application of its results,
  • Encourage fair trade – contributes to economic and social development.

But, really why?
1. What is Intellectual Property?

- In business: $$$$$
  - Apple pays Creative S$100 million for a license to its patent for a hierarchical user interface for MP3 players.
  - Cola Cola brand name worth US$44b.
  - Company fined S$30K for using pirated software in PCs.

- Why is it relevant to research, you/NUS?
- protect fruits of your research?.
- ROI?
  - Licensing/sale?
  - Spin-off/startups/funding/investments?
New test kit invented by NUS researchers enables quick, accurate, and inexpensive screening of diseases

18 September 2018

enzyme-assisted nanocomplexes for visual identification of nucleic acids (enVision)

- No equipment needed
- Up to 4 samples/pathogens can be tested at the same time
- Fits into palm of hand and uses less than a drop of liquid
NUS engineers invent smart microchip that can self-start and operate when battery runs out

03 May 2018

BATLESS microchip
– on chip solar cell
1. What is Intellectual Property?

- 2015: MIT sued Micron and Apple for infringing on its laser cutting process for semiconductor metals (eg. manufacture of DRAM chips). Micron manufactures the chips used in Apple’s products.
1. What is Intellectual Property?

- Patents
- Registered Designs
- Plant Varieties Protection (PvP)
- Copyright
- Passing of/Unreg TM
- Geographical Indications**
- Law of Confidence (Trade Secrets)
- Layout Designs of IC
- IP = Creation
2. Overview of IP rights

i) Patents (inventions) (in contrast with…)
ii) Trade Secrets
iii) Copyright

iv) Trade Marks
v) Industrial Designs
vi) Others – Geographical Indications, Layout Designs and Plant Variety

- A legal right to prevent others from doing certain acts
- IP rights are territorial - if patent covers Singapore, what happens if someone makes and sells in Malaysia?
- An asset which can be sold, licensed, bequeathed.
2(i) Overview - Patents

- **What is a patent?**
  - Legal document granted by the State to exclude others from exploiting the invention for a limited period, in return for the disclosure of the invention.
  - Invention must be:
    - i) Novelty;
    - ii) Inventive Step; and
    - iii) Sufficiently described.

- Reason for the disclosure? (vs trade secret)

- **But what is an invention?**
  - No formal definition; but generally: a solution to a problem (specifically a technical solution to a problem).
  - Can be product (incl. chemical composition, drug etc) or process (eg. manufacturing method, software process (?) etc)

- Relevance to research?
2(i) Overview - Patents

- Registration needed – relatively expensive
- High bar to registration – new and inventive etc
- First to file system (most countries)
- Limited period of protection - 20 years from filing (in general)

- Invention patent vs Utility Model

- Myth: software cannot be patented
2(i) Overview - Patents

Patent Law in action:

- Singapore solar energy retailers lock horns over patent on electrical meters (Sun Electric vs Sunseap and others)
- Source: Today online; 11 Jan 2017
2(ii) Overview – Trade Secrets

• No specific definition
• Intellectual Property Office of Singapore:
  i) information that is important to a business/company; and
  ii) not known to the public.
• Often used to cover information that has commercial value.
• Eg. a method or technique that provides an edge over its competitors.

• What is trade?
  • Business/Commercial
  • Industrial/technical

• What is secret?
  • Not ‘publicly’ known
2(ii) Overview – Trade Secrets

- Famous trade secrets: Coca Cola™; KFC™
- Criteria:
  - I) Quality of confidence (not public knowledge)
  - II) Recipient owes you an obligation of confidence
  - III) Detrimental use
- But once in public domain, no longer confidential!
- Between parties; not the world at large (legal action against the breach).
- Sufficient? Secure? Reverse engineering?
- No registration needed
2(ii) Overview – Trade Secrets

(vs patents)

• Advantage:
  • Keep information confidential vs disclosure
  • Perpetual (Coca Cola™, KFC™)
  • No registration but may be onerous (safekeeping)
  • Useful for ‘backend’ processes

• Risks
  • Reverse-engineering (patents vs publication vs trade secrets)
  • Control of communication by staff.
  • Employee exit

• Relevance to research?
2(ii) Overview – Trade Secrets

Trade Secrets Law in Action

• 2017/2018
• Waymo sued Uber for allegedly stealing trade secrets relating to self-driving cars
  o ex-employee of Waymo left to start up Otto;
  o Uber bought Otto in Aug 2016 and hired ex-employee;
  o Alleged that ex-employee downloaded 14,000 secret docs before leaving and those trade secrets are being used by Uber.
  o Feb 2018 – settled for US$245m
2(ii) Overview – Trade Secrets

Start

- Easy to reverse engineer? Y N
- Business strategy = license/sale? Y N
- Can keep invention secret? Y N

- Publish your invention in a technical paper? Y N
- New and Inventive? Y N

- Consider patent protection

- Consider other IP rights such as copyright

Consider trade secrets protection
2(iii) Overview - Copyright

- Most commonly known IP
- Protects original expressions not ideas
- Expression (not idea?)

- Subject matter:
  - Literary - books, technical papers, operating manuals, computer programs...
  - Dramatic - plays, films...
  - Musical works - songs...
  - Artistic works - drawings, paintings, photographs...

Other subject matter – sound recordings, films, TV broadcast, cable programmes etc
2(iii) Overview - Copyright

(vs patents)

Pros

- **Automatic** protection –
  - Once reduced to “material form”;
  - No registration needed (almost free);
- Period of protection - “life+70yrs” (in general)

Cons

- Protects the expression; but not idea/function (xf patents)
- Only against copycats; not against independent creation (xf patents)
- Not easy to enforce
2(iii) Overview - Copyright

Relevance to research:

- Software
  - Open source software
- Technical publications
- Technical drawings
- Big data – data collected, categorised, arranged etc
2(iii) Overview - Copyright

Copyright Law in action:

- 2 Android TV box sellers taken to court by telcos, Fox and Premier League
  - So is streaming of internet content legal? (re: Dallas Buyers Club saga in 2015)
2(iv) Overview  – Trade Marks

- Any sign that is capable of distinguishing the goods/services of a company from others i.e. brands, trade names, slogans…

iPhone™
2(iv) Overview – Trade Marks

JUST DO IT

- Registered and Unregistered right e.g. Intel®, Google™
- “First to file system”
- Perpetual Protection (renewal fees if registered)
- Relatively low costs
- Relevance to research?
- xf “enVision”; “BATLESS”
2(iv) Overview – Trade Marks

Less ‘ideal’ brands/marks
2(iv) Overview – Trade Marks

Trade Mark Law in action

• 3 arrested for trying to import counterfeit items at Woodlands, Tuas checkpoints
2(iv) Overview – Trade Marks

Trade Mark Law in action

Case study: Subway vs Subway Niche
2(v) Overview - Industrial Designs

- Protects new designs
- Design = shape, configuration, colours, ornament and pattern applied to an article or virtual product
- Protects “appearance” or “aesthetic features”; includes GUI
2(v) Overview - Industrial Designs

- Reason for protection?
- Protected by registration
- “First to file system”
- Limited period of protection: generally 15 years (renewal fees)
- Relatively low costs

- Relevance to research?
2(v) Overview - Industrial Designs

- SG Design no. D2013/1217C
2(v) Overview - Industrial Designs

SG Design no. 2003980E

SG Design no. D2007/714C

Figure 1.1 Perspective View

FRONT PERSPECTIVE VIEW
2(v) Overview - Industrial Designs

SG Design no. 30201602928W
2(v) Overview - Industrial Designs

Designs Law in action

- Case study: Apple vs Samsung (design infringement)
<table>
<thead>
<tr>
<th>Prior Art</th>
<th>Apple's U.S. Patent No. D504,889</th>
<th>Samsung Galaxy 10.1 Tab</th>
<th>Jury: Non-Infringement</th>
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2(vi) Overview - others

• Geographical Indications
  o Sign used on goods which signify geographical origin and possesses qualities, reputation and characteristics essentially attributable to that place of origin. (thus, can be shared by different producers). Examples:
    • Champagne (sparkling wine produced in the Champagne region of France)
    • Asiago cheese (cheese produced in the town of Asiago, province of Vicenza, Italy)
2(vi) Overview - others

**Layout Designs of IC**
- Protects 3-D disposition of elements of an IC and its interconnections
- Create new layouts that reduce IC dimension and still increase functionality

**Plant Varieties Protection**
- Protects a novel form of plant variety.
- Rights need to be registered.
2. Overview of IP rights – Summary

i) Patent – protects (new and inventive technical) solutions to problems

ii) Trade Secrets/Law of confidence – protects trade secrets/confidential information (to prevent information from being made public)

iii) Copyright – protects original expressions, not ideas

iv) Trademark – protects brand names/logos

v) Designs – protects shape/appearance

vi) Others…

Is it possible for these rights to overlap?
2. Overview of IP rights – Summary

Apple iPhone®

- PATENT
  Hardware/electronic circuits & Software

- REGISTERED TRADEMARKS
  “Apple” & “iPhone X”

- COPYRIGHT
  Software & User Manual

- REGISTERED DESIGNS
  Shape of the phone

- CIRCUIT LAYOUT RIGHTS
  IC Layout
2. Overview of IP rights – Summary

QUIZ

• what rights might be infringed?

a) pirated software/movie bought from pasar malam;
b) original DVD bought from USA;
c) compilation of exam papers sold at mall;
d) fake Chanel bag bought from Korea;
e) Counterfeit bladeless fan.
Part II

3) The Patent System

4) Q&A
3) The Patent System

Recap
- Legal right granted by the State
- Protects inventions
- What is an invention?
- A solution to a problem (specifically a technical solution to a problem).
- Don’t protect, free for all (unless covered by other IP rights).

- Why the most relevant to research?
3) The Patent System

Conditions for Patentability

(i) Novelty (at filing date)
   • compare with WW known technology (prior publication!)
   • Exhaustive?

(ii) Inventive step – non-obvious significant progress - unpredictable

(iii) Industrial applicability

(iv) Sufficient disclosure (xf trade secrets)

   o Independent assessment by patent office to determine if you have created new knowledge – indication of innovation?

   o Myth: Having a patent = no infringement – wrong!
3) The Patent System

Exclusive rights
• Patents give the owner exclusive (powerful) rights to prevent others from
  - using,
  - making,
  - selling/marketing,
  - importing the claimed invention.

• Protect your research? (R&D costs and efforts, ROI, license?)

• Period of protection – 20 years

• Note: Patent rights are territorial
  ▪ Myth: worldwide patent – wrong!
  ▪ PCT is only patent pending in 150+ countries for 2.5 years
3) The Patent System

- **Case Study: Creative Technology vs Apple**
- In 2006, Creative Technology sued Apple for alleged infringement of US patent no. 6,928,433 (the “Zen patent”) in the United States.
- The Zen patent relates to the user interface of a media player.
For example:

Category 1 = Album Name
   Category Value 1 = Abbey Road
   Category Value 2 = Hits from the 60's

Category 2 = Artist Name
   Subcategory Value 1 = British Artists
   Subcategory Value 2 = American Artists
   Category Value 1 = The Beatles
   Category Value 2 = Petula Clark
   Category Value 3 = Mamas and the Papas
   Category Value 4 = Nick Drake

Category 3 = All tracks
Creative asked for a court injunction to block the import and sale of Apple's iPod and iPod nano in the US. It also sought undisclosed damages for past sales.

Later that year, Apple settled with Creative Technology for US$100 million.

"Creative is very fortunate to have been granted this early patent," said Steve Jobs, Apple's CEO.

Patents = legal tool
3) The Patent System

Financial asset

• If you do not intend to exploit the invention yourself, it is an asset which can be:
  • sold (assigned)
  • Licensed to parties in return for royalty payment
  • exclusive vs non-exclusive

• Case Study: stay-tab opening mechanism:
3) The Patent System

Typical patenting process (NUS):

Stage 1
a) Invention/Creation
b) Submission/Internal discussion/approval

Stage 2
c) Provisional filing ($)
d) Draft full patent spec and file ‘non-provisional’ patent in various countries/PCT filing and country filings ($-$$$$$$) – “pending” status until (g) below

Stage 3
e) Examination by each patent office
f) Examination report and communication with Examiner
g) Grant (maybe)
- How long?
3) The Patent System

Stage 1

a) Invention/creation
• Searching of existing art – new and inventive?

b) Submission/Internal discussion/approval
• Myth: I need a prototype = No!
• But must describe fully in writing how the invention works.
• is this sufficient?
  o My invention is unique as no one has done it;
  o My smart microchip can self-start and can even power up when the battery dies out;
  o My microchip is small and can be integrated with any IoT device.
  o Results and experimental data to show the excellent performance of the microchip.
New and Inventive

Your invention can turn lead into gold.

Prior art A: describes a machine which turns lead into gold. Is your invention new?

• First: define your invention:
• Heat lead to 500°C, maintain heat of melted lead and simultaneous application of 100V over a period of time changes the lead to gold.
• vs prior art A, is your invention new?
• Prior art A: says machine has a heater which can melt lead to semi-liquid state, mixed with 50% of impurities and subject mixture to pressure for 24 hours turns the lead into gold. Is your invention new?
New and Inventive

Invention:

- Heat lead to 500°C, maintain heat of melted lead and simultaneous application of 100V over a period of time changes the lead to gold.

- Prior art A: also says ‘instead of using pressure, the inventors also believe that if the lead can be melted and a charge applied to the melted lead, the chemical structure of the lead might also change in a similar way’.

- Is your invention new?

- Is your invention inventive?

- Prior art B: discloses that if a metal is heated above its melting point and simultaneous charge of at least 100V applied to the melted metal, the chemical structure would change...
3) The Patent System

Stages 2 and 3

- Provisional: Priority date
  - $1

- Draft + File PCT (or non-PCT eg. TW)
  - $1

1 year

Prelim S&E

2.5 yrs from priority

$-$$$$/ Nat phase

3-5 yrs from PCT

US

CN

Other PCT countries

$$-$$$/ country
## 3) The Patent System

### Summary of pros and cons

<table>
<thead>
<tr>
<th>Positive attributes</th>
<th>Negative attributes</th>
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<tr>
<td>Indicator of Innovation</td>
<td>Relatively high costs</td>
</tr>
<tr>
<td>Exclusive right to prevent others</td>
<td>Time consuming</td>
</tr>
<tr>
<td>Asset which can be exploited</td>
<td>Open to attack even after grant</td>
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<td>Spread of knowledge</td>
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3) The Patent System

**Inventor vs owner/patentee**

i) **Inventor**
- actual deviser of the invention.
- right to be named (benefit?)
- no right to exploit

ii) **Owner/patentee**
- owns rights to exploit;
- can assign, license etc.
- SG – employer automatically owns employees’ inventions if part of employees’ duties.
3) The Patent System

**Inventor vs owner/patentee**

- X is an employee of NUS
- Y is an employee of SG company A
- NUS and A enter into collaboration agreement and X & Y came up with invention jointly

i) agreement silent about ownership, who **owns** the rights to the invention?

ii) agreement indicates IP rights of Y are assigned to NUS, who owns the rights to the invention?
Final words

** Consider IP as part of your research/commercial strategy
** Remember: if patent protection, keep invention confidential until patent filing.
** Once filed, determine commercial potential of invention – legal deadline may not be extended
NOTE:

- The content of this presentation is meant for general information only, and is not intended to be a substitute for legal counsel, and should not be considered legal advice.
Please contact ILO if you have any questions on Inventions, IP (Patents/Trade Secrets/Know-how), Commercialization Strategy or Funding to bring your idea to market:

startyourjourney@nus.edu.sg
Thank you!

4) Q&A

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