FOOD stars — Innovative Food Product Development Cycle: Frame for Stepping Up Research Excellence of FINS

European Commission

Introduction to intellectual property and technology transfer

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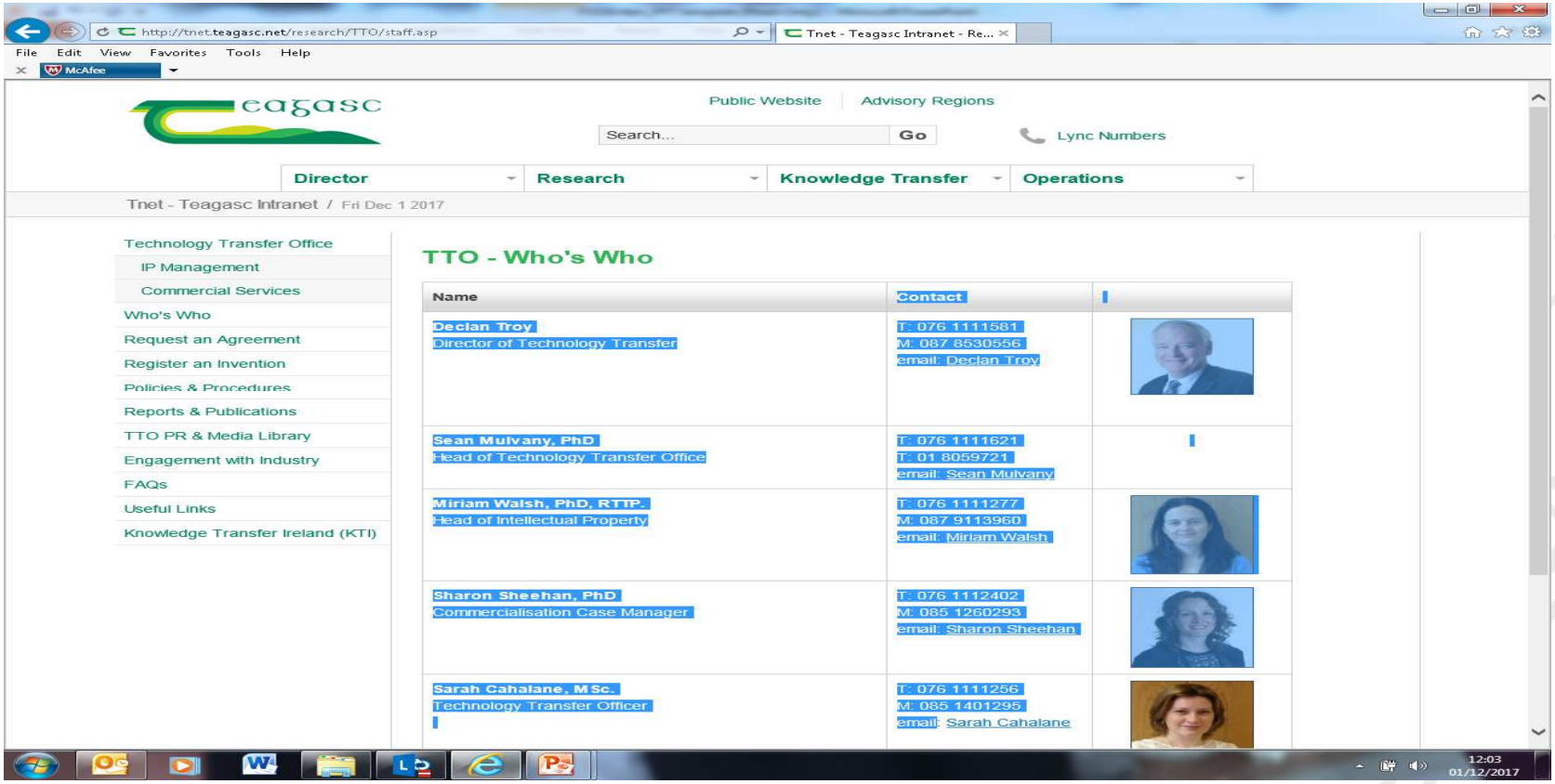
Teagasc TTO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Irish Context

KTI
Knowledge Transfer Ireland
Where Research & Business Connect

Bridge
Network
TECHNOLOGY TRANSFER CONSORTIUM

FOOD stars

IMPACT FROM PUBLIC RESEARCH

- **Trained Talent.** High quality graduates working for industry.

- **Increased industry competitiveness.** new knowledge – technology, processes, product information, trained people – which increases a companies chances of success.
- **Foreign Direct Investment.**
- **Licensing.** Transferring our intellectual capital to industry.
- **New company formation.** Supporting new companies.

- Research Performing Organisations (RPOs) IP (research outputs) is
  - **Driver of innovation**
  - **Crucial element of economic progress and prosperity**
  - **Key to RPO contribution back to the taxpayer and economy (return on investment)**

What is IP and why protect it

- Property of intellect (mental efforts) ie **research results with commercial potential-**any creative work/invention considered to be the property of the creator, eg knowledge, ideas, inventions etc

- IP Protection=legal means to protect results so others may not copy
- **Why protect/why does IP matter?**
- It enables creativity to be protected and establishes who owns it
- It vests your IP with a value so that It can be commercially exploited by others (sold/assigned or licensed)
- It attracts investment and partnering
- It may be a condition of research funding source (eg in Ireland, National IP protocol states IP must be exploited to the benefit of the economy)

Innovation Cycle/technology transfer

RESEARCH

IDEAS

RESULTS

€€€

INVENTIONS

JOBS

COMMERCIALISATION

COMPANIES

IP

FOOD stars

TT AND ROLE OF TTO

- Technology transfer= Allowing companies to use results for economic gain
  1. dissemination (publication, demos, workshops)
  2. **Protection & commercialisation (patenting, licensing, selling)**

TTO focuses on facilitating (2) and engagements with industry

- Role is to facilitate protection of RPO IP, promote collaborations (with third parties, especially industry) & commercialisation of commercially valuable research to maximise socio-economic benefits.
- increase awareness of/ educate researchers and incentivise to manage IP professionally
- manage patent and IP portfolio
- Facilitate collaborations/partnerships and other engagements
- Lead IP licence/assignment negotiations with companies

IP rights-forms and ownership

- In Ireland, the employee/research provider claims ownership of all IP developed by its employees
- Registrable IP -inventor/creator has no right until IP is registered
- Non registrable IPR exists from the moment the works are created

- REGISTRABLE
- *Patents (new principle/idea)*
- *Designs (aesthetic features)*
- *Plant breeders rights (new varieties)*
- *Trademarks (for goods and services)*

AUTOMATIC

Copyright (original works)

Database

know-how (trade secret)

Protection of IP (IPR)

IP	Utility patent (technical)	Database rights	trademark	copyright	Trade secret	Plant variety rights
Protection	Products, devices, processes, novel application of known compound	Original contents of a database	Words, phrases, logo, symbols	Expressions of original creative works presentations, Training manuals,	Confidential information kept secret	New varieties of crops (not patentable)
Term	20 years Short term (10)	14	As long as used	70 minimum	As long as secret is maintained	20 years
Registration	yes	no	Not required (but possible) TM or ®	No (but possible) ©	No	yes
Examination	Yes	no	yes	No	no	yes
Costs (to obtain and maintain	High (upto 20K over lifetime)	low	low	low	low	medium

Why protect IP

- Stop others using what you've created (brand, product or process) without your permission => CONTROL
- Exclusivity can demand higher sales prices for licensee=> competitive advantage
- Companies more likely to invest in technology it has exclusive rights to=> attracts investment
- Generate income by licensing for the RPO and researchers (return on investment)
- Attractive to investors in licensee if a spin out company

Patents

- Patents protect an inventor's monopoly.,
- Patent holder receives monopoly over the exploitation (manufacture, selling etc) of the invention. Normally 20 years monopoly.
  - UTILITY
  - DESIGN

- Utility patents-Technical inventions or improvements -20 yrs
  - *New useful products/ improvements in known products (with associated use)*
  - *New or improved process*
  - *Novel use of known compounds*

  => Inventions related to products, methods or manufacturing processes or other aspects of new technology used to solve a technical problem

- Problem solving issue is key and is reflected in the patent, by comparing it to whats out there at the moment (prior art)

Patents exclusions

Computer programs

Business methods/Mathematical methods

Methods of performing mental acts

Methods of playing games

Presentation of information

Naturally occurring compounds found in nature, -plants, animals

Use “contrary to morality/public order (eg torture devices)

Certain biotechnological inventions (eg human cloning)

Methods for diagnosis, treatment/surgical methods for humans/animals

Computer implemented inventions

- Software (source/object code) protected by copyright, BUT Inventions dependent on software may be patentable
- Novel inventive features must reside in the technical aspects of inventions eg external effects (eg robot arm control)
- Difference in US v EPO (european patent office) re software patents

Patentability

- To be patentable, IP must be

- novel-(no prior disclosure by inventors or competitors)
- inventive-Non obvious inventive step (to someone skilled in the art), ie. involves level of inspiration/creativity!
- useful- a potential industrial application (practical purpose)

- Once a patent is filed certain results can be published and talks with companies can take place (under confidentiality) => patenting should not interfere/conflict with dissemination policy if managed properly

NOVELTY

- "***Prior art = body of existing knowledge in the public domain***

- What is a public disclosure?
  - presentations, oral or poster outside lab e.g. hall
  - publications in journals or web
  - discussions to Joe Public, blogs, facebook, tweeting
  - Public demonstration (eg prototype)

- What is confidential?
  - internal lab meetings, closed thesis defense/viva
  - grant applications, manuscripts in review
  - information provided under confidentiality agreement, incl Collaborators

Once IP is disclosed in any public disclosure ("enabling information to one skilled in the art"), a patent can not be filed (except in US, with 1 year grace period) => important to review ALL disclosures prior to submission that may contain results of commercial value.

Patent searches

- Novelty (is your product really novel?) and
- state-of-the art searches (knowledge of competitors/competing products) - freedom to operate
- www.espacenet.com, www.uspto.gov
- www.patentlens.com
- Search terms are key (key words, classification) to refining a search
- Literature surveys should include patent searches

Freedom to operate

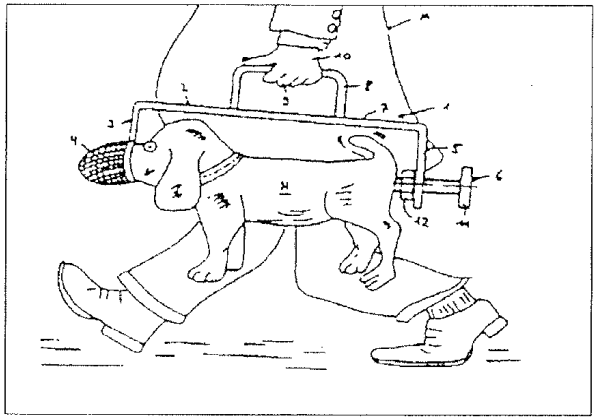
- Technology described in earlier published patent destroys novelty for a new patent filing (prior art)
- But just because it was described in earlier patent, it doesn't necessarily prevent you from using it
- Only granted claims in force in the relevant territory are a potential barrier=> important to check status of relevant patent (Applications v granted)
- Hopefully you can licence it, if required to commercialise your IP

INVENTIVE STEP /UTILITY

- Non obvious, to someone skilled in the field
- Creative step/technical

  Advance
- Most difficult to prove-examination process examines inventiveness

- Industrial application/use
- Not just aesthetic features
- Company willing to pay for it?!

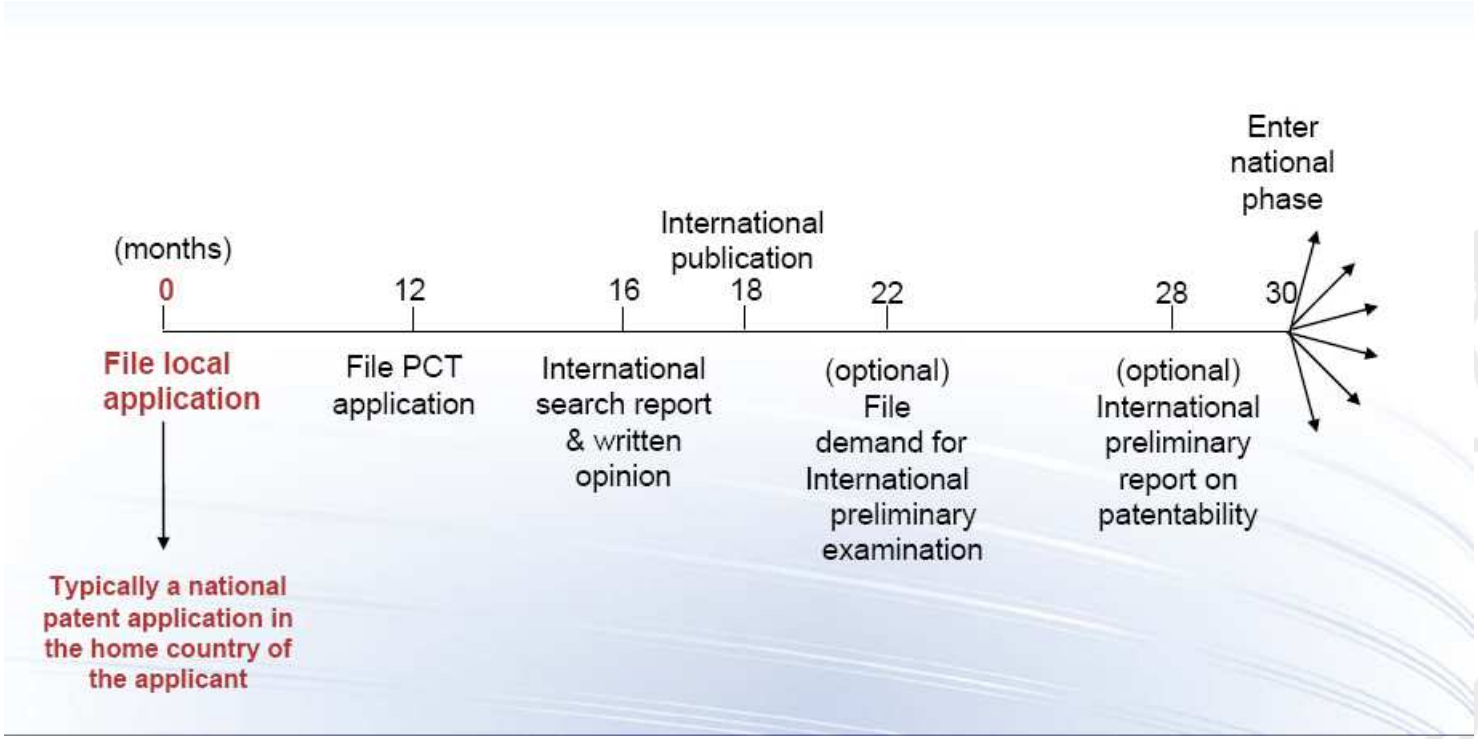


A dog-carrying device

GROUP EXERCISE

- DISCUSS LIKELY IPR IN PRODUCTS
- To consider and discuss 3 cases which are potentially patentable, and why you think so
- To revert to these cases at the end of todays session when all IPR is discussed

Patenting Process



European patent procedure (EPO)

- 38 member states, incl Serbia and Ireland
- Application procedure-in english, german, french
- Single application to EPO-search, publication and grant.
- Once granted, translations and validation required in separate countries for national rights (incl litigation)
- Opposition possible for 9 months after grant, leading to some amended and revoked patents
- New European unitary patent-to reduce time and costs for European wide patent

PCT (patent cooperation treaty)

- Indirect route to full filing, rather than selected countries- allows more time before entering national phase-suitable for early technologies and market not yet known-mostly used at Teagasc
- 129 countrs signed up to treaty
- Description, drawing, claims and abstract filed with WIPO (Geneva) often via national patent office
- Single search and publication (18 months after filing)
- After 30 months, application enters national phase. Translations must be filed, and examinations and grant handled by national patent offices

Patent Prosecution

- Patent rights granted by national Patent Offices, so protection must be sought in each country individually. No such thing as Worldwide patent.

- A patent application is filed first nationally (provisional) then internationally and following examination, it will either be issued/granted or revoked. Lengthy and costly.
- Once granted, maintenance and renewal fees payable to maintain the patent- otherwise it lapses

- European unitary patent-in progress- should reduce time/costs

- Most important part of a patent , in terms of its scope, is the claims (definitions of what is covered by the patent ie boundaries)
- Important to check status of patent (ie application or granted?)
- All key steps of examination of patent published, so can follow progress on patent databases
- Only a granted patent can be infringed

PATENT INVENTORS V OWNERS

- Assignee (owner) and inventors named on patents
- *By law* - Inventors are Inventors no matter who owns the IP. Inventors  Authors on a paper
    - Inventors have to contribute to the inventiveness of the patent – for example not just following instruction
    - Must have contributed to at least one of the claims
    - Patents can be invalidated if incorrect inventors named

    Owners (assignees)= patent holder, normally employer

Anatomy of patent specification

- TYPES: Product/Novel composition (all uses), Product/process, Process/method of use (for specific applications)
- Front page: Title, Assignee, inventors, IPC classificatiion, application and publication numbers, abstract
- Main body of Patent specification
  - Object and Summary
  - Embodiments (different features, reduction to practice-preferred)
  - Claims-independent and dependent (scope of protection of patent)
- **Data required for:**
  - sufficiency (reproducibility)-description in sufficient detail for reproduction by someone skilled in the art
  - Detailed description of the inventive step (ie show a “technical effect”)
  - the advantage that the invention has over the prior art
- **IMPORTANT TO KEEP AND MAINTAIN GOOD LAB-BOOKS**

Food/Food technology patents

- Novel technologies with technical effect
- Novel ingredients
- Novel Food combinations
- New foods /ingredients for special diets (vegan, gluten free)
- Probiotics-use for specific applications
- Novel compositions-protects all uses if novel composition claim allowed
- Biological material if materials isolated from natural environment (DNA, Proteins, plasmids) or produced by technical means (not found in nature) eg DNA sequences with technical effect
- Transgenic animal-Harvard Mouse
- Yeast-Louis Pasteur
- PCR methods-Roche

Teagasc patent types

- PCR assays-novel detection methods
- Novel/improved processes in cheese technology, food encapsulation techniques, dairy technologies..(process patents difficult to enforce however)
- Functional foods-novel compositions, use of specific micro-organisams for prevention/treatment of intestinal diseases – NEED TO DEPOSIT THE MICROOGANISM
- Food preservation techniques..

- Sample Teagasc granted patent for -novel bacteriocin with anti-microbial properties

Value of a patent

- A granted patent will exclude others from selling or making a product containing your IP in the country the patent is granted – for the patent term.
- Exclusive rights granted to the holder for a fixed period of
- time in exchange for a disclosure of an invention
- Granted in a country by country basis
- Term: 20 years from date of filing
- It's a negative monopoly right

Note: a patent can be opposed even when granted and can be revoked or amended

Who can exploit the patent

- The patent owner (assignee(s))
- Those who have licensed the patent from the patent owner-licensee
- Those who obtain the invention through authorised means (eg. A consumer buying an end product such as a phone, software licenses)
- Once patent expires, anyone can practise the patent (generic drug manufacturers)
- If two similar patents filed, in Europe first to file, in US, first to invent (importance of lab notebooks)
- Eg telephone invention, Bell v Elisha Grey

Value of patents

- Kodak-sold 1100 digital photo patents
- Apple v Samsung-Apple patented features including “slide to lock”, “tap from search” features- €290 million plus royalties from Samsung for infringement and licence required
- Nokia v Apple- Nokia (patent filed in 1999 re touchscreen technology) awarded $1 billion and royalties of $13 per I -phone sold
- Valve technology-(bottles upside down with no leaking)-licensed to Heinz and others for €12 million in the 1980s

PATENT INFORMATION

- Invaluable source of research information, often not appearing in technical/academic journals
- Most of what is published in patents is not protected and free to use
- NB source of commercial information, leading to customers, suppliers and new partners, as well as warning about developments by competitors and changes in the market
- Exploiting patent information is separate from owning, licensing, and enforcing patents

Things to consider

When undertaking novel research, Consider "**freedom to operate patent search**" to identify potentially conflicting patents owned by third parties, as such patents if granted may impact freedom to operate

include **patent searches** in literature surveys

Find out more about **your TTO**, its policies and role in IP management/technology transfer

If you think you have an invention

- **Avoid disclosing publically before filing** – premature disclosure can invalidate a subsequent patent filing. Consider what is "enabling" disclosure
- Carry out **patent search** (novelty) to make sure you are not re-inventing the wheel
- **Capture the IP and present to the Technology Transfer Office-**(invention disclosure form)
- **Meet to discuss with the TTO** - patent filing and commercialisation, or other IPR may be considered, if the invention has commercial potential. TTO normally makes the final decision.

Note patenting may not always be the best route even if invention is patentable-case studies to follow

Other IP protection may be appropriate-to follow this afternoon

- Thank you.

- Any questions?

Group exercise-IDF submission

- Questions

- Discuss in a group the most likely IPR to protect the results and the issues to consider
- What issues need to be considered to ensure freedom to operate
- What might prevent patent filing?
- Etc etc?