

An Analysis of Intellectual Property Activity in Ireland Based on Existing Data

by CambridgeIP

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Executive Summary

Background to Study

Increasingly intangible assets are becoming more valuable to firms than their physical assets and companies are seeking out ways in which they can best make use of these intangible assets. One crucial way of doing so is by legally protecting intangible assets and, where they meet the criteria for intellectual property (IP) protection, acquiring and maintaining IP rights (IPR).

Internationally there has been an increase in IP related activities with a parallel shift towards increasing importance attributed to IP pursuits. Business sectors that depend on IP protection represent an important and growing part of modern economies, and are substantial drivers of GDP and employment growth.* However, a number of recent reports and indicators have highlighted that Ireland is typically below EU and OECD averages when compared on metrics associated with IP activity.**

The IP indicators reported previously for Ireland are at a macro level and so provide little insight as to the IP activity of firms in different sectors for example, or the IP activity of indigenous vs multinational companies (MNC), etc..

This purpose of this study was to developing a deeper understanding of the IP activity of firms in Ireland through review of existing data and information on IP that is available for Ireland - either published or raw data - through channels such as publications that report on IP activity, IP databases, national and international surveys and through data held by national stakeholders.

This report sets out the systematic review of IP data and information available for Ireland and positions the IP activity in Ireland relative to a number of comparator countries (European comparators were selected due to their leadership position on the European Innovation Scoreboard).

This work was undertaken by Cambridge IP*** on behalf of Department of Jobs, Enterprise and Innovation (DJEI), with guidance from an Advisory Group****.

The review was limited to intangible assets that meet the criteria for intellectual property protection and not to the broader range of intangible assets such as employee skills, corporate reputation, technological leadership, etc...

The research, as presented in this report, will be used to further our understanding of IP activity in Ireland and highlight gaps in the existing evidence base for IP activity.

There are many technical details to grapple with in the discussion of IP activity. To aid the reader, section one and two of this report focus on definitions, a description of IPRs and a discussion on data availability.

- * Intellectual Property: Powerhouse for Innovation and Economic Growth, International Chamber of Commerce and ICC Commission on Intellectual Property, 2011.
- ** Innovation Union Scoreboard, 2014
- ** Squicciarini, M. and H. Dernis (2013), “A Cross-Country Characterisation of the Patenting Behaviour of Firms based on Matched Firm and Patent Data”, OECD Science, Technology and Industry Working Papers, 2013/05, OECD Publishing. <http://dx.doi.org/10.1787/5k40gxd4vh41-en> OECD
- *** CambridgeIP is the global innovation and intellectual property consultancy, with experience in hundreds of IP strategy projects and experience assisting clients develop and optimise their innovation and IP related processes. CambridgeIP provides clients with resources including global-leading access to patent data, science literature, analysis tools and evidence-based insights drawn from our extensive technology and IP strategy experience. CambridgeIP owns and operates one of the world’s most comprehensive patent databases in the globally, containing over 100 million documents.
- **** An Advisory Group was established by DJEI and was made up of members representing the Department of Enterprise, Jobs and Innovation, Enterprise Ireland, IDA, Science Foundation Ireland and Knowledge Transfer Ireland.

Executive Summary

Intellectual Property Rights

In summary IPRs may be acquired for the following categories of intangible assets:*

1. Innovative products and processes (through patents and utility models);
2. Cultural, artistic and literary works including, in most countries, also for computer software and compilation of data (database) (through copyright and related rights protection);
2. Creative designs, including textile designs (through industrial design rights);
3. Distinctive signs (mostly through protection of trademarks including collective and certification marks, but in some cases through geographical indications; see below);
4. Denominations for goods of a given quality or reputation attributable to the geographical origin (through protection of geographical indication);
5. New Plant Variety (Plant Variety Rights).
5. Microchips (through protection of layout-designs or topographies of integrated circuits);
6. Trade secrets (through protection of undisclosed information of commercial value). Know-how is not an IP right as such but may be protected by confidentiality agreements and/or by the law of confidential information .

IP Rights may be split into two categories; registered and unregistered rights. In Ireland, registered IP rights include: patents, utility models, trademarks, industrial designs, new plant variety, and geographical denominations. Unregistered IP rights in Ireland include copyright, chip topography, and trade secrets (through confidentiality protection).

Further detail is provided on each of the forms of IPR as they are reviewed within the subsequent sections.

* http://www.wipo.int/sme/en/ip_business/ip_asset/business_assets.htm

Analysis of IP Data

There is no single metric for a given type of IP, and so this research aims to present analyses of the different types of IP from a number of perspectives, as follows:

1. Patent data analysis is presented for Ireland and the following comparator countries: Germany, Sweden, Denmark, Finland, and Singapore. The analysis focuses on patent volume trends, patent family trends, patent activity by technology and industrial sectors, types of organisations patenting, geographical filing locations, and co-application analysis.
2. Trademark analysis is presented for Ireland and the following comparator countries: Germany, Sweden, Denmark, Finland, and Singapore. The analysis focuses on Trademark volume trends, location of filings and technology sectors.
3. Industrial Design analysis is presented for Ireland and the following comparator countries: Germany, Sweden, Denmark, Finland, and Singapore. The analysis focuses on Industrial Design Rights volume trends, location of filings and technology sectors.
4. Analysis of other forms of IP including Plant Variety Rights and Geographical Indicators are presented for Ireland and the following comparator countries: Germany, Sweden, Denmark, and Finland. Limitations in providing quantitative data analysis for IP associated with copyright and Trade Secrets is also described in this section.
5. IP Trading analysis is provided on three different analysis approaches: patent legal events, firm survey data analysis and analysis of HEI licensing activities in Ireland.
6. A high level overview of innovation activities in Ireland is presented so as to add a contextual background piece to support interpretation of IP activity.

This report is intended as a reference document and consequently no attempt has been made to make interpretations or draw conclusions from the data. However, a series of observations for IP activity in Ireland have been developed and a summary of these are shown in the following table.

Summary of IP activity in Ireland

IP Type	Ireland	EU comparators [Denmark, Finland, Germany, Sweden]	Singapore comparison
Patents			
Trends	In both applicant and inventor filings patent volumes increased year-on-year until 2008, from which point there has been a gradual decline	Demonstrates broadly similar trends of constant patent volume growth 1999-2008, followed by levels of plateauing (or decline) between 2008-2010	Demonstrated continued growth in absolute patent volumes through 2010.
Type of Organisation	Of applications filed 1999-2013: 65.6% Companies; 6.1% HEIs, 26.2% individuals; 0.4 % Gov/Non-Profit; 1.6% Other. The top ten Irish applicants included 8 companies and 2 HEIs.	Ireland shows a greater proportion of filing from HEIs.	Similar proportions of HEI contribution to applications.
Sector (IPC)	Human necessities/Health' dominates; however, in recent years Physics and computing have come to the fore.	Ireland has a greater proportion of 'human necessities' technologies than any other country. Ireland's growth in 'Physics' technologies (including computing) is unique across the comparators (with the exception of Finland).	Singapore shows a continued dominance in the 'Electricity' technology focus area.
Sector (NACE)	Activity in pharmaceutical sector has been in decline since 2006. Irish inventor with Irish applicants are driving the increase in office machinery and computing sector since 2006.		
Filing location	Ireland, the US and the EPO are the three main filing locations for Irish applicants and Irish inventors. With the US emerging as a dominant location in 2004.	The PCT system and EPO have reported considerable growth in their patenting systems in recent years.	The PCT system and EPO have reported considerable growth in their patenting systems in recent years.
Collaboration	4 of the top ten collaborating entities of Irish applicant/foreign co-applicant were HEI or govt. Whereas, 7 out of the top ten of Irish applicant/Irish co-applicant were HEI or govt.		

Summary of IP activity in Ireland

IP Type	Ireland	EU comparators [Denmark, Finland, Germany, Sweden]	Singapore comparison
Trademarks			
Trends	Irish applicants filed 27,177 trademark applications, this accounts for ~0.675% of global filings. Ireland records an annual rate of increase of 7.1% in trademark filings.	Comparators demonstrates similar filing trends over time, with a rapid rise since 2003. Normalised to GDP/GNP and population Ireland ranked ahead of Finland in application filings.	Normalised to GDP/GNP and population Ireland ranked ahead of Singapore.
Sectors (NICE)	'Advertising, business management, business administration...' most commonly ascribed classification.		
Other forms of IP			
Industrial Design Rights	In 2011 Ireland applicants accounted for ~0.22% (2,228) of global filings; on average filing 90% of applications in foreign jurisdictions.	Ireland ranks 5th in terms of volume and normalisation factors. Comparator countries show a stagnation since 2008 that is not reflected in the Irish trend.	Singapore consistently has slightly lower volumes of filings
Plant variety rights	217 registered since 1999	Comparators show similar low volumes	Data not available
Geographical indications	6 protections held	Comparators show similar low volumes	Data not available

1. Definitions

1.1 Definitions

Applicant/Assignee An individual or other legal entity that files an application for a patent, utility model, trademark or industrial design. There may be more than one applicant/assignee in an application.

Application The formal request for IP rights at an IP office, which examines the application and decides whether to grant or refuse protection in the jurisdiction concerned. Application also refers to a set of documents submitted to an office by the applicant.

Application abroad/Foreign application An application filed by a resident of a given country/jurisdiction with a patent office of another country/jurisdiction. For example, a patent application filed by an applicant residing in France with the USPTO is considered an “application abroad” from the perspective of France. “Application abroad” is a concept similar to “non-resident application”, which describes a patent application received by an IP office from an applicant residing in a country represented by another IP office, such as the EPO.

Equivalent application Applications at regional offices are equivalent to multiple applications, one in each of the member states of those offices. To calculate the number of equivalent applications for BOIP (Benelux Office for Intellectual Property), EAPO (The Eurasian Patent Organization), OAPI (African Intellectual Property Organization) or OHIM (Office for Harmonization in the Internal Market) data, each application is multiplied by the corresponding number of member states.

Filing date The filing date of a patent application is the date the patent application was first filed in one or more patent offices, i.e. the date on which that application is legally accepted at the patent office. That date is typically the date on which the documents are deposited at the office.

Foreign-oriented patent families A patent family having at least one member filing in a different country than the applicant’s country of residence.

GDP (PPP) Gross Domestic Product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser’s prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

GNP Following statistical practice, the World Bank has adopted the following terminology in line with the 1993 System of National Accounts (SNA). Previous terminology listed ‘Gross national product, GNP’ is now referred to ‘Gross national income, GNI’

Grant Exclusive IP rights conferred to an applicant by an IP office. For example, patents are granted to applicants (assignees) to make use of and exploit an invention for a limited period of time. The holder of the rights can prevent unauthorized use of the invention.

Hague registration An international registration filed under the Hague system, which facilitates the acquisition of industrial design rights in multiple jurisdictions. An application for international registration of industrial designs leads to its recording in the International Register and the publication of the registration in the International Designs Bulletin. If the registration is not refused by the IP office of a designated Hague member, it will have the same effect as a registration made in that member’s jurisdiction.

Hague system The abbreviated form of the Hague System for the International Registration of Industrial Designs. This system consists of several international treaties (the London Act, the Hague Act and the Geneva Act). The Hague system makes it possible for an applicant to register up to 100 industrial designs in multiple jurisdictions by filing a single application with the International Bureau of WIPO. It simplifies the process of multinational registration by reducing the requirement to file separate applications with each IP office. The system also simplifies the management of the industrial design, since it is possible to record subsequent changes or to renew the registration through a single procedural step.

Industrial design Industrial designs are applied to a wide variety of industrial products and handicrafts. They refer to the ornamental or aesthetic aspects of a useful article, including compositions of lines or colours or any three-dimensional forms that give a special appearance to a product or handicraft. The holder of a registered industrial design has exclusive rights against unauthorized copying or imitation of the design by third parties. Industrial design registrations are valid for a limited period. The term of protection is usually 15 years for most jurisdictions. However, differences in legislation do exist, notably in China (which provides for a 10-year term from the application date) and the US (which provides for a 14-year term from the date of registration).

1.1 Definitions

International Patent Classification (IPC) An internationally recognized patent classification system. The IPC's hierarchical structure consists of sections, classes, subclasses and groups. IPC symbols are assigned according to technical features in patent applications. A patent application can be assigned multiple IPC symbols, as it may relate to multiple technical features.

Lacarno classification The Locarno Classification (LOC), established by the Locarno Agreement (1968), is an international classification used for the purposes of the registration of industrial designs.

Madrid registration An international registration filed under the Madrid system, which facilitates the acquisition of trademark rights in multiple jurisdictions. It is not the same as a trademark registration issued by a national or regional IP office. An international registration, once issued by WIPO, serves as an application at each of the national and regional IP offices designated by the applicant and party to the Madrid system. On the basis of the Madrid international registration, the national or regional IP offices designated decide whether or not to issue a trademark registration that is valid within its jurisdiction.

Madrid system The abbreviated form of the Madrid System for the International Registration of Marks, established under the Madrid Agreement and the Madrid Protocol and administered by WIPO. The Madrid system makes it possible for an applicant to apply for a trademark registration in a large number of contracting parties by filing a single application at a national or regional IP office party to the system. In addition, it simplifies the process of multinational trademark registration by reducing the requirement to file a separate application with each IP office. The system also streamlines subsequent management of the registration, since it is possible to record changes or to renew the registration through a single procedural step. Registration through the Madrid system does not create an "international" registration of a trademark, and the decision to register or refuse the trademark remains in the hands of the national and/or regional IP office(s). Trademark rights are limited to the jurisdiction of the trademark registration office(s).

NACE code A pan-European classification system which groups organisations according to their business activities.

National Office is a governmental organization which controls the issue and examination of various form of intellectual property (i.e., the Irish Patent Office

is the national patent office of Ireland responsible for the examination and grant of patents, trademarks and design rights in Ireland).

Nice Classification The abbreviated form of the International Classification of Goods and Services for the Purposes of the Registration of Marks under the Nice Agreement. The Nice Classification is divided into 34 classes for goods and 11 for services.

Non-resident application An application filed with a patent office of a given country/jurisdiction by an applicant residing in another country/jurisdiction. For example, a patent application filed with the USPTO by an applicant residing in France is considered a non-resident application for the USPTO. Non-resident applications are sometimes also referred to as foreign applications. A non-resident grant is a patent granted on the basis of a non-resident application.

Origin The country of residence (or nationality, in the absence of a valid residence) of the first-named applicant of an IP application. Country of origin is used to determine the origin of the IP application.

Patent A set of exclusive rights granted by law to applicants for inventions that are new, non-obvious and commercially applicable. It is valid for a limited period of time (generally 20 years), during which patent holders can commercially exploit their inventions on an exclusive basis. In return, applicants are obliged to disclose their inventions to the public in a manner that enables others, skilled in the art, to replicate the invention. The patent system is designed to encourage innovation by providing innovators with time-limited exclusive legal rights, thus enabling innovators to reap the benefits of their innovative activity.

Patent family A set of interrelated patent applications filed in one or more countries to protect the same or a similar invention.

PCT application A patent application filed through the WIPO-administered PCT system.

1.1 Definitions

PCT national/regional phase entry The decision by a PCT applicant to enter the national phase before a national or regional patent office is referred to as national phase entry. It consists of the submission of a written request and payment of fees and must be carried out within 30 months from the priority date of the application (longer time periods are allowed by some offices).

PCT system The PCT, an international treaty administered by WIPO, providing a unified procedure for filing patent applications in its contracting states. The PCT system simplifies the process of multiple national patent filings by reducing the requirement to file a separate application in each jurisdiction. However, the decision of whether to grant patent rights remains in the hands of national and regional patent offices, and the patent rights remain limited to the jurisdiction of the patent granting authority. A PCT application does not itself result in the grant of a patent, since there is no such thing as an "international patent". In other words, a PCT application, establishes a filing date in all contracting states, must be followed up with the step of entering into national or regional (see above) phases to proceed towards grant.

Plant variety rights (Plant breeders' rights) Rights granted to the breeder of a new variety of plant that give the breeder exclusive control over the propagating material (including seed, cuttings, divisions, tissue culture) and harvested material (cut flowers, fruit, foliage) of a new variety for a number of years.

Priority right a time-limited right, triggered by the first filing of an application for a patent, an industrial design or a trademark respectively. The priority right (also referred to as the **priority date**) allows the claimant to file a subsequent application in another country for the same invention, design, or trademark effective as of the date of filing the first application. When filing the subsequent application, the applicant must claim the priority of the first application in order to make use of the right of priority. The period of priority, i.e., the period during which the priority right exists, is usually 6 months for industrial designs and trademarks and 12 months for patents and utility models.

Protected Designation of Origin (PDO) Covers agricultural products and foodstuffs which are produced, processed and prepared in a given geographical area using recognised know-how.

Protected Geographical Indication (PGI) Covers agricultural products and foodstuffs closely linked to the geographical area. At least one of the stages of

production, processing or preparation takes place in the area

Publication date The date on which an IP application is disclosed to the public. On that date, the subject matter of the application becomes "prior art".

Regional office A regional patent office is an intergovernmental patent office that controls the issue of patents for a set of countries (i.e., the EPO)

Registration Exclusive rights, notably for trademarks and industrial designs, issued to an applicant by an IP office. Registrations are issued to applicants to make use of and exploit trademarks or industrial designs for a limited period of time and, in some cases, particularly in the case of trademarks, can be renewed indefinitely.

Resident application An application filed with an IP office by an applicant residing in the country/region in which that office has jurisdiction. For example, an application filed with the JPO by a resident of Japan is considered a resident application for the JPO. Resident applications are sometimes referred to as **domestic applications**. A resident grant/registration is an IP right issued on the basis of a resident application.

Trademark A trademark is a distinctive sign, which distinguishes certain goods or services of one undertaking from those produced or provided by other undertakings. The holder of a registered trademark has the legal right to exclusive use of the mark in relation to the products or services for which it is registered. The owner can prevent unauthorized use of the trademark, or a confusingly similar mark, used for goods or services that are identical or similar to the goods and services for which the mark is registered. Unlike patents, trademark registrations can potentially be maintained indefinitely, as long as the trademark holder pays the renewal fees and actually uses the trademark. The procedures for registering trademarks are governed by the rules and regulations of national and regional IP offices. Trademark rights are limited to the jurisdiction of the authority that issues the trademark. Trademarks can be registered by filing an application with the relevant national or regional IP office(s), or by filing an international application through the Madrid system.

Trademark application filed via the Madrid system An application for international registration of a trademark through the WIPO-administered Madrid system.

Traditional Speciality Guaranteed (TSG) Highlights traditional character, either in the composition or means of production

1.2 Acronyms

ARIPO	African Regional Intellectual Property Organization
BERD	Business Expenditure on Research & Development (Ireland)
BOIP	Benelux Office for Intellectual Property
CIS	Community Innovation Survey
CPVO	Community Plant Variety Office
CSO	Central Statistics Office (Ireland)
EAPO	The Eurasian Patent Organization
EPO	European Patent Office
EU	European Union
GCCPO	Gulf Cooperation Council Patent Office
GDP	Gross Domestic Product
GNI	Gross National Income
GNP	Gross National Product
HEI	Higher Education Institute
IE	Ireland
INID	Internationally agreed numbers for the identification of
IP	Intellectual Property
IPC	International Patent Classification
IPR	Intellectual Property Rights
LOA	Licences, option or assignment agreements
NACE	Nomenclature of Economic Activities
OAPI	African Intellectual Property Organization
OHIM	Office for Harmonization in the Internal Market
PCT	Patent Cooperation Treaty
PDO	Protected Designation of Origin
PGI	Protected Geographical Indication
SIPO	State Intellectual Property Office of the People's Republic of China
TSG	Traditional Speciality Guaranteed
TTO	Technology Transfer Office
TTSI	Technology Transfer Strengthening Initiative
UPOV	International Union for the Protection of New Varieties of Plants
USPTO	United States Patent Office
WIPO	World Intellectual Property Organization

2. Intellectual Property Rights in Ireland and Data Sources and Coverage

2.1 Introduction to Intellectual Property Rights in Ireland

Each national patent office will have specific codification and statutes to protect intellectual property rights in their national jurisdictions. While there is a high degree of overlap between patenting office code, here we introduce the legal text specific to Ireland for patents, trademarks, copyrights and design rights. The information relating to Plant Variety Rights, geographical indications and trade secrets is regionally or internationally defined.

Intellectual Property rights are legally enforceable rights applicable to intangible assets, such as but not limited to inventions, names, pictures, types of plants and aesthetic appeal of objects. These rights can be bought, sold, licensed and mortgaged; these rights are usually owned initially by the creator of the Intellectual Property.

Patents

Patents give monopoly rights to exclude everyone but the owner and licensees from performing the following restricted acts in Ireland (as outlined in the national patent act in Ireland):

- making, offering, putting on the market or using a product which is the subject-matter of the patent, or importing or stocking the product for those purposes;
- using a process which is the subject-matter of the patent, or, when the third party knows, or it is obvious to a reasonable person in the circumstances, that the use of the process is prohibited without the consent of the proprietor of the patent, offering the process for use in the State;
- offering, putting on the market, using or importing, or stocking for those purposes, the product obtained directly by a process which is the subject-matter of the Patent*

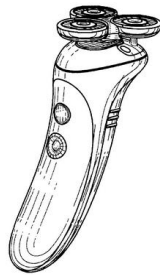


Figure 1: Sample patent image

Trademarks

Trademark are utilised to claim exclusive properties of products or services, with

the essential function of a trademark identifying the commercial source or origin of a product or service. The registration of a trademark grants certain exclusive rights to the owner, such as legal recourse against false advertising and licencing rights. Proprietary rights are most securely accessed through the registration of a mark with a trademark office and international system.

The Irish Statute book lists the ‘Trade Marks Act, 1996’ which defines a trade mark as “any sign capable of being represented graphically which is capable of distinguishing the goods or services of one undertaking from those of other undertakings”**. A trademark can be a sign, design, word(s), numerals, the shape of goods or their packaging or any other distinctive sign that is capable of establishing goods and services from one another. The system is designed to allow consumers recognise a product or service based on unique identifiers to establish consumer confidence and corporate identity.

Copyrights

Copyright may subsist in computer software, original literary, dramatic, musical, artistic works, sound recordings, films, broadcasts, cable programmes, the typographical arrangement of published editions, original databases. The copyright in a work is infringed by a person who without the licence of the copyright owner undertakes, or authorises another to undertake, any of the acts restricted by copyright. References to the undertaking of an act restricted by the copyright in a work shall relate to the work as a whole or to any substantial part of the work and to whether the act is undertaken directly or indirectly, as defined below:

- a) to copy the work;
- b) to make available to the public the work;
- c) to make an adaptation of the work or to undertake either of the acts listed above in (a) or (b) in relation to an adaptation, and those acts shall be known and in this Act referred to as “acts restricted by copyright”***

Computer programmes are becoming a valuable form of copyright IP. The underlying code once recorded or published by any means, obtains copyright protection. There are in particular infringement exemptions to restricted acts such as making back up copies, or for observing, studying or testing the functioning of the programme. these exemptions are only available to lawful users. A lawful user will be dependent upon the type of computer programme for example open source or closed source software, which may require a license.

*Irish Patent Act: http://www.patentsoffice.ie/en/legislation_acts.aspx

** Irish Trademark Act: http://www.patentsoffice.ie/en/legislation_acts.aspx

***Irish Copyright Act: http://www.patentsoffice.ie/en/legislation_acts.aspx

Design Rights

Industrial design rights protect the ornamental or aesthetic aspects on an article. Designs may consist of two-dimensional features, such as patterns, lines or colours or three-dimensional features, such as the shape or surface of an article. To be a registerable design, it must be “new” and have individual character. “New” in this context means that no identical or very similar design is known to have previously existed. While the requirement of “individual character” refers to the overall impression produced by the design, which must be different ‘on an informed user’ from the overall impression produced by an earlier design.



Figure 2: Sample design right image

Plant Variety Rights

Plant variety rights (PVRs) also known as Plant breeders’ rights (PBRs), are rights are granted to new varieties of plants meeting national and international agreed standards of novelty and distinction. Features such as improved yield, resistance to plant pests, salt tolerance, or better adaptation to climatic stress can be key elements in new plant varieties seeking protection.

UPOV (International Union for the Protection of New Varieties of Plants) sets out an intellectual property right (IPR) framework for plant varieties. The UPOV is an inter-governmental organisation, established by the UPOV Convention in 1961. The UPOV currently has 71 members (2013), including Ireland, and is headquartered in Geneva. The UPOV defines the basic principles relating to variety protection, and it is on these principles that the National and EU Plant Breeders’ Rights systems are based.

The criteria for PVR which a plant variety must meet all of the following criteria: Distinct, Stable, Uniform and Novel.

Geographical Indications

A geographical indication is a sign used on goods that have a specific geographical origin and possess qualities, reputation or characteristics that are essentially attributable to that place of origin. Most commonly, a geographical indication includes the name of the place or origin of the goods. Agricultural products typically have qualities that derive from their place or production and are influenced by specific local factors, such as climate and soil.



Figure 3: Sample geographical indication product

The European Union has developed a scheme to identify and protect the names of quality agricultural products and foods as PDO (Protected Designation of Origin) for products with a strong link to the defined geographical area where they are produced or as PGI (Protected Geographical Indication) for agricultural products and foods linked to a geographical area where at least one production step has taken place. Traditional Specialities Guaranteed (TSG) emphasise the products traditional composition and traditional mode of production

Trade Secrets

Trade secrets are aspects of a businesses everyday process, and can include technical information about products and process, customer lists, formulas, patterns or any part valuable piece of information which is not generally known or reasonably ascertainable.

This type of information can be protected by non-disclosure agreements and other contractual obligations.

2.2 Data and Methodology

Data sources

The IP data that underpins this report was derived from numerous primary sources including:

- PATSTAT: Containing worldwide patent coverage (from the EPO)
- WIPO Statistics database: Statistical trademark and design right data
- EU Database of origin and registration: Covering geographical indication and traditional species data
- UPOV: Detailing data on New Varieties of Plants
- Business Expenditure on R&D in Ireland (BERD)
- Community Innovation Survey (CIS): Survey on firm innovation activities

The data was compiled, processed and analysed using internal proprietary systems developed by CambridgeIP.

GDP, GNP and population data used in the development of normalisation factors for comparative country analysis was sourced from the World Development Indicators Database, which is maintained by the World Bank*.

Data coverage

Patent data in this report includes direct filings at national offices, regional offices [including European Patent Office (EPO)] as well as PCT national phase entries (for more information see Data Limitation discussion).

Trademark data includes direct filings at the national level, regional offices (including OHIM), and designations received by the relevant offices via the Madrid systems.

Industrial design data includes direct filings from national offices, regional filings and designations received by relevant offices through the Hague system (where members are contracting parties).

Plant variety rights data includes national data of plant variety rights, national listings of agricultural and vegetable species and commercial registers.

Geographical indication and traditional specialities are covered by three schemes, Protected Designation of Origin (PDO), Protected Geographical Indications (PGI) and Traditional Speciality Guaranteed (TSG). Application and

registration data from all three schemes was considered in geographical indication analysis.

R&D and innovation information includes published statistical releases for CIS2004-2006, CIS2006-2008, and CIS2008-2010 for firm innovation activity. BERD 2007-2008, BERD 2009-2010 and BERD 2011-2012 were reviewed.

Other forms of IP considered for review included copyrights, trade secrets and chip layout design. However, due to the lack of registered databases a systematic review was not possible and therefore primary statistical analysis was not undertaken. Previously published reports have attempted to utilise various methodological frameworks to quantitative and qualitatively assess these forms of IP. A summary table of relevant third-party studies has therefore been included here for reference.

For a detailed inventory and reference guide of the data sources and data coverage presented in this report see Appendix: Data sources and coverage.

Country comparison data

In order to review Ireland's IP generation in a global context, aspects of Ireland's IP activity have been compared to comparator countries.

The countries decided upon as comparator countries are: Denmark; Finland; Germany; Sweden; and Singapore.

The European comparator countries have been chosen for their positions as European innovation leaders, with the intention of representing how Ireland compares, or could improve, relative to the countries with strongest innovation. The status of Innovation leaders has been determined by the European commission in their Innovation Scoreboard report.

In addition to those countries, Singapore has been included to add a global context, outside of the European Union, whilst mirroring to some extents Ireland's unusual mix of indigenous and foreign firm base.

In order to represent the comparator countries in a comparable fashion, the raw volume of patent statistics have been normalised according to two different metrics; GDP and population. In order to preserve the focus on Ireland, figures are divided by a normalisation factor, which normalises the comparator countries' data relative to that of Ireland'. See Appendix: Comparator countries: Normalisation for more details.

*<http://data.worldbank.org/about>

3. Patents



3.1.1 Introduction to Patents: Patent documents

This section introduces information contained and indexed on patent documentation. The front page of a patent document is codified by 'INID' numbers - these numbers are 'internationally agreed numbers for the identification of bibliographic data' on the front page of patent documents (refer to the following figure for a sample patent with INID numbers). These numbers are usually shown in parentheses, brackets or circles, i.e., (72) is the inventor code.

Two key pieces of information analysed throughout the report are applicant and inventor data. **Inventors** (INID 72) are the individuals whom have been credited with the inventive concept for this patent application. **The Applicant** (INID 71) is the organisation or individual whom will own the patent. It is also possible to see that the **inventor and applicant's country of residence is noted** in parentheses following the name e.g (US). The filing location, for national or regional patent offices, is listed as the first two digits of the filing number (INID 11).

Patents are tagged by various classification codes by the patent examiners dealing with their application, e.g. IPC (international patent classification) codes, Cooperative Patent Classifications (CPC), or US classifications. IPC codes (INID 51) are used most frequently, and are associated with over 100 patent offices globally.

The International Patent Classification (IPC) is:

- A hierarchical patent classification
- Updated on a regular basis by a Committee of Experts from WIPO
- Assigned by patent examiners to patent applications

IPCs may be used as a means for assessing the technology application areas of patents.

For a full list of INID numbers and patent codes, please see Appendix: Patent information - INID codes.

Figure 4: Sample EPO patent document

The image shows a sample EPO patent document page with several key pieces of information highlighted by red boxes:

- (11) EP 2 728 488 A2**: The patent number, located at the top right.
- (19)**: The logo of the European Patent Office (EPO) at the top left.
- (43) Date of publication: 07.05.2014 Bulletin 2014/19**: The date and bulletin information.
- (21) Application number: 14153062.6**: The application number.
- (22) Date of filing: 01.04.2010**: The date of filing.
- (30) Priority: 08.04.2009 US 167709 P, 17.06.2009 US 187835 P, 07.08.2009 US 537719**: Priority information.
- (62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC: 10712655.9 / 2 417 531**: Information on earlier applications.
- (27) Previously filed application: 01.04.2010 PCT/US2010/029677**: Information on previously filed applications.
- (71) Applicant: Google Inc., Mountain View, CA 94043 (US)**: The applicant's name and address.
- (72) Inventors: Borchers, Albert T., Mountain View, CA California 94043 (US); Sprinkle, Robert S., Mountain View, CA California 94043 (US); Swing, Andrew T., Mountain View, CA California 94043 (US); Klaus, Jason W., Mountain View, CA California 94043 (US)**: The names and addresses of the inventors.
- (51) Int. Cl.: G06F 13/42 (2006.01), G06F 3/06 (2006.01)**: The international classification codes.
- Remarks:** This application was filed on 29-01-2014 as a divisional application to the application mentioned under INID code 62.

Below the highlighted information, the document includes a section for **(54) Data storage device** and a detailed description **(57)** of the device. The description states: "A data storage device (100) may include a first memory board (104a) and a second memory board (104b), where the first memory board (104a) and the second memory board (104a) each comprise multiple memory chips (118a, 118b). The data storage device (100) may include a controller board (102) to operably connect to the first memory board (104a) and the second memory board (104b), where the controller board includes a high speed interface (108) and a controller (110) that to receive commands from a host (106) using the high speed interface (108) and to execute the commands. The first memory board (104a) and the second memory board (104b) are each separately removable from the controller board (102). The controller (110) can query the characteristics of the memory board (104a, 104b), and execute the commands accordingly."

Below the description is a block diagram labeled **FIG. 1**, showing the internal components of the data storage device (100). The diagram includes a host (106) connected to a high-speed interface (108) on a controller board (102). The controller board (102) also contains a controller (110), a power source (114), and memory (118). The controller board (102) is connected to two memory boards (104a and 104b) via a bus (112). Each memory board (104a, 104b) contains multiple memory chips (118a, 118b). The diagram also shows a data bus (110) connecting the controller board (102) to the memory boards (104a, 104b).

EP 2 728 488 A2

3.1.2 Introduction to Patents: Filing options

An invention is only protected in the country of patent office filing - patents need to be filed in all relevant jurisdictions. Applications can be made in three ways:

1. National application
 - Applications can be made directly to the patent offices of interest
 - Can be expensive, as each jurisdiction will have their own associated fees
 - Generally the patent must be written in the national language.
2. Regional application
 - Application to a central office provides protection to designated member jurisdictions
 - Regional offices include EPO (European), ARIPO (African), EAPO (Eurasian), GCCPO (The Gulf states), OAPI (French African)
 - Considered cost-effective for three or more desired protected states
3. Patent Cooperation Treaty (PCT) application
 - International application which can provide filing route for up to 148 countries (does not provide patent protection - is only a filing system as the decision of grant remains in the authority of national and regional patent offices)
 - Publication to national filings can be delayed for 30 months

Figure 5: Map of European Patent Office (EPO) coverage



Figure 6: Map Patent Cooperation Treaty (PCT) coverage



3.1.3 Introduction to Patents: Patent Timeline

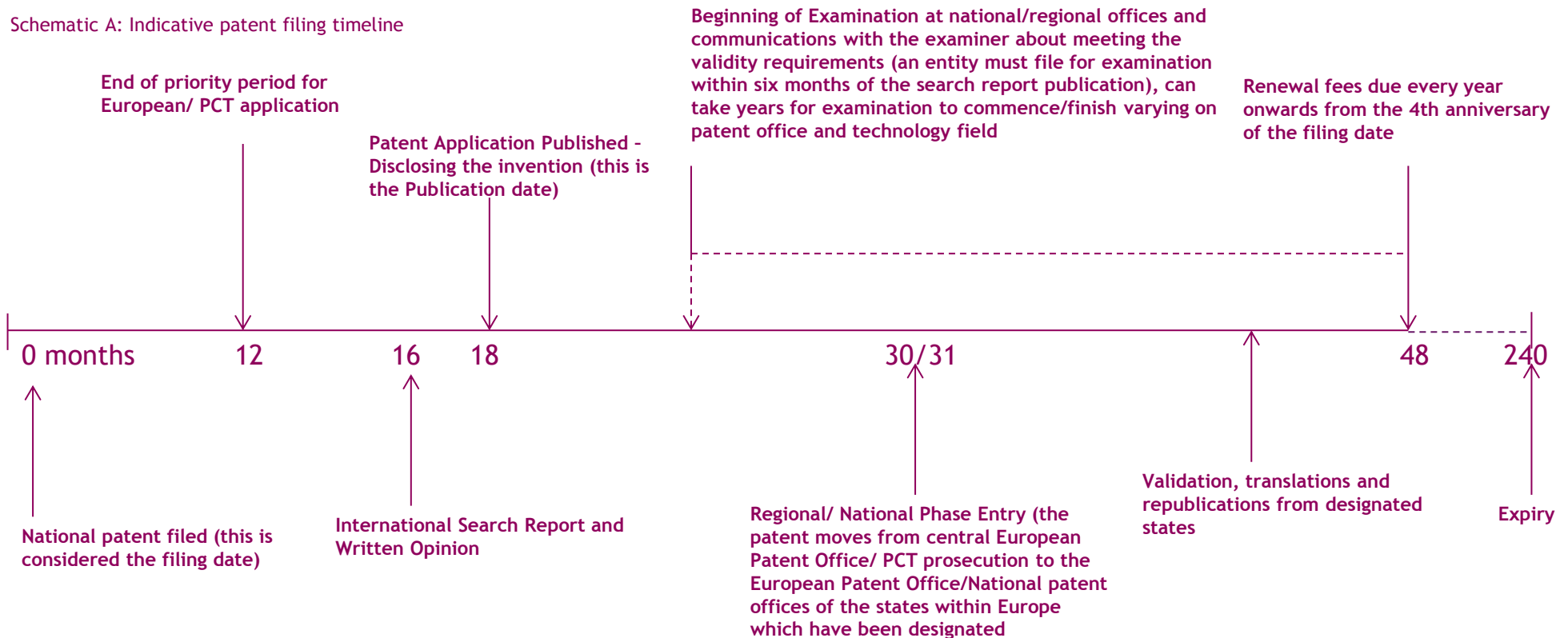
The timeline below introduces the time pathway and key events for the filing of a patent document.

Key events in a patent filing timeline:

- **Filing date:** This is the initial date of filing; this can be a national, regional or PCT filing.
- **Priority date:** A patent application has 12 months from filing to file a priority application (an application that will allow it claim patent protection in further jurisdictions) to a national/regional or Patent Co-operation Treaty.
- **Publication date:** After 18 months the patent will be published internationally.

- The patent will be under examination by the relevant patent office and correspondences between the examiner and applicant will continue until grant or rejection.
- If the patent has been filed at the European patent office, once examination has finished, validation and possible translations will be required to enable the patent rights to commence within those designated states.

Schematic A: Indicative patent filing timeline



3.1.4 Introduction to Patents: Patent Family

This patent filing timeline demonstrates a single patent filing from an Irish applicant and subsequent patent family filings into other jurisdictions.

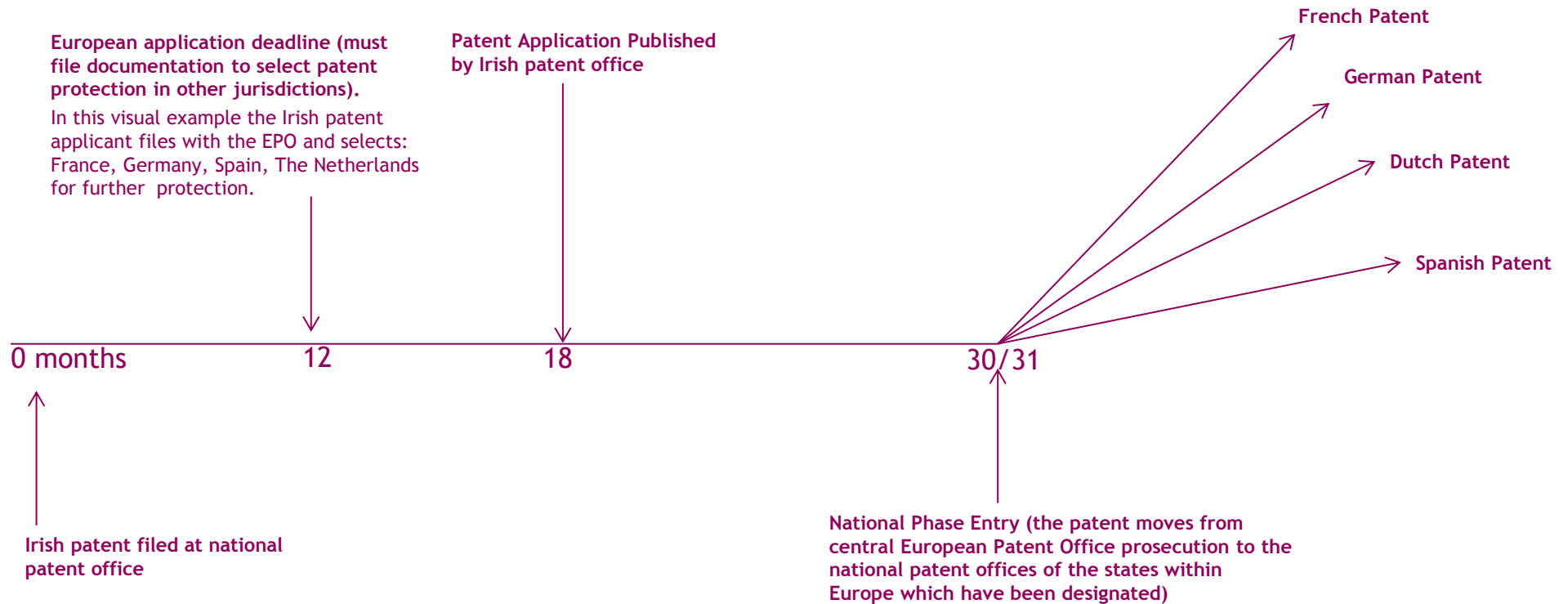
If a patent is first filed in Ireland, the date of filing is also known as the priority date, and the applicant then has up to 12 months to decide what other jurisdictions they intend to file in to seek patent protection. In the example visualised below, at the 12 month mark applicant selects four (4) other European countries and claims the 'priority date' of the original patent filing in Ireland.

As the example is considering only EU filings, the most cost-effective route is to

file a regional patent application with the European patent office (EPO) and designate protection in France, Germany, Spain and The Netherlands. If the applicant wished to file in countries outside the EU, they could choose to file at each individual office (i.e., US and CA individually), or if they wish to file with numerous global filing offices they could then file a PCT application and designate the countries using the international filing system process.

When the applicant files subsequent applications within the 12 months, the patents protecting these jurisdictions would be known as a patent family, as they are all linked to the same priority date, which in this case would be the filing date of the Irish patent.

Schematic B: Indicative patent filing timeline for national patent offices



3.2 Patents: Data & methodology

Patents in context

WIPO produces an annual report examining the emerging landscape of IP filing activity. This report provides a snapshot of global IP filing activity for the previous year based on patent statistics reported to WIPO [see *Data sources and coverage variations* discussion in this section(3.2)].

Recent statistical reporting produced by WIPO ('2013 World Intellectual Property Indicators')* cites that patent filings worldwide grew by 9.2% in 2012, this is following the 3.9% decrease in 2009 and the growth rates of 7.6% in 2010, and 8.1% in 2011.

The report highlights that this growth was mainly due to strong growth in filings at SIPO (State Intellectual Property Office of the People's Republic of China). And that among the top 20 IP offices, SIPO (+24%) saw the largest growth in filings in 2012 with an increase of 24%, while filing behaviour in Europe showed mixed trends, with the EPO witnessing growth trends*, while other European countries patent offices received fewer applications.

Patent data exploration/investigation

Data analysed by **applicant country** is based on the individual or other legal entity that files an application for a patent by the listed country of residence. For example, an application filed with the Irish patent office by listing a residency country of Ireland is considered an Irish applicant. This can include companies that establish holding companies and registered offices in Ireland.

Analysis conducted on the **inventor country** is based on the listed country of residence of the inventor(s), where at least one (1) inventor is listed as Irish.

The **filing office** is the national or regional jurisdiction that a patent application is filed in, this is denoted by a two letter code. Patent applications can also be filed under the Patent Cooperation Treaty (PCT), which are commonly referred to as international patent applications. However, the PCT system is not a patent office and cannot result in the issuance of an 'international patent', rather it is a filing system designed to assist in the administration of a patent filing to multiple jurisdictions. At present, there is no global patent system that is responsible for granting international patents. The decision of whether to grant or reject a patent application filed under the PCT rests with the national or regional (e.g. EPO)

patent offices.

Patent limitations

Intellectual property data is a rich source of structured information and can offer valuable insights regarding the innovative activities and intellectual capital of a particular individual, company or region. A key defining feature of patent documentation is their representation as a global technology library that is curated, documented, verified and indexed by external experts through a series of national and regional patent offices. The development of this global resources is not without inherent challenges, and therefore the patent analysis results presented here should be interpreted within the context of patent data limitations outlined below. Where possible we have made attempts to mitigate and signpost data limitations.

Lag in patent publications

There is a lag of up to eighteen (18) months in the publication of patent data by various patent offices. This lag can be further compounded by the time it takes to process, index and verify the data once it is received by various patent offices. Additionally, patents filed through the PCT system could be subject to up to a 36 month data publication lag as they enter into the national phase of their publication. This means that a patent filed with the PCT, while published after 18 months as a PCT application, could take up to 36 months to become published as a national (IE) or regional (EP) patent filing. We represent this on the graphs presented as a shaded box.

The patent analysis contained in this report used the most recent publication of PATSTAT (May 2014 edition). PATSTAT data is maintained and supplied by the EPO and was developed in cooperation with the World Intellectual Property Organisation (WIPO), the OECD and Eurostat and contains data from over 100 countries. Full details on the PATSTAT data coverage and documentation can be found here: <http://www.epo.org/searching/subscription/raw/product-14-24.html>.

Assignee/Applicant names

A well-known data issue in patent landscaping is that of ensuring accurate and consistent assignee/applicant names. Errors in the harmonisation of names can occur for a number of reasons, including: spelling differences, companies listing distinct country based holdings, M&A, filings in different languages, filings as separate divisions as part of a multinational as well as other possible entry errors.

*'2013 World Intellectual Property Indicators' available here:
<http://www.wipo.int/ipstats/en/wipi/>

Up-to-date assignee/applicant name harmonisation is an industry challenge and steps were undertaken to minimize the occurrences including the use of a normalised name list, published by ECOOM in cooperation with PATSTAT and the OECD, called the EEE-PAT harmonized name table. Full details on this information can be found here: <https://www.ecoom.be/en/EEE-PPAT>. Additional manual review of the top fifty assignee/applicants was undertaken and normalisation errors were corrected.

Data sources and coverage variations

The source for PATSTAT data is a combination of DOCDB (the documentation of bibliographical coverage maintained by the EPO) and data provided by other national and regional patent offices. Due to reliance of data submission by other patent filing offices there is potential gaps due to transmission from national offices.

The WIPO IP Statistics Data Center was queried in the development of this report for internal statistical benchmarking. Our analysis revealed a key numerical data distinction between PATSTAT and WIPO IP Statistic Data Centre, namely the WIPO IP Statistics Data Center returned higher numerical values, especially in recent years. Upon further methodological review, we found that the WIPO IP Statistics Data Centre published PCT filing data in advance of the national phase entry, thereby reducing the 36 month lag (to approximately 18 months or less) that appears in PATSTAT. Plainly, WIPO statistic count a PCT filing in their statistical filing, whereas PATSTAT does not include the data until it enters into regional or national phase. Therefore, there could be no direct comparison between the two data sources, only context and trend consideration.

The decision to use PATSTAT as a primary data source for patent analysis was based on data provision capacity. The WIPO IP Statistics Data Center limits the publication of data to public provision of statistical filing data (i.e., patents filed by year and office of origin) without the capacity to undertake more detailed patent data analysis (i.e., IPC or assignee data).

Similar to PATSTAT, WIPO reports data based on data provision from national and regional offices and therefore will have similar transmission limitations. Additionally though, for a small percentage of patent offices where data is missing, WIPO will use estimation methods such as linear extrapolation. For full details see the WIPO report Data Description (pg. 12): http://www.wipo.int/export/sites/www/freepublications/en/intproperty/941/wipo_pub_941_2013.pdf

It is important to note that WIPO Statistics reports (such as the ‘World Intellectual

Property Indicators - 2013’ report found here: <http://www.wipo.int/ipstats/en/>) also incorporate data from PATSTAT (such as IPC data) to complement their statistical findings when publishing annual reports.

Data completeness

As previously discussed in the above ‘Data sources and coverage variations’ section, patent data relies on submission of data by national patent offices to compile data. The inventory, indexing and completeness of this data therefore relies on networks of patent offices to transmit data in a uniform and cohesive manner for a range of data fields. Data can therefore vary depending on the capacity and resources of the national patent offices reporting. This variation is documented in the patent source documentation:

<http://www.epo.org/searching/subscription/patstat-online.html>

3.3.1 Patent filing trends for Ireland

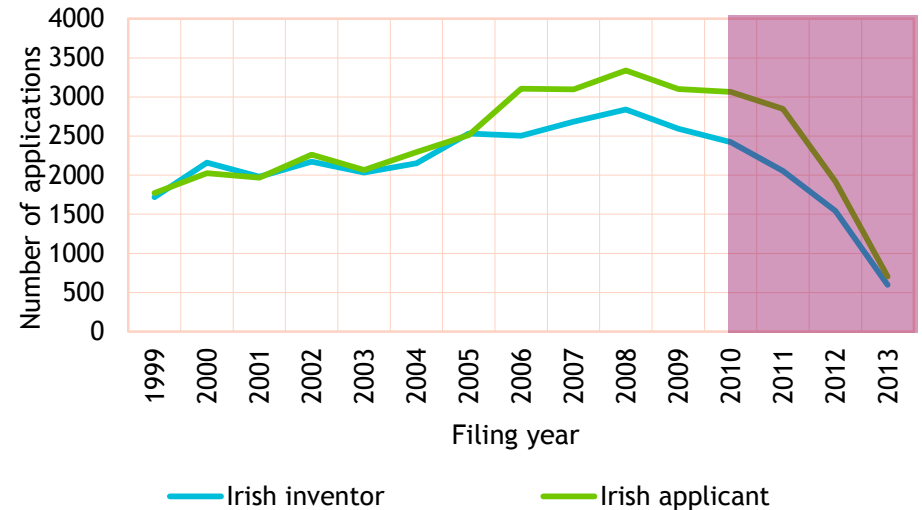
Combining the origin of applicant and inventor in different ways reveals information about different aspects of the Irish patenting community.

Firstly, we can consider any patent applications that have an applicant listed which has filed as Irish. This can include indigenous Irish firms, whilst also accounting for foreign owned corporate entities who are Irish subsidiaries of a foreign owned multinational corporation, or have a holdings company based in Ireland.

Another method of distinguishing Irish patenting is to look at the nationality of any of the inventors listed on the patent applications. This accounts for the resident location of that inventor at the time of patent filing. Consequently, this should be a good indicator of whether a patent application's technology has its research and development roots in Ireland.

When observing patenting filing trends (figure 7), it is important to note that there exists a publication lag, which can manifest itself in an apparent drop off in patenting activity over the most recent years (as discussed in section 3.2 Patents: Data & methodology - Lag in patent publications). We represent this on the graphs presented as a shaded box.

Figure 7: Patent application trends for different definitions of Irish patenting



3.3.2 Patent filing trends: Irish applicants

There were 36,081 published applications filed between 1999 - 2013 with Ireland listed as an applicant country. There have been 11,233 granted patents. The filing trend seen in figure 8 shows that there was an increase in patenting until 2006, from which point there has been a plateau in the number of filings.

Figure 9 slightly underrepresents the average grant rate due to the inclusion of patent filings from 2009 onwards (as they are still under patent examination), however analysis of data from 1999 - 2008 indicates that, on average just over one-third of all patents filed are granted.

Non-granted patents can be pending applications, withdrawn applications, refused or revoked patents or patents whose application has lapsed due to non-fee payment or abandonment.

Figure 8: Ireland as applicant: Country patent grant & non-grant rates

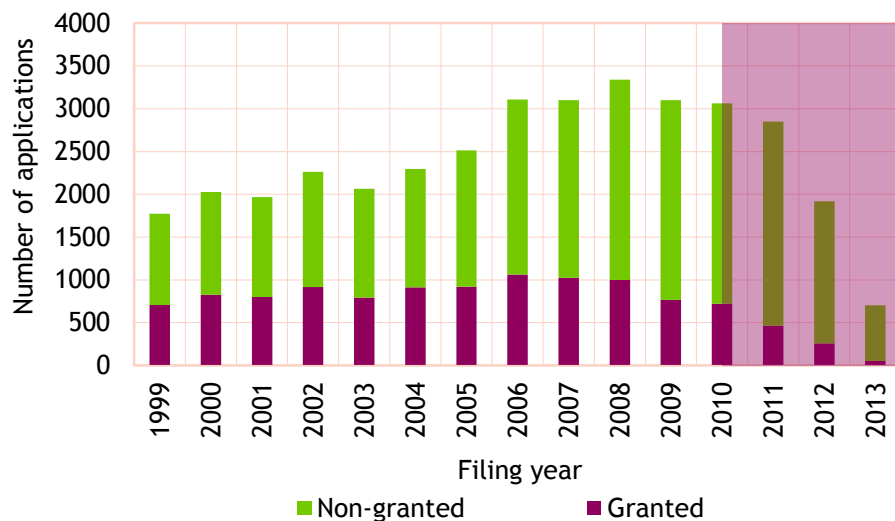


Figure 9: Patent application and grant proportion of filings

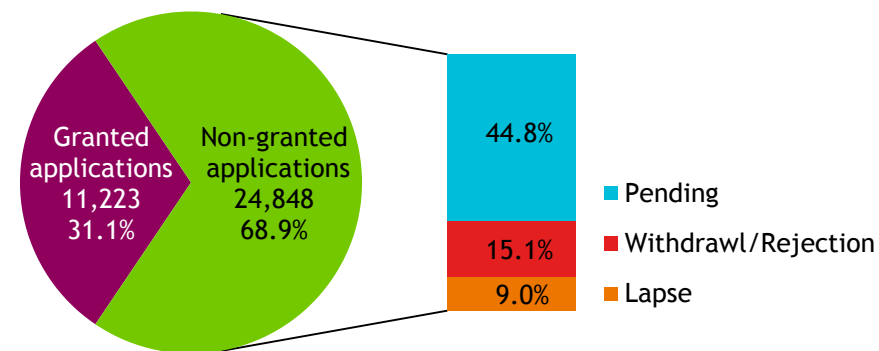


Table 1: Ireland as applicant: Patent status table

Patent status	Number of patent applications	% of all applications
Grant	11,223	31.1%
Non-grant	24,848	68.9%
Pending	16,158	44.8%
Withdrawal/Rejection	5,429	15.1%
Lapse	3,261	9.0%
Total	36,081	

3.3.3 Patent filing trends: Irish inventors

There were 31,980 published applications filed between 1999 - 2013 with Ireland listed as an applicant country there have been 9,601 granted patents.

Similar to the Irish applicant filings, the filing trend seen in figure 10 shows that there was an increase in patenting until 2008, from which point there has been a plateau in the number of filings.

Again, it should be noted that figure 11 slightly underrepresents the average grant rate due to the inclusion of patent filings from 2009 onwards (as they are still under initial review), however analysis of data from 1999 - 2008 indicates that, on average a third of all patents filed are granted. Levels are similar between Irish inventors filings and Irish applicant filings.

Non-granted patents can be pending applications, withdrawn applications, refused or revoked patents or patents whose application has lapsed due to non-fee payment or abandonment.

Figure 11: Patent application and grant proportion of filings

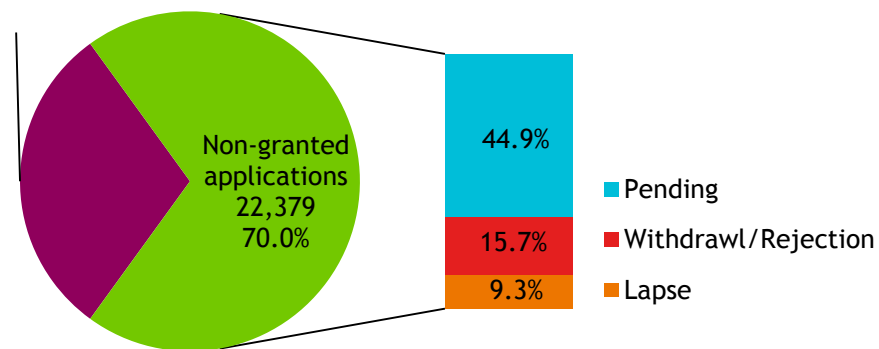
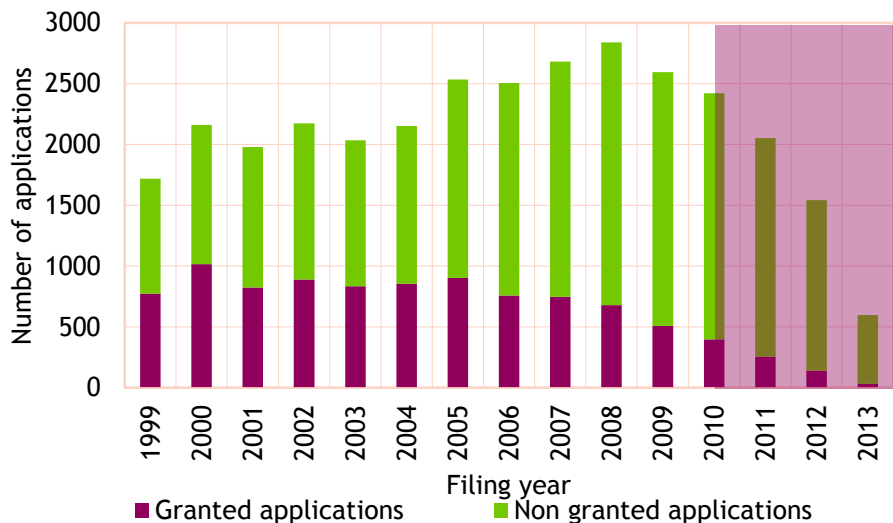


Table 2: Ireland as inventor: Patent status table

Patent status	Number of patent applications	% of all applications
Grant	9,601	30.0%
Non-grant	22,379	70.0%
Pending	14,368	44.9%
Withdrawal/Rejection	5,026	15.7%
Lapse	2,985	9.3%
Total	31,980	

Figure 10: Ireland as inventor country: patent grant & non-grant rates



3.3.4 IPC sections: Irish applicants

Of the 36,081 published applications filed there were 45,808 IPC section codes assigned to the applications. As indicated in table 3, the most frequently occurring IPC codes at the section* level from patent applications with an Irish applicant country is 'A: Human necessities'.

Figure 12: IPC sections : Irish applicants percentage of total occurrences

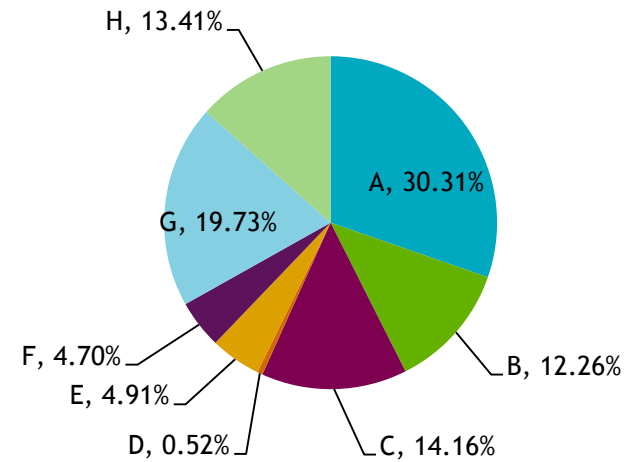


Table 3: IPC Codes: Irish applicants top ten most frequently occurring IPC sections

Rank	IPC	Description	Nr patent applications with IPC section	% of all Section assignments
1	A	HUMAN NECESSITIES	13884	30.31%
2	G	PHYSICS	9037	19.73%
3	C	CHEMISTRY; METALLURGY	6485	14.16%
4	H	ELECTRICITY	5126	13.41%
5	B	PERFORMING OPERATIONS; TRANSPORTING	4901	12.29%
6	E	FIXED CONSTRUCTIONS	2251	4.91%
7	F	MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING	2151	4.70%
8	D	TEXTILES; PAPER	240	0.52%

*There are six levels of granularity in the IPC hierarchy - Section, Class, Subclass, Main Group, Sub-group, and Full Details. For more information on IPC's see Appendix: IPC Structure.

3.3.5 IPC sections: Irish inventors

Of the 31,980 published applications filed there were 40,093 IPC section codes assigned to the applications. As indicated in table 4, the most frequently occurring IPC codes at the section level from patent applications with an IE inventor is 'A: Human necessities' which is representative of the large degree of patenting from the pharmaceutical field.

There is variation between Irish applicants and Irish inventors IPC proportions. Insofar as the Irish inventor data depicts a higher occurrence of both IPCs G and H relating to 'Physics' and 'Electricity' respectively.

Figure 13: IPC sections : Irish inventors percentage of total occurrences

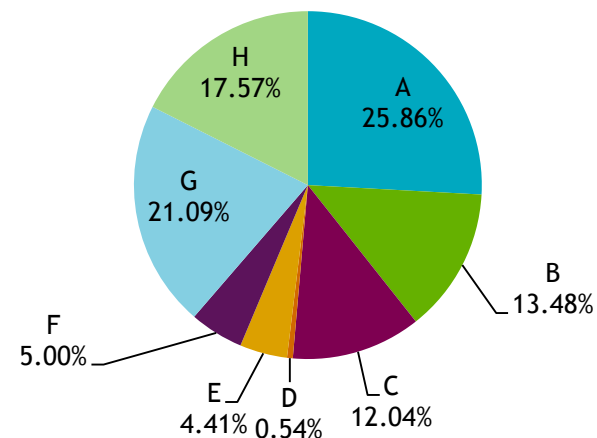


Table 4: IPC Codes: Irish inventors top ten most frequently occurring IPC sections

Rank	IPC	Description	Nr patent applications with IPC section	% of all Section assignments
1	A	HUMAN NECESSITIES	10370	25.86%
2	G	PHYSICS	8456	21.09%
3	H	ELECTRICITY	7044	17.57%
4	B	PERFORMING OPERATIONS; TRANSPORTING	5403	13.48%
5	C	CHEMISTRY; METALLURGY	4828	12.04%
6	F	MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING	2006	5.00%
7	E	FIXED CONSTRUCTIONS	1770	4.41%
8	D	TEXTILES; PAPER	216	0.54%

3.3.6 IPC classes: Irish applicants

Of the 36,081 published applications filed there were 31,691 IPC classes assigned to the applications. As indicated in table 5, the most frequently occurring IPC codes at the class* level from patent applications with an IE applicant country is 'A61: Medical or Veterinary science', accounting for just under a third of all patent filings.

Figure 14: IPC classes : Irish applicants percentage of total occurrences

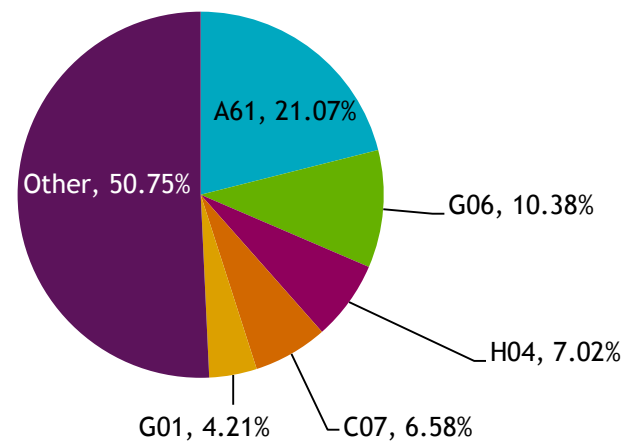


Table 5: IPC Codes: Irish applicants top ten most frequently occurring IPC classes

Rank	IPC	Description	Nr patent applications with IPC class	% of all Class assignments
1	A61	HUMAN NECESSITIES > HEALTH; LIFE-SAVING; AMUSEMENT > MEDICAL OR VETERINARY SCIENCE; HYGIENE	10772	21.07%
2	G06	PHYSICS > INSTRUMENTS > COMPUTING; CALCULATING; COUNTING	5308	10.38%
3	C07	ELECTRICITY > ELECTRIC COMMUNICATION TECHNIQUE	3587	7.02%
4	H04	CHEMISTRY; METALLURGY > CHEMISTRY > ORGANIC CHEMISTRY	3363	6.58%
5	G01	PHYSICS > INSTRUMENTS > MEASURING; TESTING	2151	4.21%
6	C12	CHEMISTRY; METALLURGY > CHEMISTRY > BIOCHEMISTRY; BEER; SPIRITS; WINE; VINEGAR; MICROBIOLOGY; ENZYMOLOGY; MUTATION OR GENETIC ENGINEERING	1641	3.21%
7	H01	ELECTRICITY > BASIC ELECTRICAL ELEMENTS	1532	3.00%
8	E04	FIXED CONSTRUCTIONS > BUILDING	1314	2.57%
9	A01	HUMAN NECESSITIES > AGRICULTURE > AGRICULTURE; FORESTRY; ANIMAL HUSBANDRY; HUNTING; TRAPPING; FISHING	1033	2.02%
10	B65	PERFORMING OPERATIONS; TRANSPORTING > CONVEYING; PACKING; STORING; HANDLING THIN OR FILAMENTARY MATERIAL	990	1.94%
Top ten			31,691	62.0%

*There are six levels of granularity in the IPC hierarchy - Section, Class, Subclass, Main Group, Sub-group, and Full Details. For more information on IPC's see Appendix: IPC Structure.

3.3.7 IPC classes: Irish inventors

Of the 31,980 published applications filed there were 45,223 IPC section codes assigned to the applications at the sub-classification level. As indicated in table 6, the most frequently occurring IPC codes at the class level from patent applications with an IE applicant country is 'A61: Medical or Veterinary science', accounting for about one-fifth of the patents.

Figure 15: IPC classes: Irish inventors percentage of total occurrences

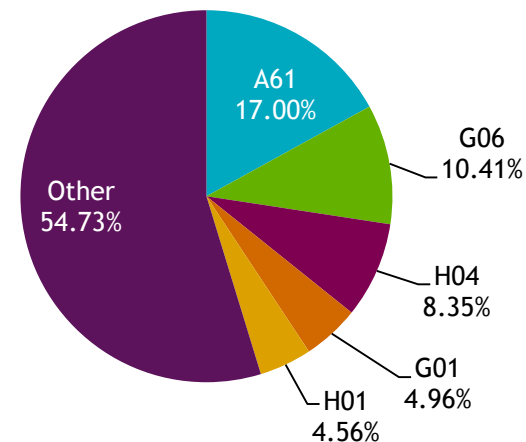


Table 6: IPC Codes: Irish inventors top ten most frequently occurring IPC classes

Rank	IPC	Description	Nr patent applications with IPC class	% of all Class assignments
1	A61	HUMAN NECESSITIES > HEALTH; LIFE-SAVING; AMUSEMENT > MEDICAL OR VETERINARY SCIENCE; HYGIENE	7,687	17.00%
2	G06	PHYSICS > INSTRUMENTS > COMPUTING; CALCULATING; COUNTING	4,709	10.41%
3	H04	CHEMISTRY; METALLURGY > CHEMISTRY > ORGANIC CHEMISTRY	3,774	8.35%
4	G01	PHYSICS > INSTRUMENTS > MEASURING; TESTING	2,242	4.96%
5	H01	ELECTRICITY > BASIC ELECTRICAL ELEMENTS	2,062	4.56%
6	C07	ELECTRICITY > ELECTRIC COMMUNICATION TECHNIQUE	2,011	4.45%
7	C12	CHEMISTRY; METALLURGY > CHEMISTRY > BIOCHEMISTRY; BEER; SPIRITS; WINE; VINEGAR; MICROBIOLOGY; ENZYMOLOGY; MUTATION OR GENETIC ENGINEERING	1,525	3.37%
8	B65	PERFORMING OPERATIONS; TRANSPORTING > CONVEYING; PACKING; STORING; HANDLING THIN OR FILAMENTARY MATERIAL	1,097	2.43%
9	A01	HUMAN NECESSITIES > AGRICULTURE > AGRICULTURE; FORESTRY; ANIMAL HUSBANDRY; HUNTING; TRAPPING; FISHING	987	2.18%
10	E04	FIXED CONSTRUCTIONS > BUILDING	870	1.92%
Top ten			26,964	59.62%

3.3.8 IPC time trends: Irish applicants

IPC codes can provide valuable insight into the technology focus areas for Irish applicant filings. This has been analysed for how the number of IPC assignments change over the time period of 1999 to 2013.

The highest level of IPC codes, the section, shows the dominance of ‘A: Human necessities’ over the other sections in figure 16. However, in more recent years this section has been in decline, with technologies around physics coming to the fore.

The heart of this ascendancy of physics as a technology area can be seen in the breakdown of IPC classes for Ireland, seen in figure 17, which shows a recent increase in patenting around computing; under the branch of physics. Looking at this more detailed layer of IPC codes also shows us the reason for the decline in human necessities; Medical or Veterinary Science has sharply fallen since a significant peak in 2006. This peak and decline structure is reflected in the higher section level analysis.

Table 7: IPC class and section descriptions: Irish applicants

IPC section	Description	IPC section	Description
A	Human Necessities	E	Fixed Constructions
B	Performing Operations; Transporting	F	Mechanical Engineering; Lighting; Heating; Weapons; Blasting
C	Chemistry; Metallurgy	G	Physics
D	Textiles; Paper	H	Electricity

IPC class	Description
A61	Human Necessities > Health; Life-saving; Amusement > Medical Or Veterinary Science; Hygiene
G06	Physics > Instruments > Computing; Calculating; Counting
C07	Chemistry; Metallurgy > Chemistry > Organic Chemistry
H04	Electricity > Electric Communication Technique
G01	Physics > Instruments > Measuring; Testing

Figure 16: IPC section: Irish applicants trends over time

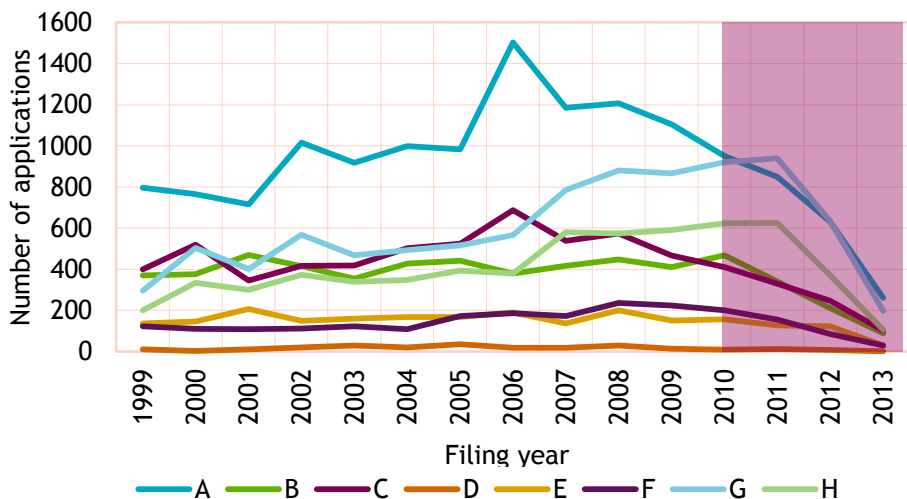
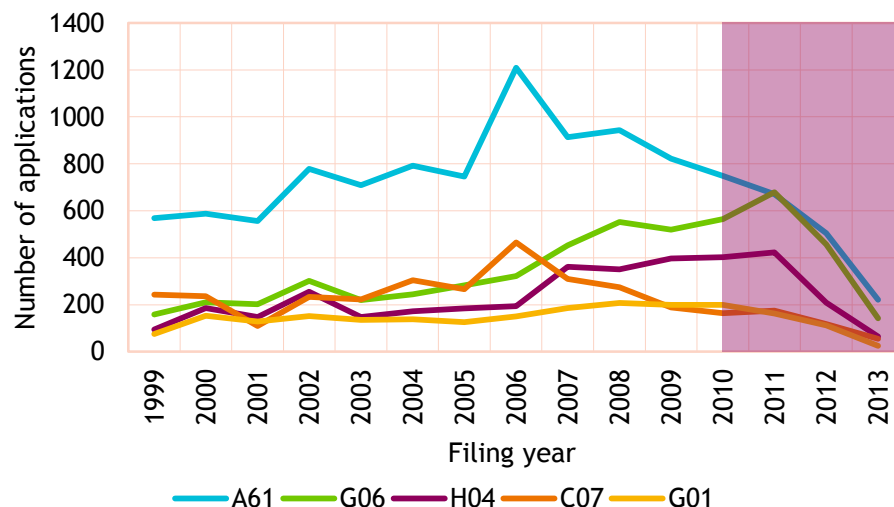


Figure 17: Top five IPC classes: Irish applicants trends over time



3.3.9 IPC time trends: Irish inventors

While the IPC trends of Irish applicants and Irish inventors show similar prevalence in the A61: Human Necessitates > Health, etc. and G06: Physics > Instruments, etc. IPC classes. What is striking is the decreased margin in occurrences between sectors (figure 18). This could reflect a more equal diversity of Irish inventiveness across sectors.

Similar to Irish applicants IPC trends, there is a clear growth in recent years in the IPC sub-class G06: Physics > Physics > Instruments > Computing; Calculating; Counting (figure 19).

Table 8: IPC class and section descriptions

IPC class	Description
A61	Human Necessities > Health; Life-saving; Amusement > Medical Or Veterinary Science; Hygiene
G06	Physics > Instruments > Computing; Calculating; Counting
H01	Electricity > Basic Electric Elements
H04	Electricity > Electric Communication Technique
G01	Physics > Instruments > Measuring; Testing

IPC section	Description	IPC section	Description
A	Human Necessities	E	Fixed Constructions
B	Transporting	F	Mechanical Engineering; Lighting; Heating; Weapons; Blasting
C	Chemistry; Metallurgy	G	Physics
D	Textiles; Paper	H	Electricity

Figure 18: IPC section: Irish inventors trends over time

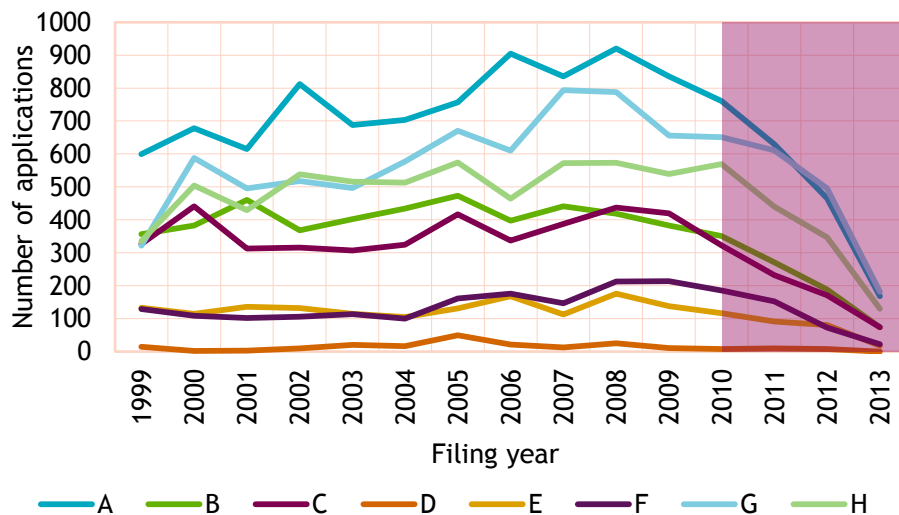
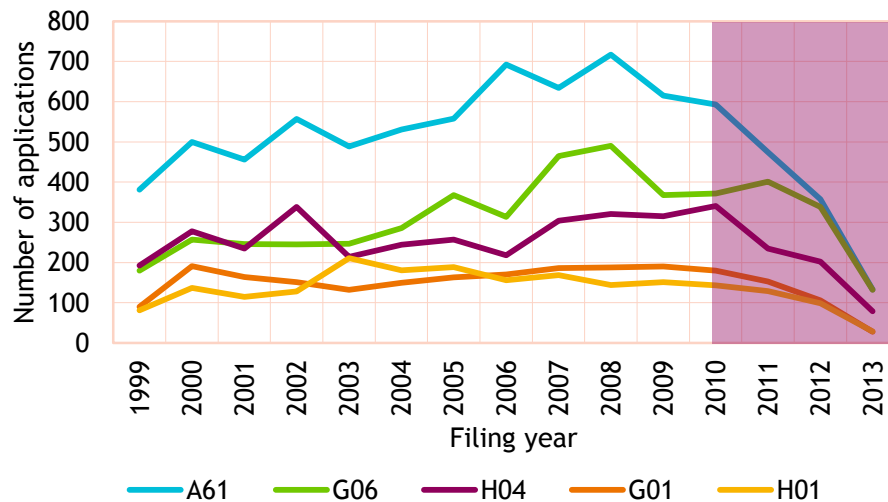


Figure 19: Top five IPC classes: Irish inventors trends over time



3.3.10 NACE sectors: Irish applicants

The top NACE sectors for Irish applicants, as mapped* from IPC subclass assignments are represented here for 1999 to 2013 (table 9), in addition to being split out for the first and second half of this time period to show the evolution of sector innovation (table 10, 11).

The pharmaceutical sector, is highly dominant throughout the time period, although its impact peaked somewhat in 2006, from whence there has been a steady decline, bringing it towards the level of some of the other highly active sectors within Ireland, for example medical equipment, office computing, and telecommunications as can be seen in figure 20.

Table 9: Top ten NACE sectors: Irish applicants 1999-2013

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	15047
33.1	Medical equipment	6643
30	Office machinery and computers	6450
32.2	Signal transmission, telecommunications	4240
24.1	Basic chemical	3214
29.5	Special purpose machinery	2402
26	Non-metallic mineral products	2318
33.2	Measuring instruments	2164
25	Rubber and plastics products	1661
15	Food, beverages	1430

*IPC subclasses were mapped to NACE sectors via technical field groupings, through concordance tables presented by Smoch et al. in the 2003 paper "Linking Technology Areas to Industrial Sectors": ftp.cordis.europa.eu/pub/indicators/docs/ind_report_isi_ost_spru.pdf

Table 10: Top ten NACE sectors: Irish applicants 1999 - 2005

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	7581
33.1	Medical equipment	2852
30	Office machinery and computers	2228
32.2	Signal transmission, telecommunications	1877
24.1	Basic chemical	1610
29.5	Special purpose machinery	1389
26	Non-metallic mineral products	1140
25	Rubber and plastics products	944
33.2	Measuring instruments	926
15	Food, beverages	892

Table 11: Top ten NACE sectors: Irish applicants 2006 - 2013

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	7466
30	Office machinery and computers	4222
33.1	Medical equipment	3791
32.2	Signal transmission, telecommunications	2363
24.1	Basic chemical	1604
33.2	Measuring instruments	1238
26	Non-metallic mineral products	1178
29.5	Special purpose machinery	1013
32.3	Television and radio receivers, audiovisual electronics	731
25	Rubber and plastics products	717

3.3.11 Top 20 NACE sectors: Irish applicants (1999 - 2013)

Figure 20: Top five NACE sector trends: Irish applicants

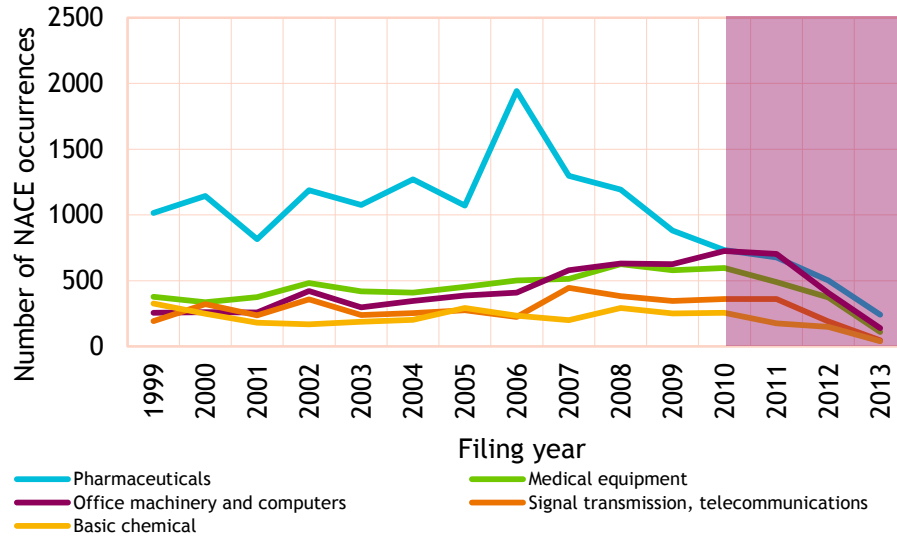


Figure 21: 6th - 10th NACE sector trends: Irish applicants

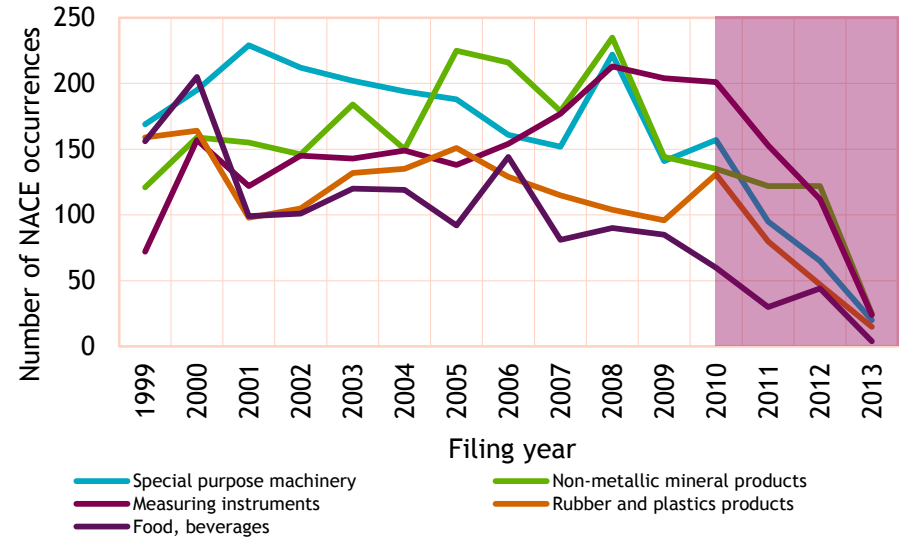


Figure 22: 11th to 15th NACE sector trends: Irish applicants

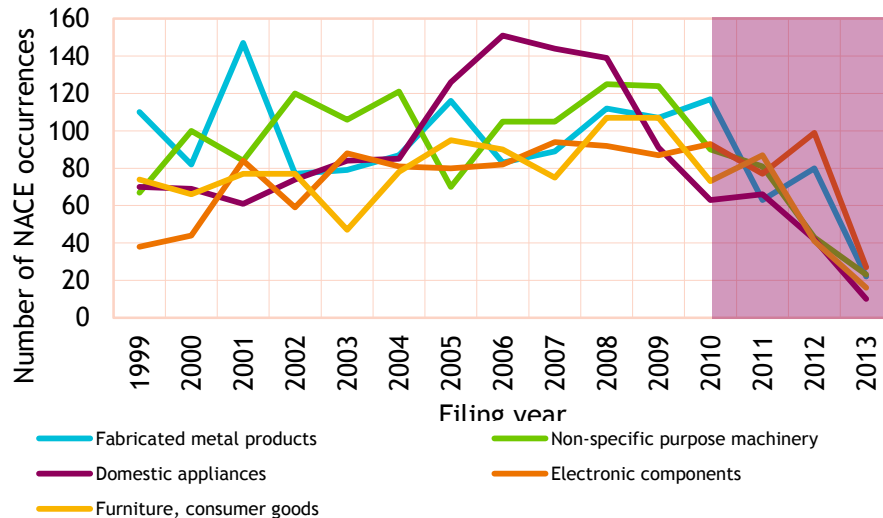
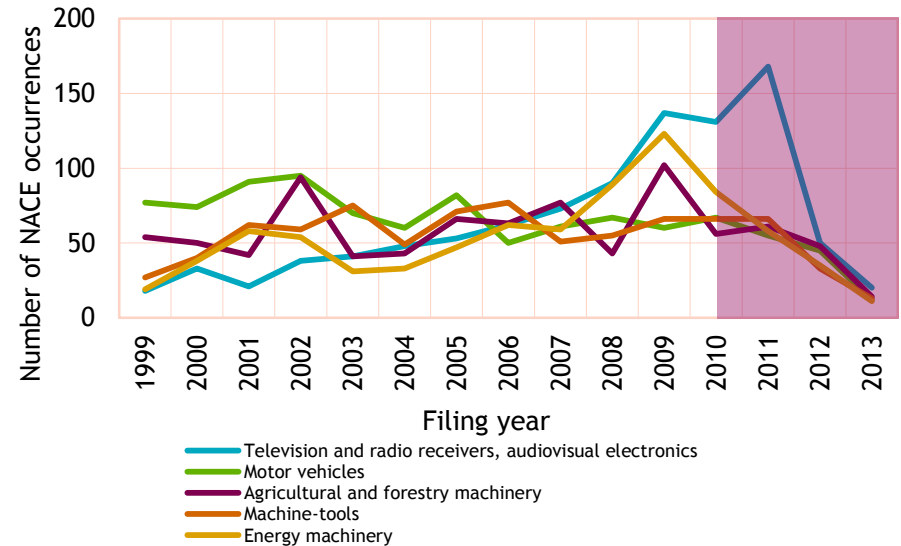


Figure 23: 16th to 20th NACE sector trends: Irish applicants



3.3.12 NACE sectors: Irish inventors

The top NACE sectors for Irish inventors, as mapped* from IPC subclass assignments are represented here for 1999 to 2013 (table 12), in addition to being split out for the first and second half of this time period to show the evolution of sector innovation (table 13, 14).

Similar to the trends in Irish applicant data, the pharmaceutical sector is the most dominant sector until 2009. However, the data shows a smaller margin between the sectors in the Irish inventor data than the Irish applicant (figures 24,25,26,27).

Table 12: Top ten NACE sectors: Irish inventors 1999 - 2013

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	8723
33.1	Medical equipment	6246
30	Office machinery and computers	5945
32.2	Signal transmission, telecommunications	4809
24.1	Basic chemical	2722
29.5	Special purpose machinery	2426
33.2	Measuring instruments	2283
25	Rubber and plastics products	1852
32.1	Electronic components	1587
26	Non-metallic mineral products	1579

Table 13: Top ten NACE sectors: Irish inventors 1999 - 2005

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	4665
33.1	Medical equipment	2799
32.2	Signal transmission, telecommunications	2704
30	Office machinery and computers	2612
24.1	Basic chemical	1437
29.5	Special purpose machinery	1414
25	Rubber and plastics products	1115
33.2	Measuring instruments	1079
32.1	Electronic components	804
15	Food, beverages	781

Table 14: Top ten NACE sectors: Irish inventors 2006 - 2013

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	4058
33.1	Medical equipment	3447
30	Office machinery and computers	3333
32.2	Signal transmission, telecommunications	2105
24.1	Basic chemical	1285
33.2	Measuring instruments	1204
29.5	Special purpose machinery	1012
26	Non-metallic mineral products	819
32.1	Electronic components	783
25	Rubber and plastics products	737

*IPC subclasses were mapped to NACE sectors via technical field groupings, through concordance tables presented by Smoch et al. in the 2003 paper "Linking Technology Areas to Industrial Sectors" : ftp.cordis.europa.eu/pub/indicators/docs/ind_report_isi_ost_spru.pdf

3.3.13 Top 20 NACE sectors: Irish inventors

Figure 24: Top five NACE sector trends: Irish inventors

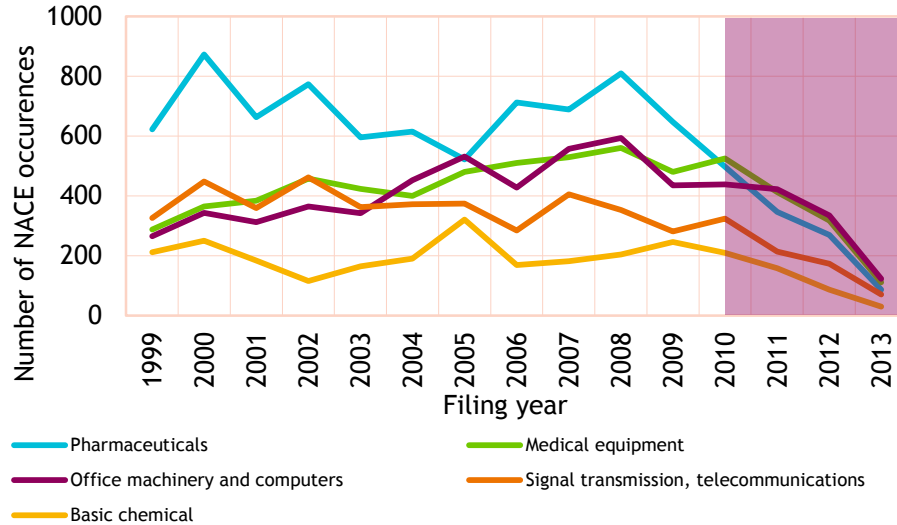


Figure 25: 6th -10th NACE sectors trends: Irish inventors

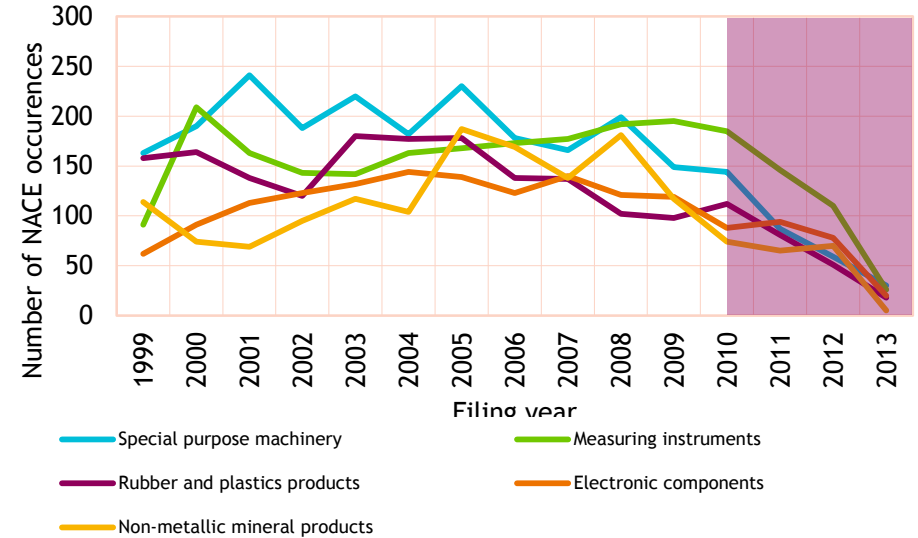


Figure 26: 11th to 15th NACE sector trends: Irish inventors

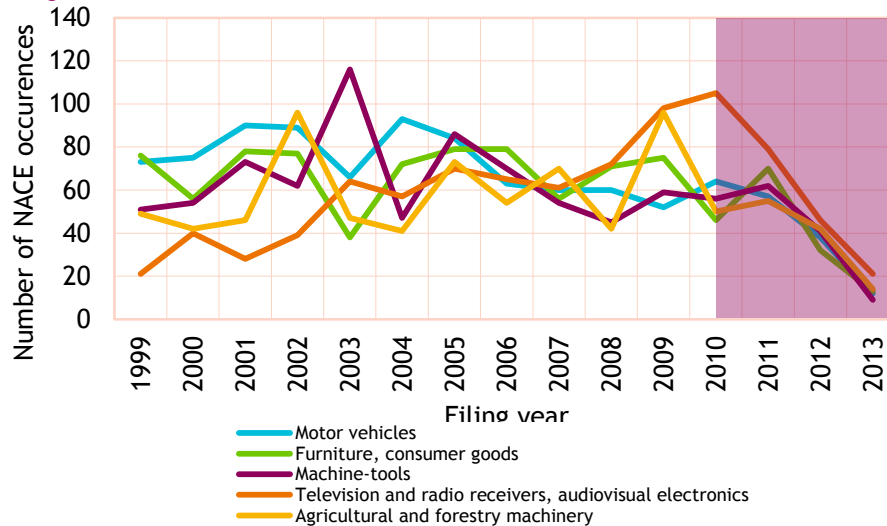
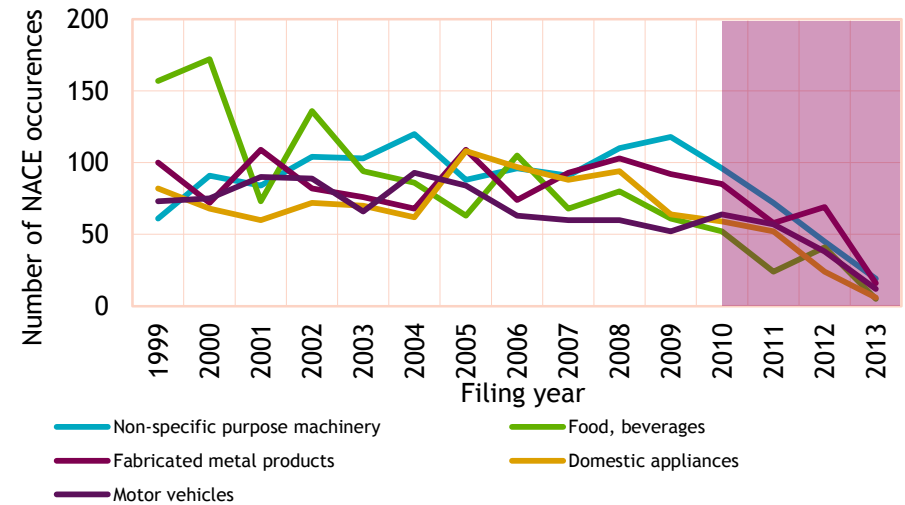


Figure 27: 16th to 20th NACE sector trends: Irish inventors



3.3.14 Organisation type: Irish applicants

The organisation type breakdown of applicants from Ireland shows the areas of highest IP generation. The greatest contribution towards patent filing in Ireland comes from corporate entities, as can be seen in figure 28, with 65.6% of applications. Although corporate entities are the dominant generator of IP in Ireland, this is significantly lower than the proportion from this sector within the other European comparator countries, which have an average of 75.5% company filings.

This difference arises from the inflated* number of Individual applications and applications from HEIs, which account for 26.2% and 6.1% of patent applications respectively. This proportion of filings from HEIs is higher than the European comparator countries.

The top ten corporate applicants from Ireland consist of a mix of Irish owned companies and foreign owned entities. Whilst the predominant industry is pharmaceutical, there is also representation from engineering, software, and services industries.

Table 15: Top ten applicants listed as Irish and as companies

Applicant	Owner nationality	Nr of patent filings
Tibotec Pharma Ltd**	US	1213
Accenture Global Services	US	782
Elan Pharma International	IE	761
Skype	US	562
Kingspan	IE	425
Vasogen Ireland	CA	374
Loctite	DE	343
Abbott Laboratories	IE	336
Salviac	IE	269
Fotonation Vision	US	214

* US patent applications are usually first filed as the individuals who invented the technology as the inventors and the applicants. Furthermore, company policy, or Inventor-entity relationship may allow for a lead inventor to be listed as another assignee. These factors result in a greater number of apparent individual filings

** Tibotec was acquired by Johnson and Johnson in 2002

*** The National University of Ireland was historically assigned for all colleges within that federal university system, and therefore this is an aggregation of various institutions.

Figure 28: Patent application trends by Ireland applicants for each sector

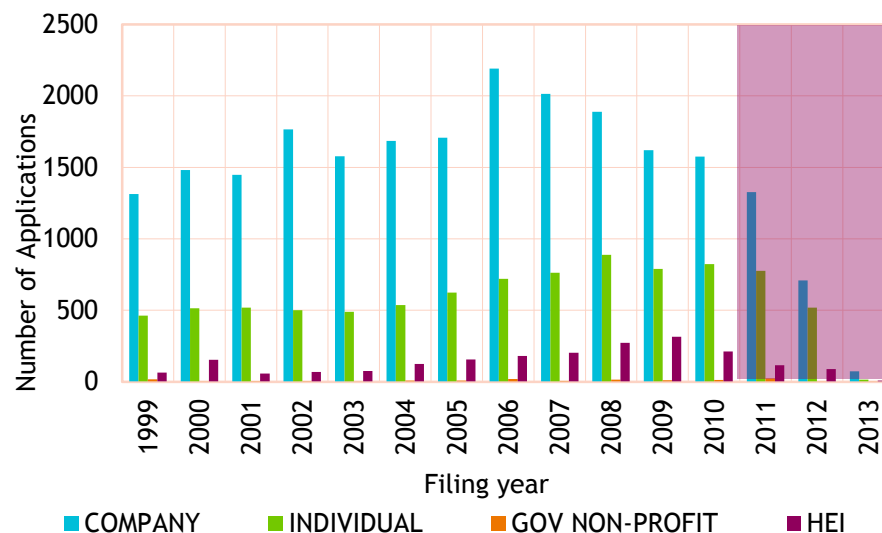


Table 16: Top ten applicants listed as Irish and as HEIs

Applicant	Nr of patent filings
University College Cork	386
Trinity College Dublin	360
National University Of Ireland Galway	264
Dublin City University	253
University College Dublin	225
University Of Limerick	131
National University Of Ireland***	91
Royal College Of Surgeons In Ireland	87
Dublin Institute Of Technology	76
National University Of Ireland Maynooth	49

3.3.15 Organisation type: Irish inventors

The organisation type breakdown of inventors from Ireland shows the areas of highest IP generation. The greatest contribution towards patent filing in Ireland comes from corporate entities, with 67.0% of applications.

Patent application filings from individuals and HEIs account for 28.1% and 7.4% of patent applications respectively.

Table 17: Top ten inventors listed as Irish and as companies

Applicant	Owner nationality	Nr of applications
Analog Devices	US	534
IBM	US	465
Ericsson	SE	372
Loctite	DE	333
Salviac	IE	295
Boston Scientific Scimed	US	272
Medtronic Cardiovascular	US	230
Kingspan	IE	223
Fotonation Vision	US	202
Philips Electronics	NL	200

* US patent applications are usually first filed as the individuals who invented the technology as the inventors and the applicants. Furthermore, company policy, or inventor-entity relationship may allow for a lead inventor to be listed as another assignee. These factors result in a greater number of apparent individual filings.

** The National University of Ireland was historically assigned for all colleges within that federal university system, and therefore this is an aggregation of various institutions.

Figure 29: Patent application trends by Ireland inventor for each organisation type

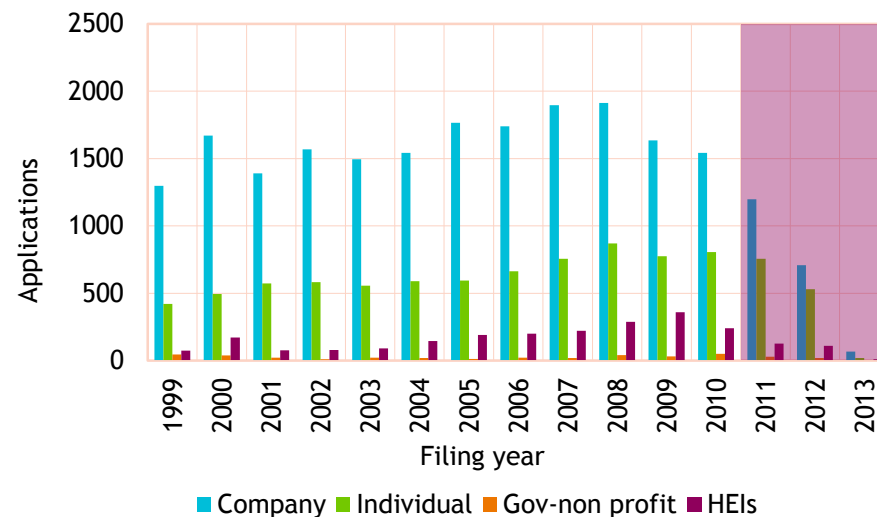


Table 18: Top ten inventors listed as Irish and as HEIs

Applicant	Nr of applications
University College Cork	384
Trinity College Dublin	345
National University Of Ireland Galway	269
Dublin City University	246
University College Dublin	214
University Of Limerick	130
National University Of Ireland**	84
Royal College Of Surgeons In Ireland	82
Dublin Institute Of Technology	71
National University Of Ireland Maynooth	48

3.3.16 Nationality of ownership: Irish applicants

358 companies had 10 or more Irish applications. These 358 Irish applicants accounted for 17,111 applications over the 1999-2013 time frame considered. This equates to 77% of total applications by companies that are Irish applicants.

Of the 358 firms with 10 or more Irish applications, ownership could be assigned to - 80% of them. The 281 companies for which ownership was assigned were responsible for 65% of all IE applications by companies.

From figure 30, an interesting relationship between patenting volumes and ownership nationality is apparent. For companies with 10 or more Irish applications, Irish owned companies account for more of the companies but the foreign owned entities are patenting more in terms of volume, than their Irish owned counterparts.

Table 19: Top ten patenting Irish-owned companies: Irish applicants 1999 - 2013

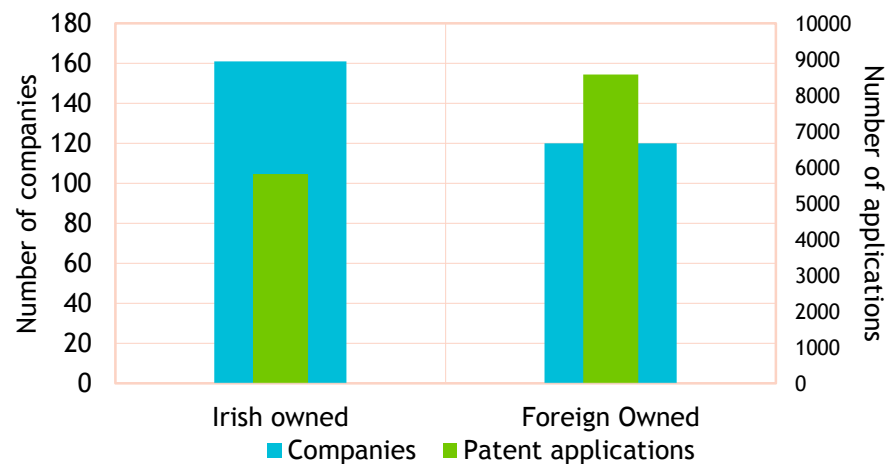
Applicant	Number of applications
Elan Pharma International	761
Abbott laboratories	336
Kingspan	227
Basic holdings	207
Flooring industries	197
Nellcor Puritan Bennett Ireland	172
Alimentary health	149
Xsil technology	106
Zamtec	96
Janssen Alzheimer immunotherapy	92

* Tibotec was acquired by Johnson and Johnson in 2002

Table 20: Top ten patenting by foreign-owned companies: Irish applicants 1999 - 2013

Applicant	Number of applications
Tibotec Pharma Ltd*	1213
Accenture global services	782
Vasogen ireland	374
Loctite	343
Salviac	269
Fotonation vision	214
Recordati Ireland	206
Saeco IPR	205
Markport	181
Activcard Ireland	167

Figure 30: Ownership of patenting activity for 65% of Irish applications by companies 1999 - 2013



	Number of companies	Number of applications
Irish owned	161	5820
Foreign Owned	120	8583

3.4.1 Patent filing trends: Comparator countries

The raw patent application numbers (figure 31,32) are shown here for each comparator country, for applicant and for inventor nationality.

Germany is shown here on a separate scale, due to the much larger volumes of patent applications filed with German origin.

The two different metrics, of applicant and inventor country, show similar trends across all comparator countries.

Ireland's patenting is consistently lower than the comparator countries chosen. It is noted that the European comparator countries having been chosen for their innovation leadership, as discussed in section 2.2.

Figure 31: Applications by applicant country

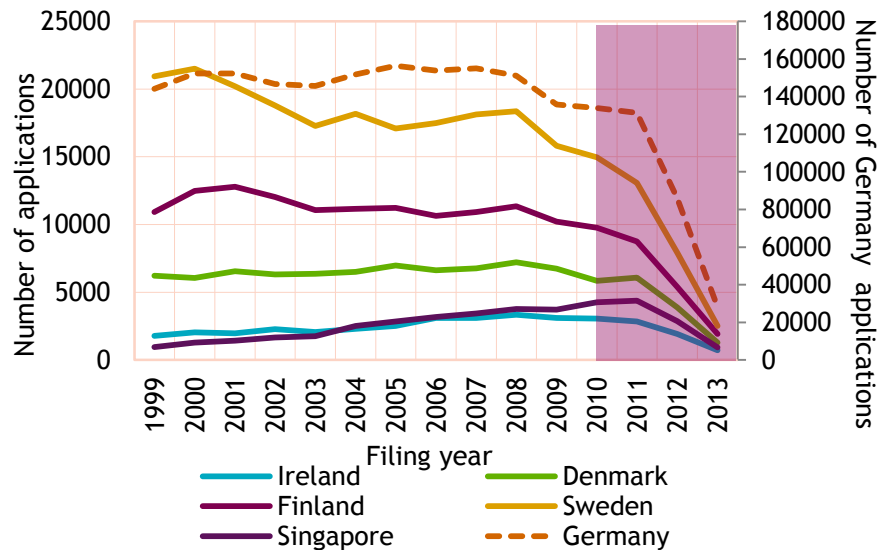
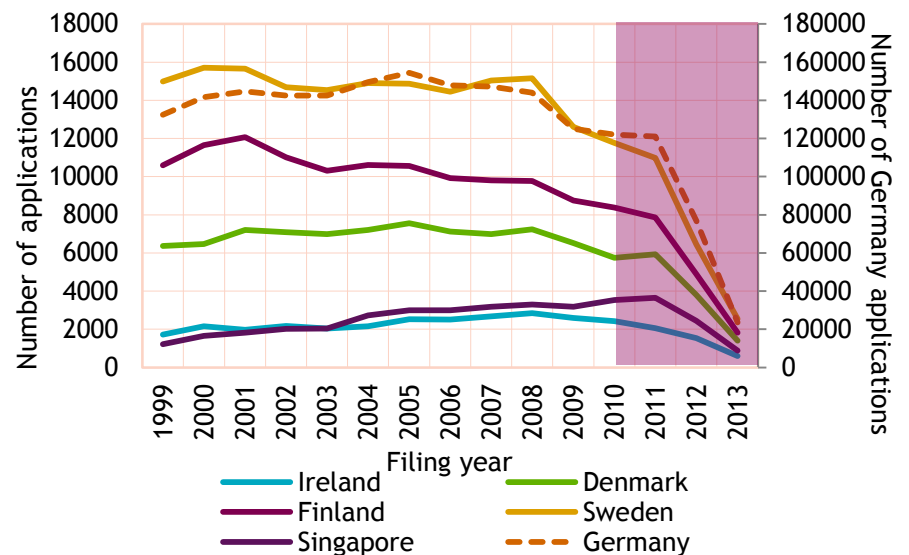


Figure 32: Applications by inventor country



3.4.2 Patent filing trends: Applicant country

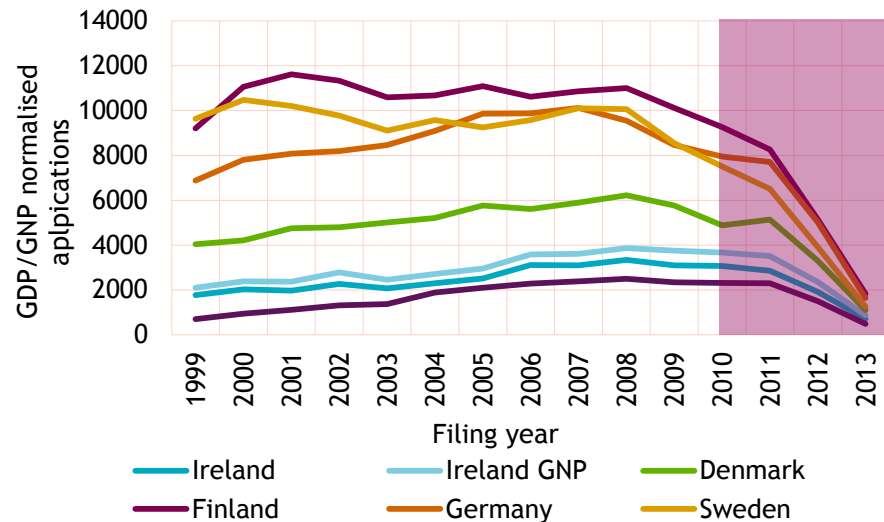
Country based analysis is normalised in order to make more appropriate country comparisons.

The number of applications filed per year has been presented for Ireland and the comparator countries discussed in section 2.2. These trends are shown for applicant country being listed within the patent application. This can consist of both indigenous companies and foreign-owned companies with a holdings company, subsidiary, or operations centre based in that country.

The applications have been normalised by two methods: GDP/GNP and population (see Appendix: Comparator countries normalisation).

Firstly, figure 33 (applicant country analysis) shows the number of applications normalised by GDP relative to Ireland's GDP. Also represented is the number of Irish applications normalised by Ireland's GNP relative to its GDP.

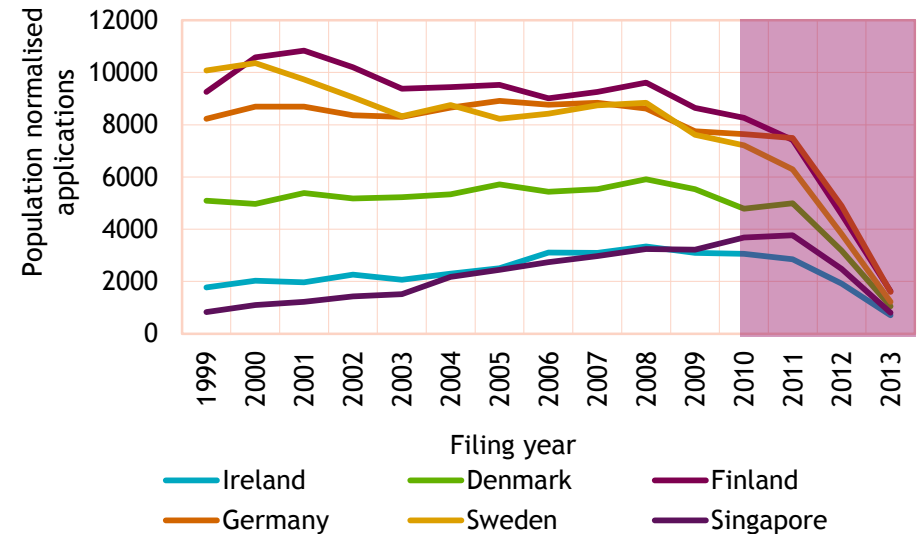
Figure 33: Annual patent trends by applicant country from 1999-2013: normalised by GDP/GNP (PPP constant 2011 Int\$)



Secondly, in figure 34 (applicant country analysis), the filings per year are represented for comparator countries' population relative to Ireland's population.

For both of these normalisation methods, Ireland comes fifth out of the six countries in terms of patent filings for each year. Singapore (sixth) is increasing in patent rates such that over the past three years it actually had a greater number of filing than Ireland (based on the data available).

Figure 34: Annual patent trends by applicant country from 1999-2013: normalised by population



3.4.3 Patent filing trends: Inventor country

Figure 35 (inventor country analysis) shows applications normalised by GDP relative to Ireland's GDP. Also represented is the number of Irish filings normalised by Ireland's GNP relative to its GDP.

Figure 36 (inventor country analysis) shows the filings per year for comparator countries' population relative to Ireland's population.

The inventor data tracks the applicant data in both of these normalisation methods: Ireland comes fifth out of the six countries in terms of patent filings for each year.

Singapore (sixth) is increasing in patent rates such that over the past three years it actually had a greater number of filing than Ireland (based on the data available).

Figure 35: Annual patent trends by inventor country from 1999-2013: normalised by GDP/GNP PPP (PPP constant 2011 Int\$)

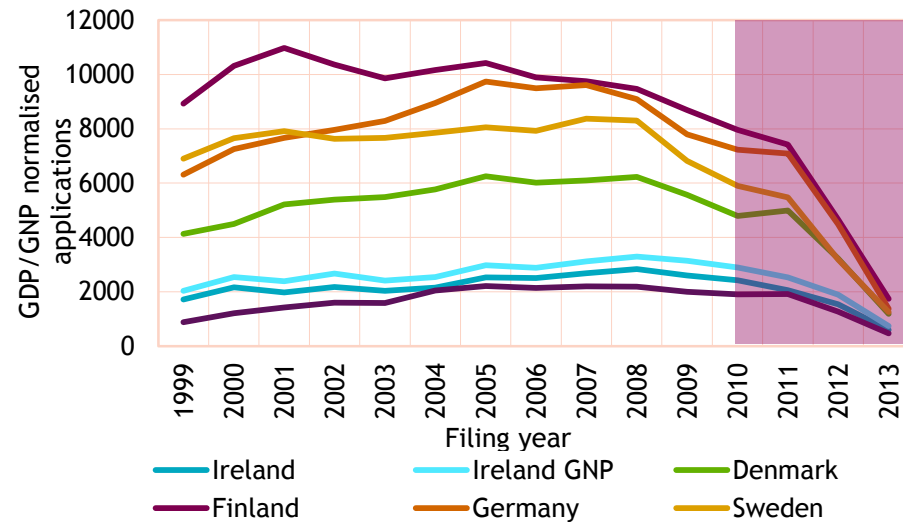
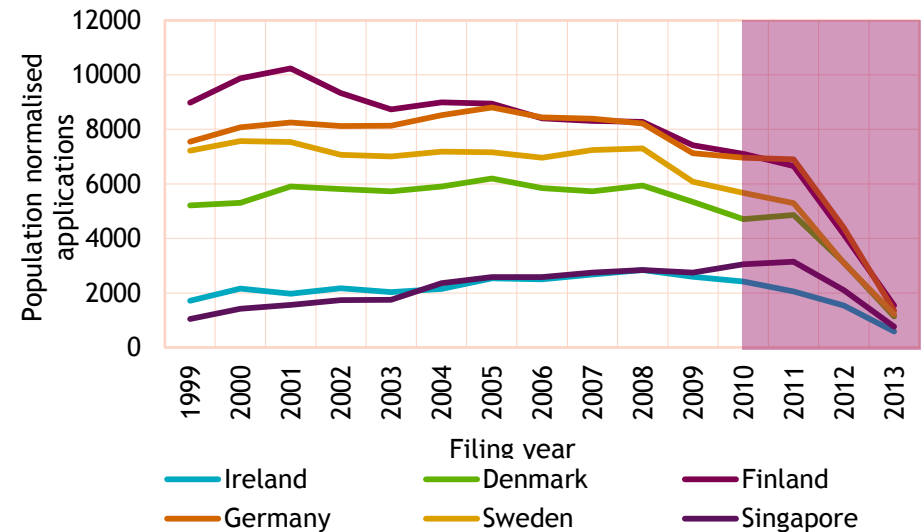


Figure 36: Annual patent trends by inventor country from 1999-2013: normalised by population



3.4.4 Family filing trends: Applicant country

A family of patents refers to a group of patents linking back to one priority patent. In the case for these simple patent families, they share identical priority documents or combinations of priority filings. Consequently, patent families can be used as a proxy for individual inventions; multiple patents filed in different jurisdictions but describing the same technologies are collapsed into a single family. This helps to extricate patent filing strategy and market flooding by large corporations from the innovation.

We can see from these filing trends that there is less of a drop off for countries throughout the time period, with Ireland showing steady growth, at a rate comparable to Singapore throughout. This is in contrast to the other comparator countries which show a stagnation, or in the case of Sweden, a decline over the period analysed.

Figure 37: Annual patent family trends by applicant country from 1999-2013

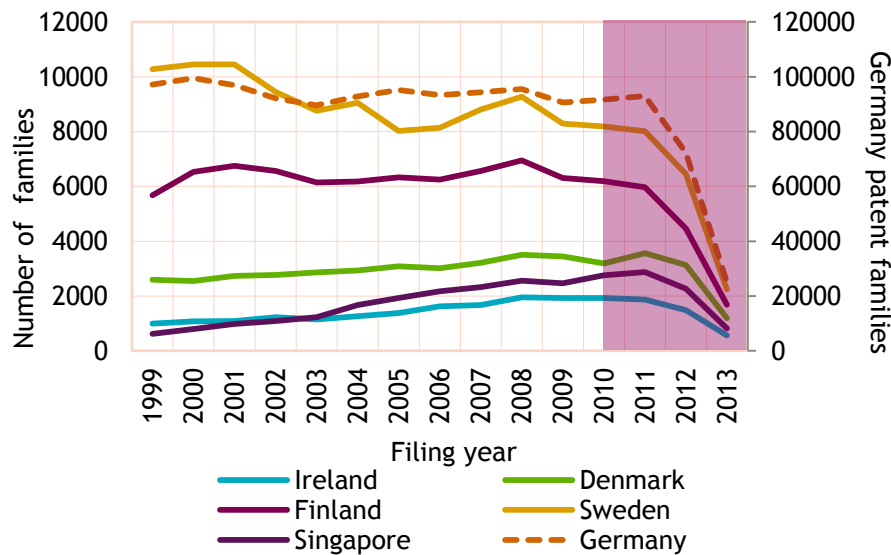


Figure 38: Annual patent family trends by applicant country from 1999-2013: normalised by GDP/GNP (PPP constant 2011 Int\$)

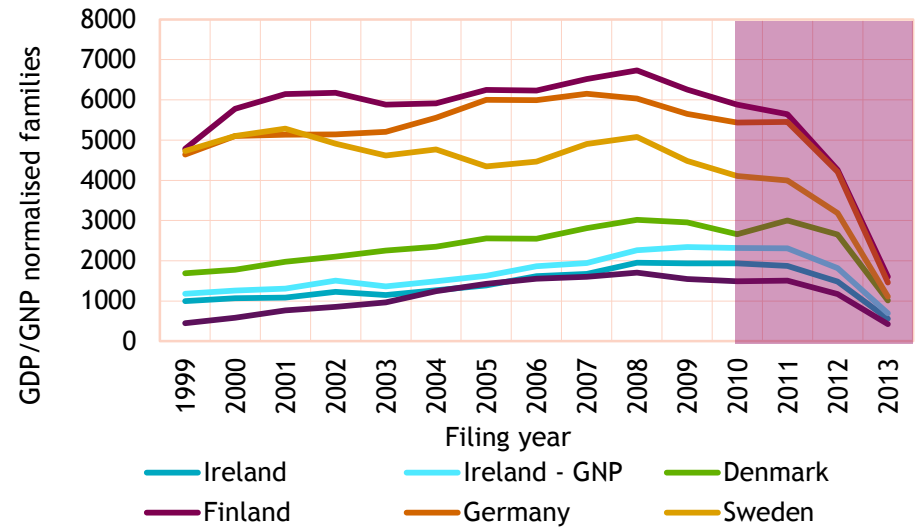
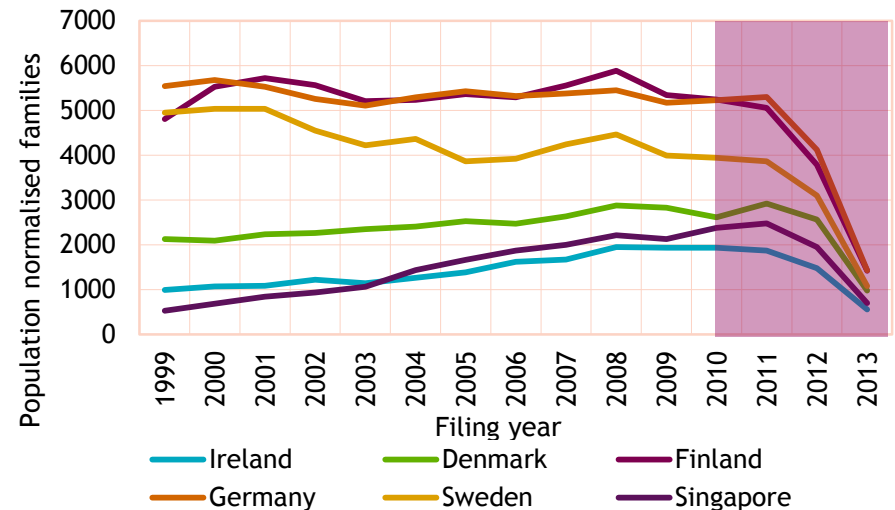


Figure 39: Annual patent family trends by applicant country from 1999-2013: normalised by population



3.4.5 Family filing trends: Inventor country

Similar to the applicant trends, we see slow rates of growth from inventors from Singapore and Ireland in contrast to the stagnation of other comparator countries . This appears to be slowly developing towards a convergence in the normalised data.

Figure 41: Annual patent family trends by inventor country from 1999-2013: normalised by GDP/GNP (PPP constant 2011 Int\$)

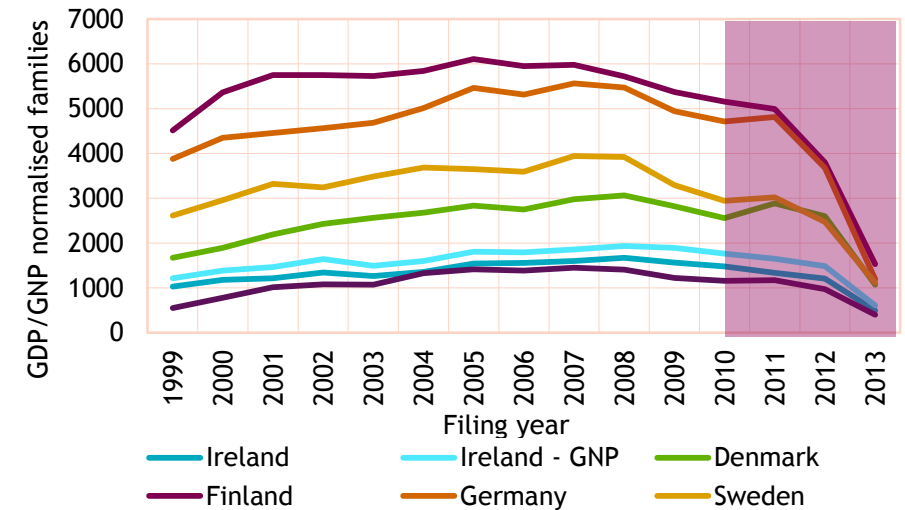


Figure 42: Annual patent family trends by inventor country from 1999-2013: normalised by population

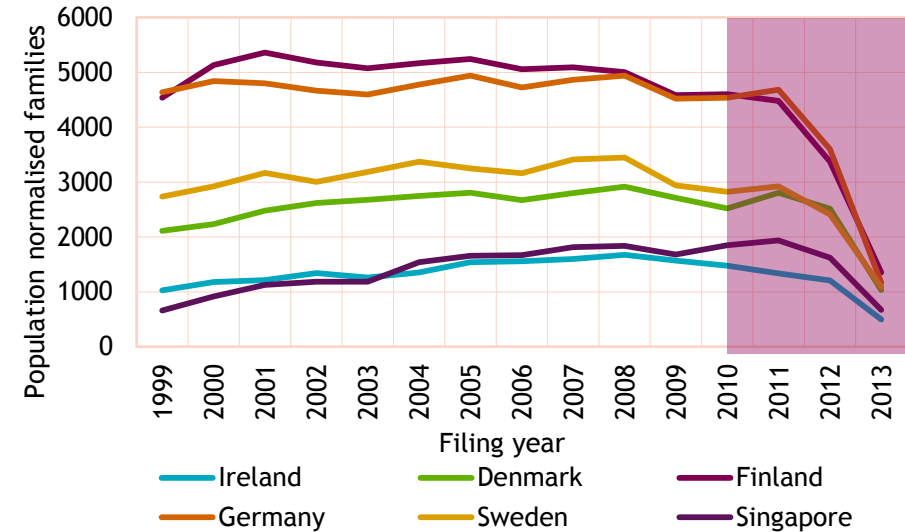
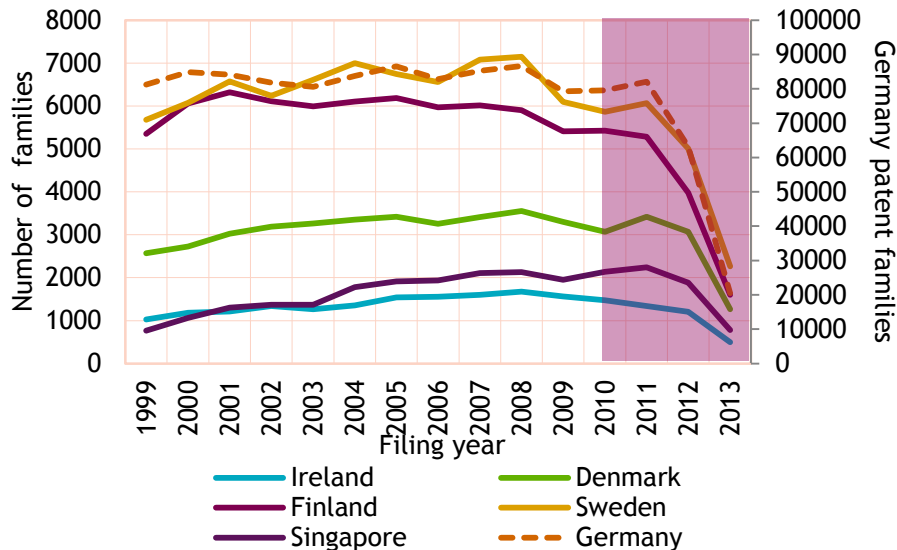


Figure 40: Annual patent family trends by applicant country from 1999-2013



3.4.6 Organisation type: Applicant country in 1999 - 2013

Figure 43: Ireland applicants by organisation type

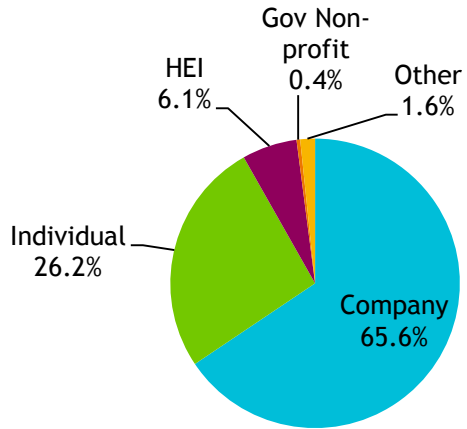


Figure 44: Denmark applicants by organisation type

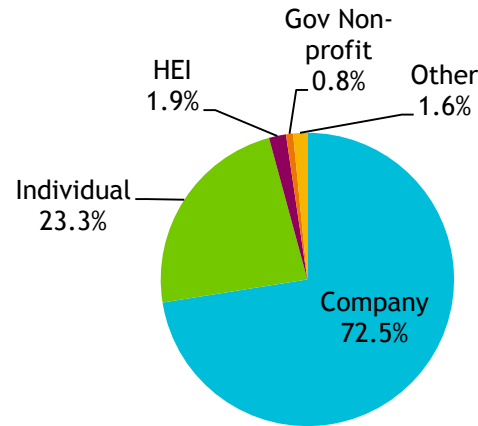


Figure 45: Finland applicants by organisation type

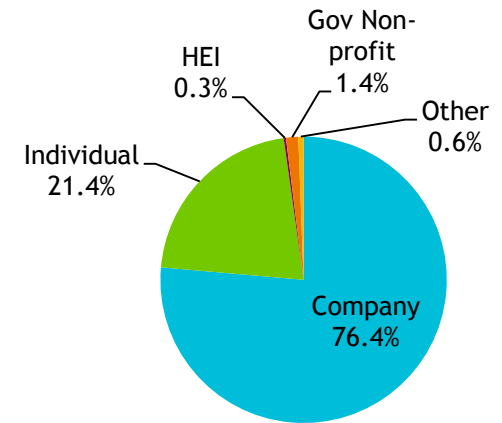


Figure 46: Germany applicants by organisation type

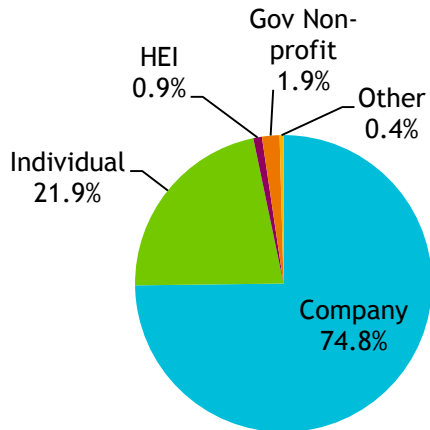


Figure 47: Sweden applicants by organisation type

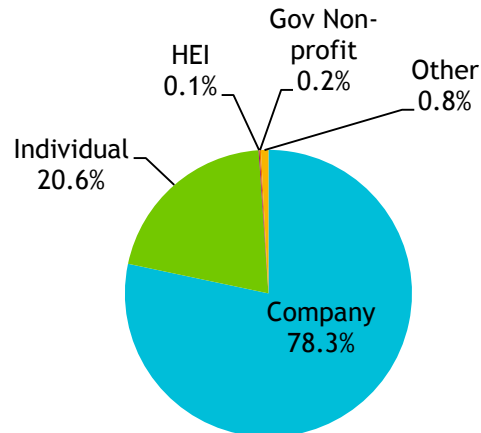
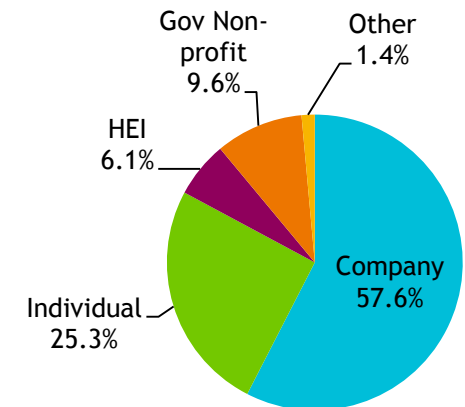
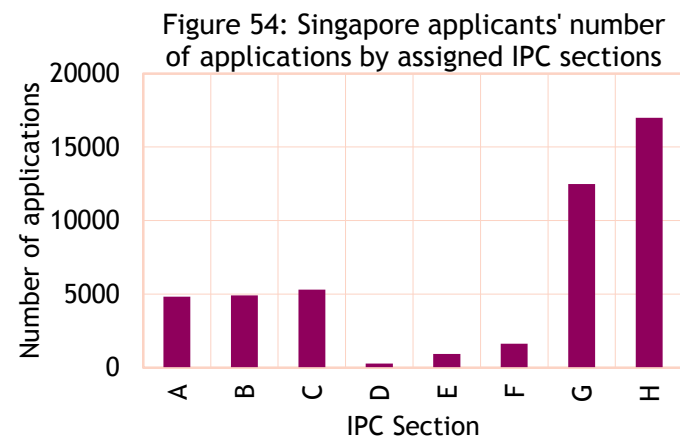
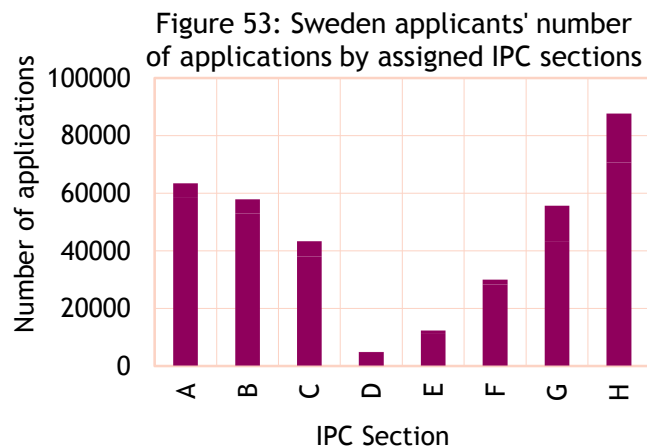
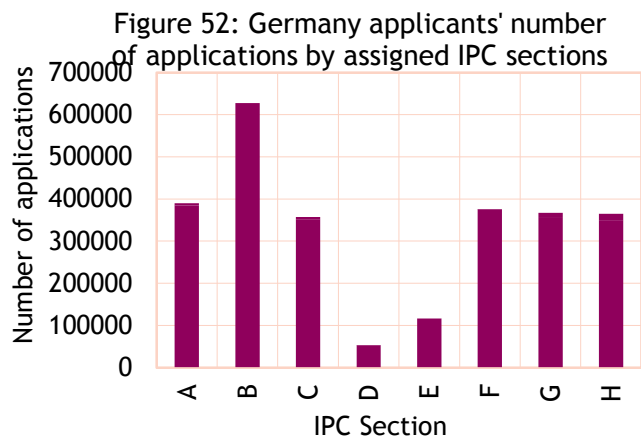
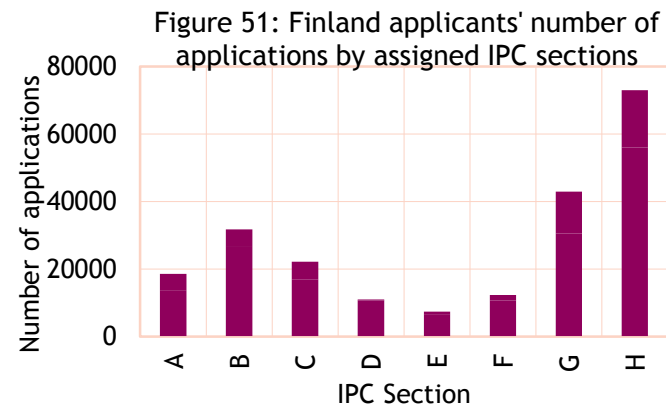
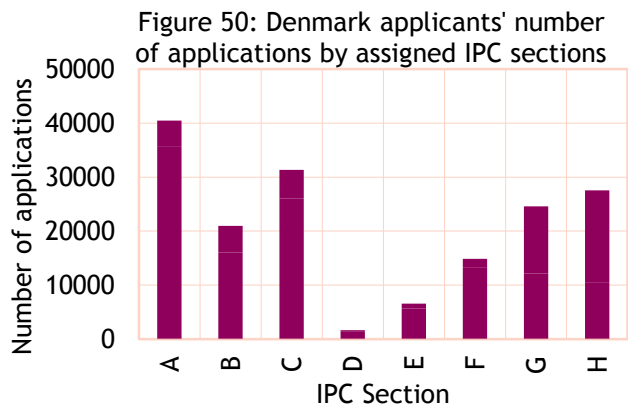
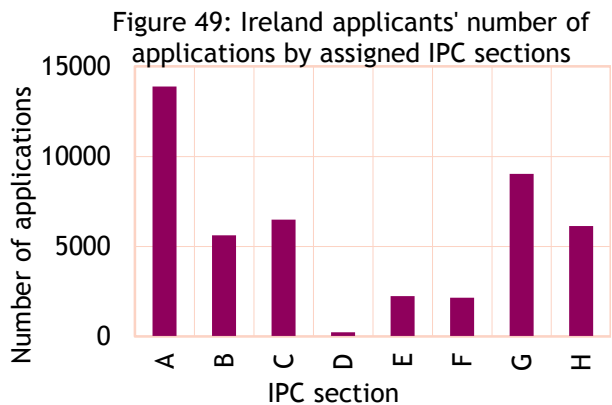


Figure 48: Singapore applicants by organisation type



3.4.7 IPC Sections: Cumulative volume by applicant country



Please note that there can be multiple IPC sections listed on a single patent application, and consequently overlaps result in more section occurrences than applications.

IPC section	Description	IPC section	Description
A	Human Necessities	E	Fixed Constructions
B	Performing Operations; Transporting	F	Mechanical Engineering; Lighting; Heating; Weapons; Blasting
C	Chemistry; Metallurgy	G	Physics
D	Textiles; Paper	H	Electricity

3.4.8 IPC Sections: Trends over time by applicant country

Figure 55: Ireland 1999 - 2005

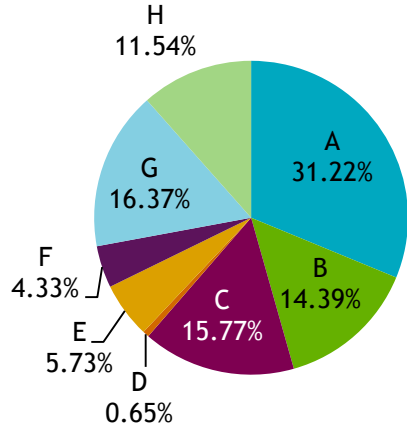


Figure 56: Denmark 1999 - 2005

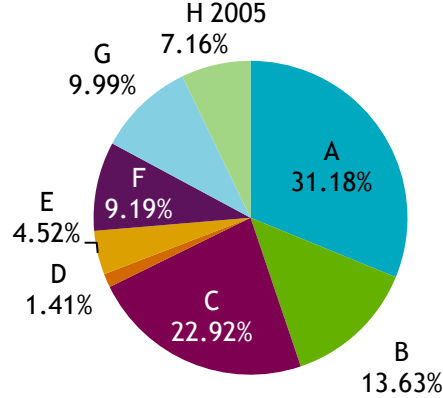


Figure 57: Finland 1999 - 2005

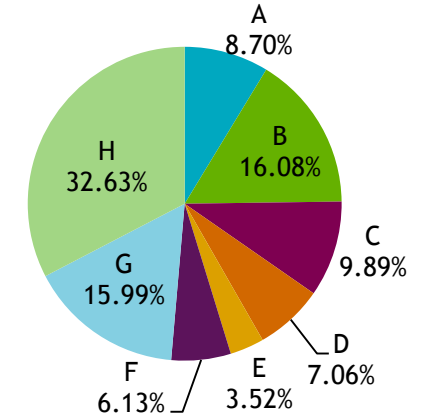


Figure 58: Ireland 2006 - 2013

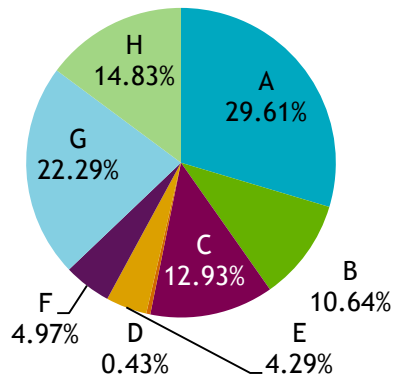


Figure 59: Denmark 2006 - 2013

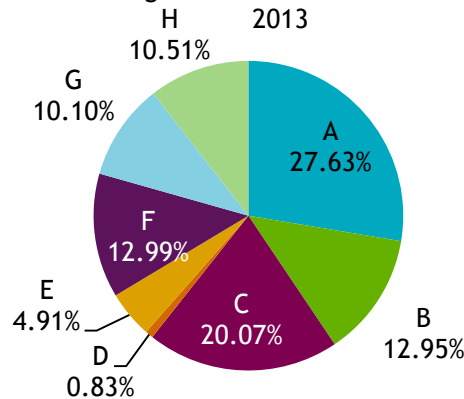
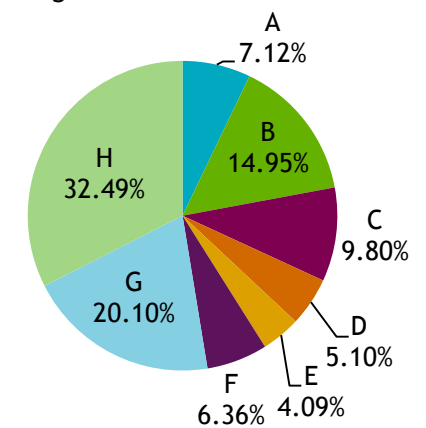


Figure 60: Finland 2006 - 2013



IPC section	Description	IPC section	Description
A	Human Necessities	E	Fixed Constructions
B	Performing Operations; Transporting	F	Mechanical Engineering; Lighting; Heating; Weapons; Blasting
C	Chemistry; Metallurgy	G	Physics
D	Textiles; Paper	H	Electricity

3.4.9 IPC sections: Trends over time by applicant country

Figure 61: Germany 1999 - 2005

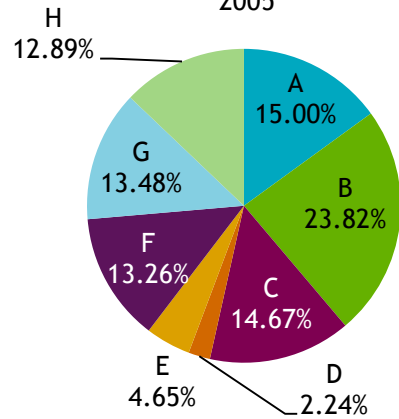


Figure 62: Sweden 1999 - 2005

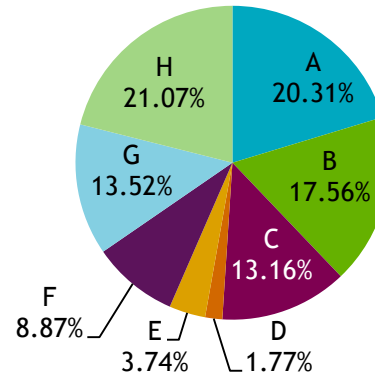


Figure 63: Singapore 1999 - 2005

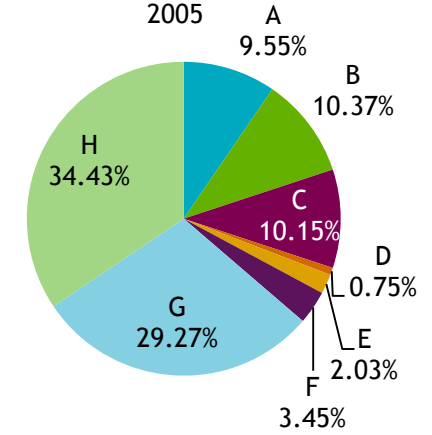


Figure 64: Germany 2006 - 2013

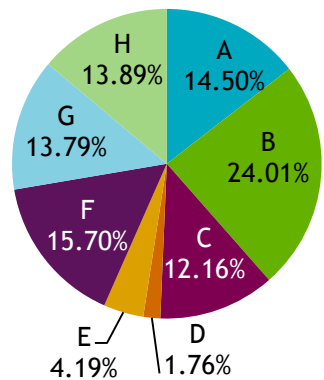


Figure 65: Sweden 2006 - 2013

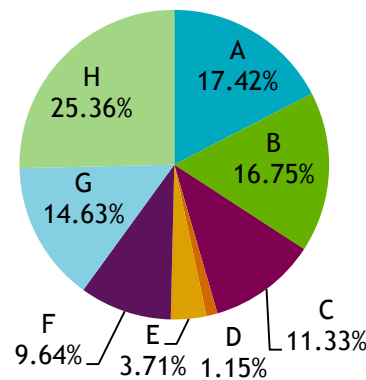
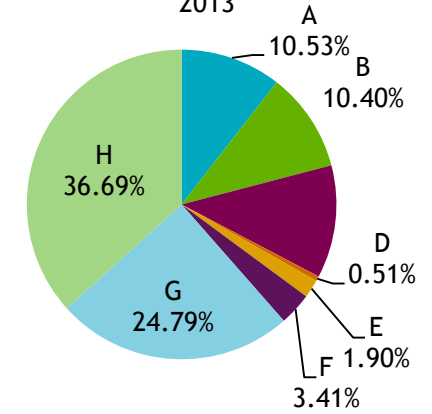


Figure 66: Singapore 2006 - 2013



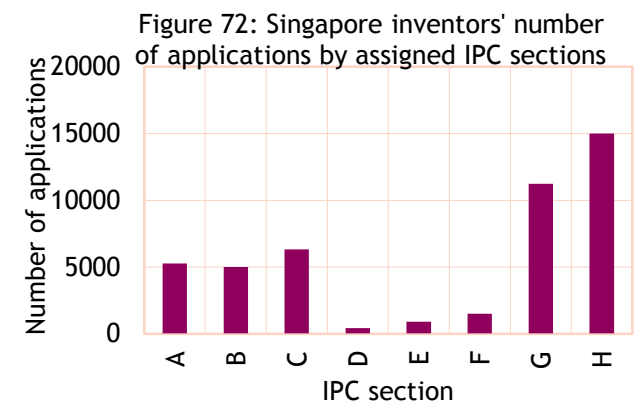
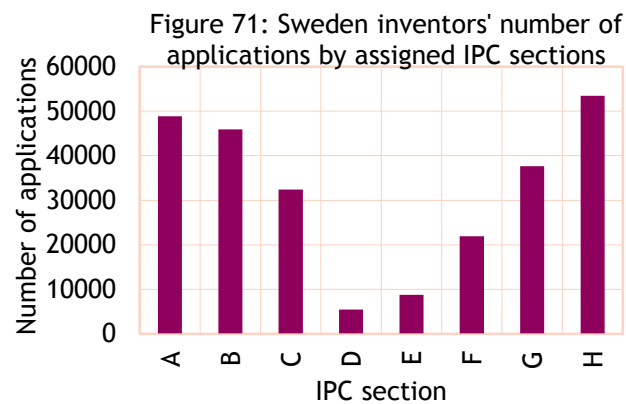
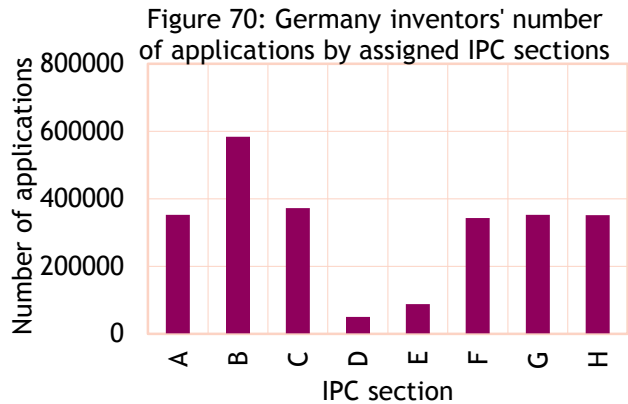
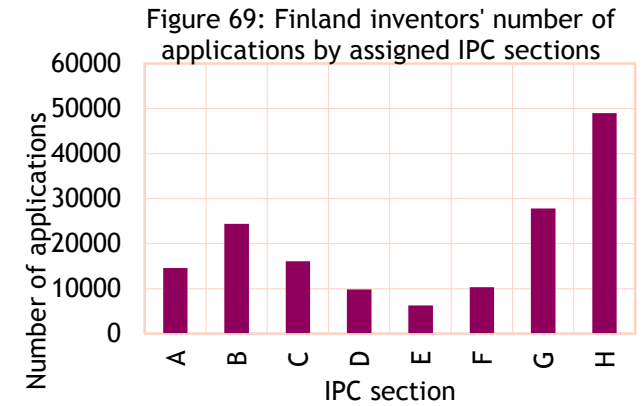
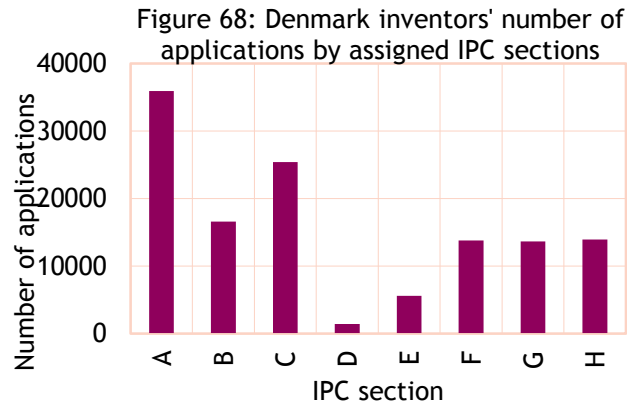
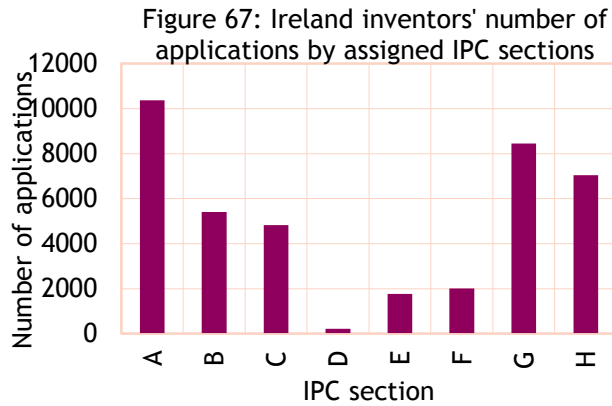
IPC section	Description	IPC section	Description
A	Human Necessities	E	Fixed Constructions
B	Performing Operations; Transporting	F	Mechanical Engineering; Lighting; Heating; Weapons; Blasting
C	Chemistry; Metallurgy	G	Physics
D	Textiles; Paper	H	Electricity

3.4.10 IPC sections: Applicant country

Ireland applicants' technology interests are focused on "human necessities" technologies, to a greater proportional extent than all other comparator countries. This is also true for Physics - with the exception of Singapore which demonstrates a higher proportion than Ireland in both time periods but for which there has been a decrease in proportion between the two time periods rather than the increase that has been seen in Ireland.

Ireland's patenting around computing has grown, as shown by the increase in IPC section G (Physics - containing computing technologies). This growth is not seen to this extent in the comparator countries, except for Finland.

3.4.11 IPC Sections: Cumulative volume by inventor country



Please note that there can be multiple IPC sections listed on a single patent application, and consequently overlaps result in more section occurrences than applications.

IPC section	Description	IPC section	Description
A	Human Necessities	E	Fixed Constructions
B	Performing Operations; Transporting	F	Mechanical Engineering; Lighting; Heating; Weapons; Blasting
C	Chemistry; Metallurgy	G	Physics
D	Textiles; Paper	H	Electricity

3.4.12 IPC Sections: Trends over time by inventor country

Figure 73: Ireland 1999 - 2005

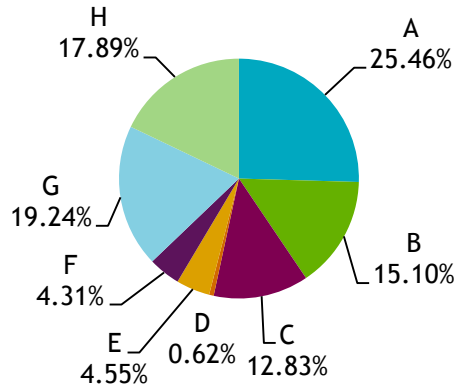


Figure 74: Denmark 1999 - 2005

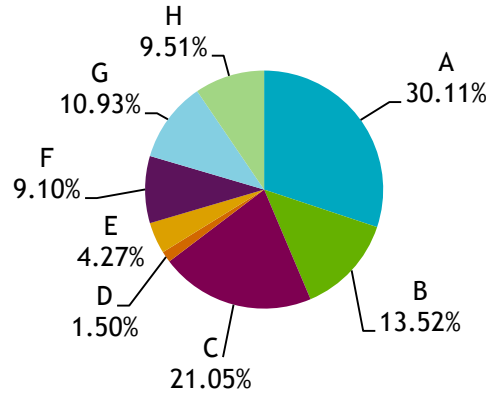


Figure 75: Finland 1999 - 2005

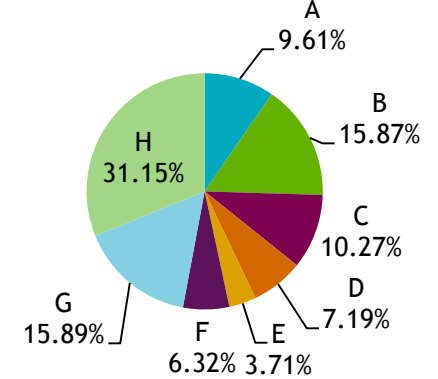


Figure 76: Ireland 2006 - 2013

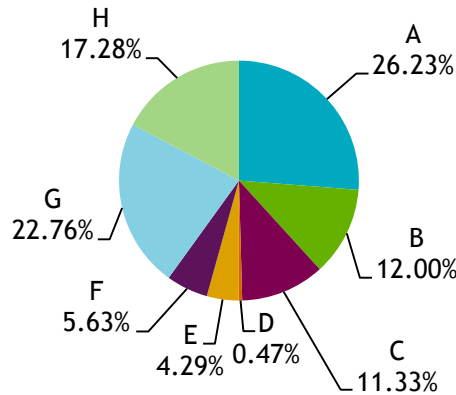


Figure 77: Denmark 2006 - 2013

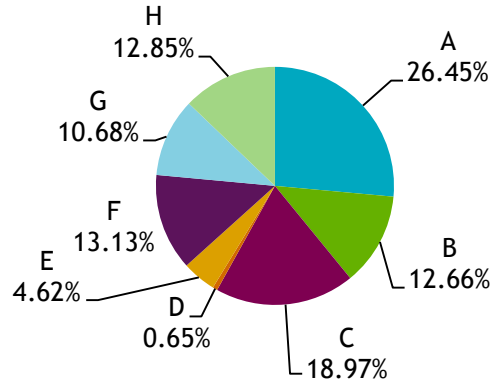
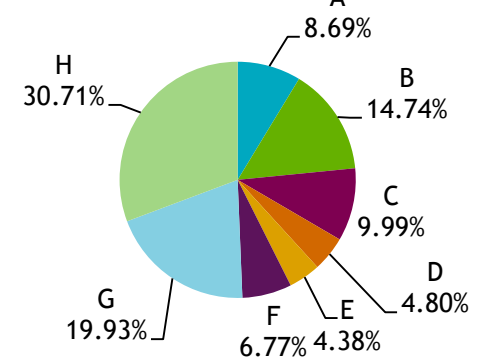


Figure 78: Finland 2006 - 2013



IPC section	Description	IPC section	Description
A	Human Necessities	E	Fixed Constructions
B	Performing Operations; Transporting	F	Mechanical Engineering; Lighting; Heating; Weapons; Blasting
C	Chemistry; Metallurgy	G	Physics
D	Textiles; Paper	H	Electricity

3.4.13 IPC Sections through time: Inventor country

Figure 79: Germany 1999 - 2005

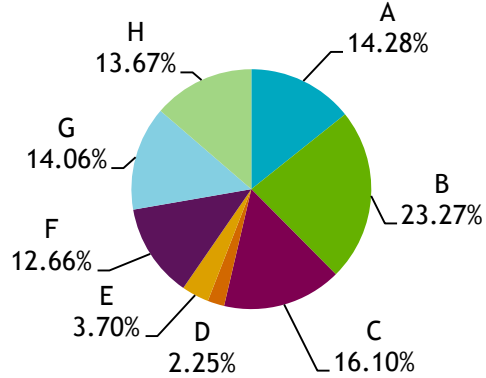


Figure 80: Sweden 1999 - 2005

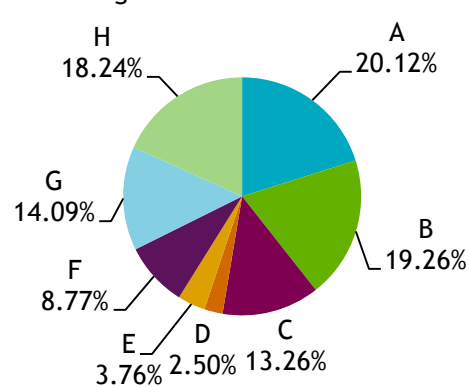


Figure 81: Singapore 1999 - 2005

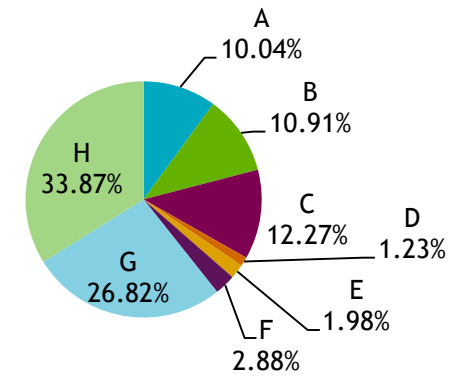


Figure 82: Germany 2006 - 2013

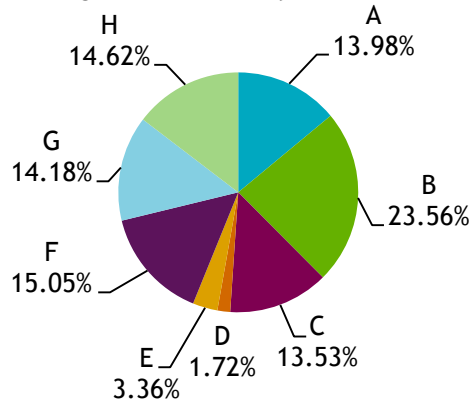


Figure 83: Sweden 2006 - 2013

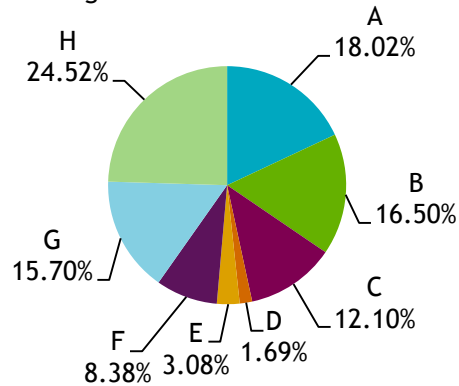
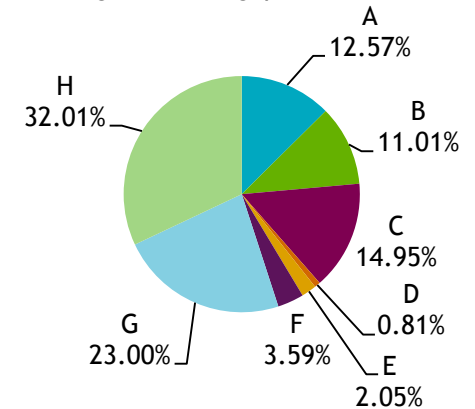


Figure 84: Singapore 2006 - 2013



IPC section	Description	IPC section	Description
A	Human Necessities	E	Fixed Constructions
B	Performing Operations; Transporting	F	Mechanical Engineering; Lighting; Heating; Weapons; Blasting
C	Chemistry; Metallurgy	G	Physics
D	Textiles; Paper	H	Electricity

3.4.14 IPC sections: Inventor country

Ireland inventors' technology interests are focused on "human necessities" technologies, to a greater proportional extent than all other comparator countries, in a similar way to the applicant country comparison.

However, in the case of inventor country, Ireland shows a small increase in proportions of "human necessities" technologies between the earlier and later time periods, which is against the trend for all other European comparator countries.

3.4.15 Grant rates: Applicant country

Figure 85: Ireland applicants granted vs non-granted

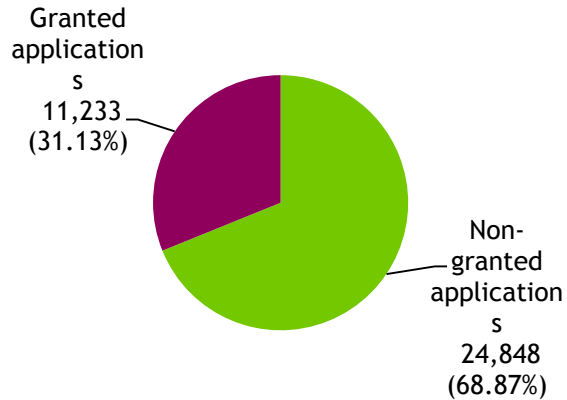


Figure 86: Denmark applicants granted vs non-granted

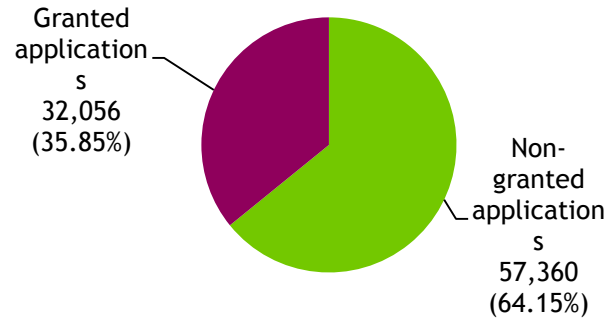


Figure 87: Finland applicants granted vs non-granted

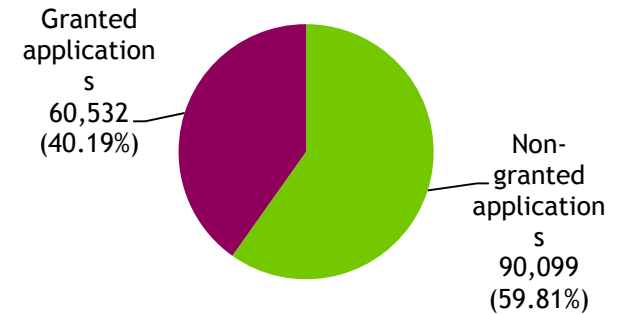


Figure 88: Germany applicants granted vs non-granted

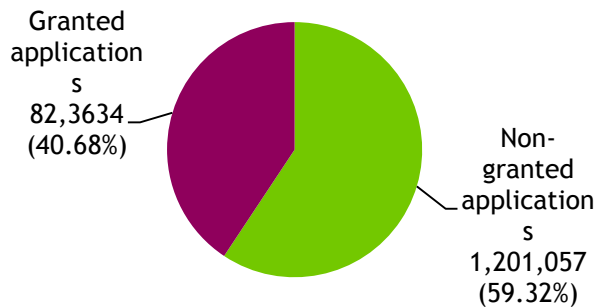


Figure 89: Sweden applicants granted vs non-granted

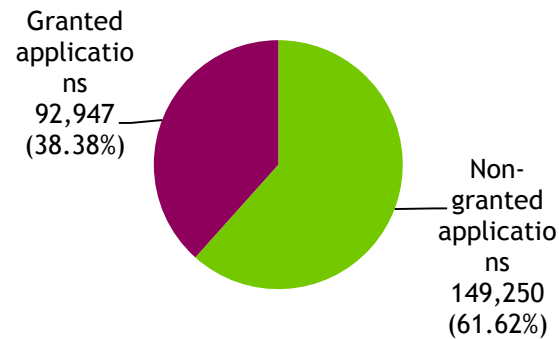
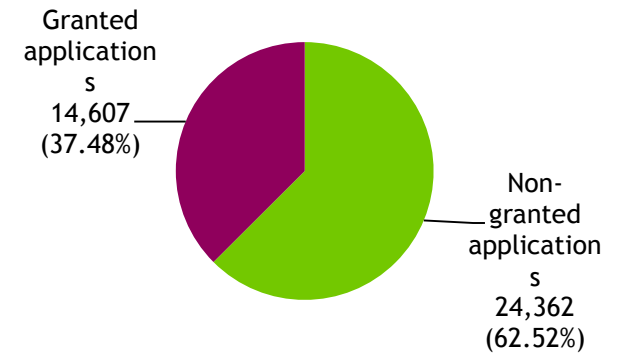


Figure 90: Singapore applicants granted vs non-granted



3.4.16 Grant rate trends: Applicant country

Patent filings grant rates*:

Figure 91: Ireland as applicant country patent grant rates

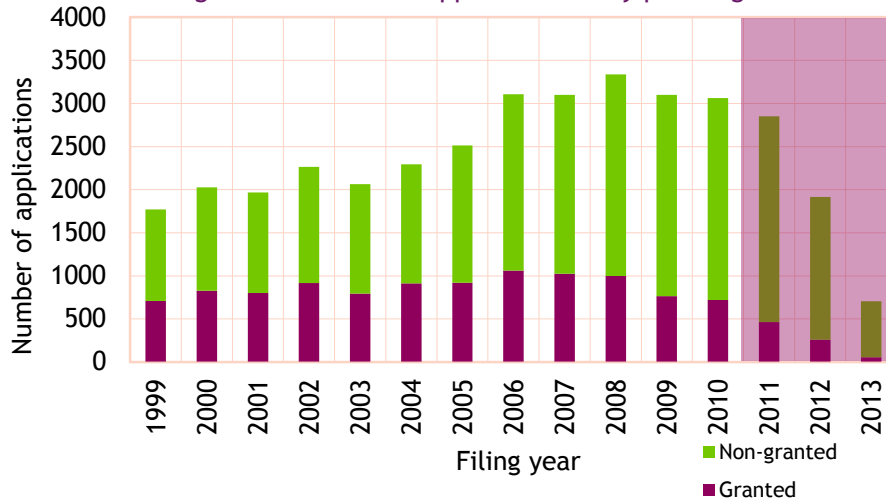


Figure 92: Denmark as applicant country patent grant rates

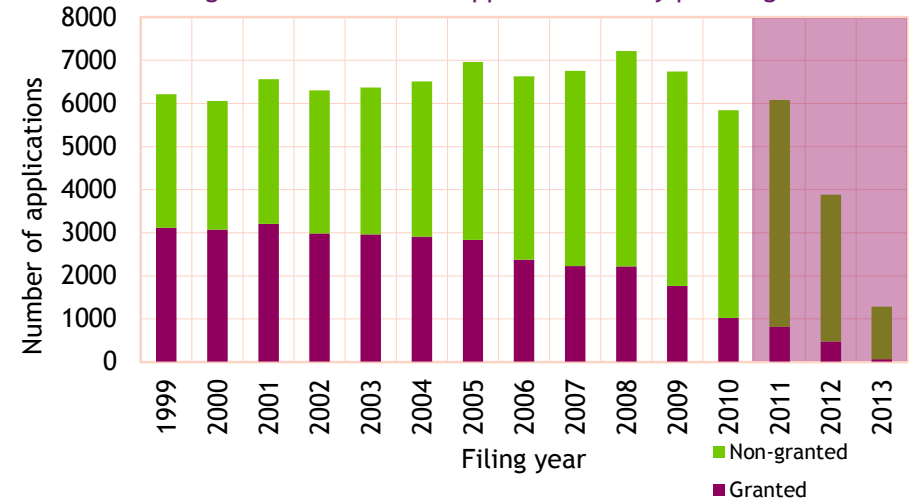


Figure 93: Finland as applicant country patent grant rates

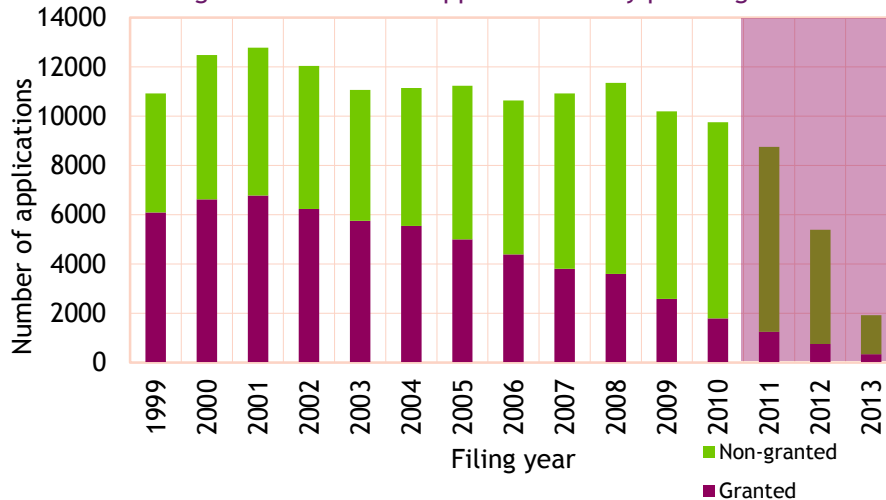
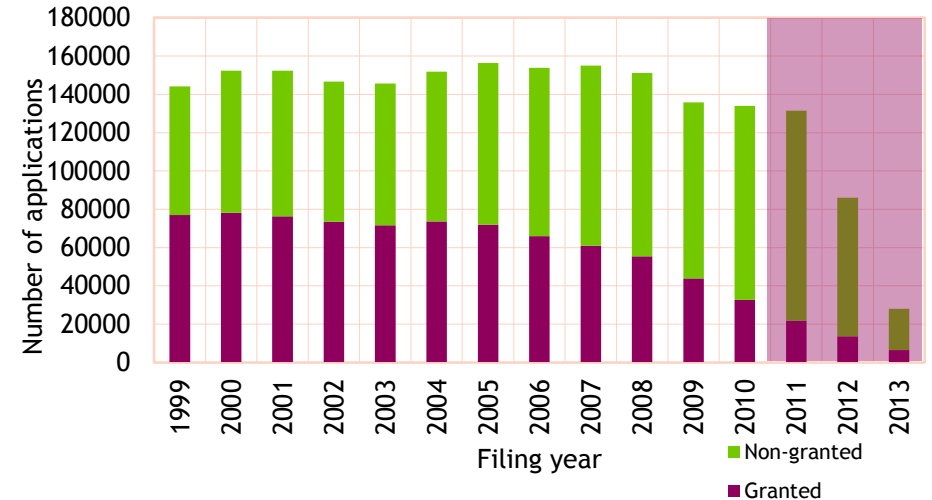
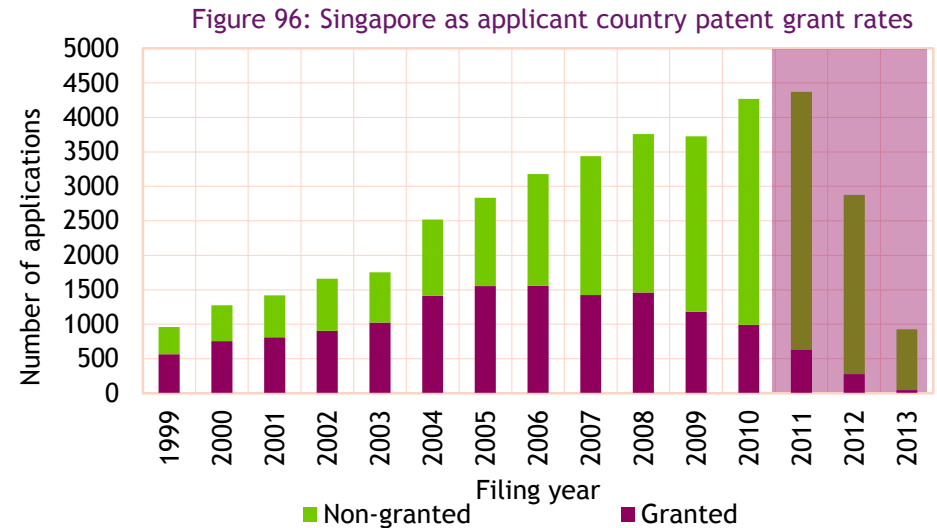
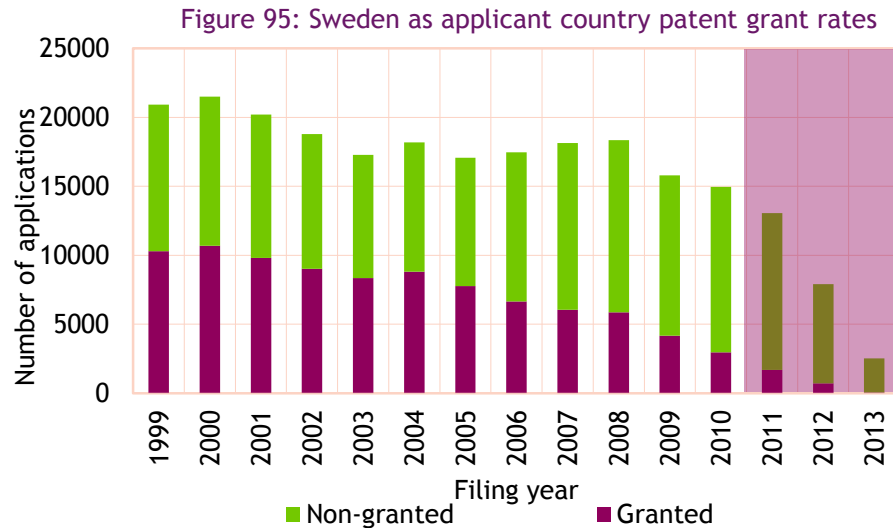


Figure 94: Germany as applicant country patent grant rates



*The granted patent numbers here are shown next to the non-granted patent applications filed in that year. The two are mutually exclusive, and the sum of the two is the total number of patent applications filed in that year

3.4.17 Grant rate trends: Applicant country



These graphs of granted applications versus non-granted applications show very different trends for the different comparator countries.

Grant rates always decrease as one looks to more recent years due to pending applications from previous years taking several years to grant in some jurisdictions. Consequently, it is hard to make any hard judgements of more recent years' granting rates.

Non-granted patents can be pending applications, applications with unpaid examination fees, refused patents or revoked patents.

Ireland exhibits a grant rate which is lower than for the comparison countries, with only 31% of filed applications being granted for Irish applicants. This compares to the average of 39% for the comparator countries taken as equal weight. This low value for Ireland can be seen to be a combination of an increase in filings up to 2006, but with a non-increasing number of granted patents. Consequently from 2006, a greater proportion have not been granted.

Other comparator countries have experienced a similar, but more distinct and

sustained drop in grant rates coupled with a maintained high volumes of filing, particularly noticeable for Finland and Denmark.

Singapore saw the only growth in granting rates, but this has now reduced with marked increases in their patenting activity over the last ten years not matched by grant rates.

3.4.18 Grant rates: Inventor country

Figure 97: Ireland inventors granted vs non-granted

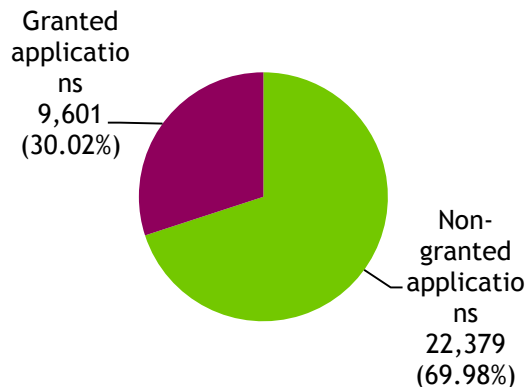


Figure 98: Denmark inventors granted vs non-granted

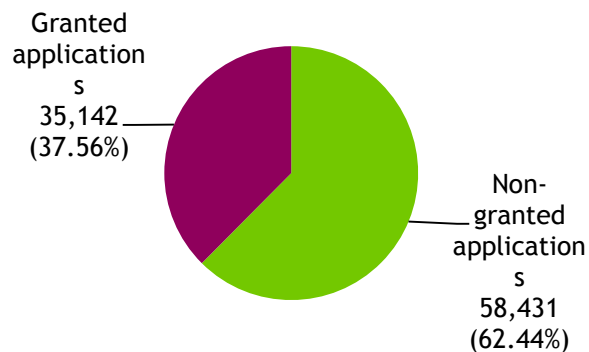


Figure 99: Finland inventors granted vs non-granted

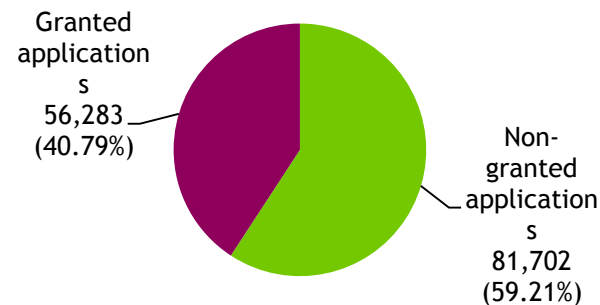


Figure 100: Germany inventors granted vs non-granted

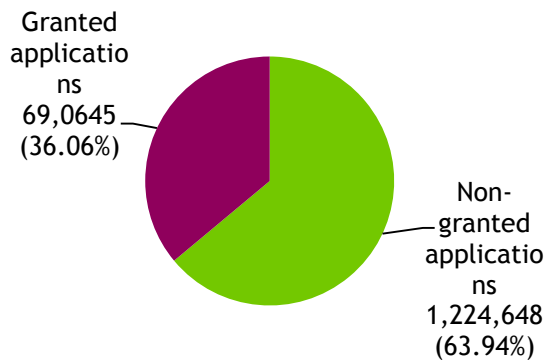


Figure 101: Sweden inventors granted vs non-granted

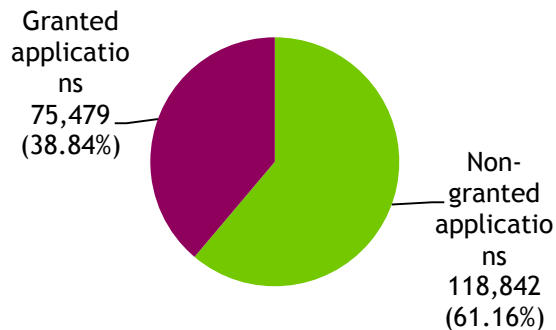
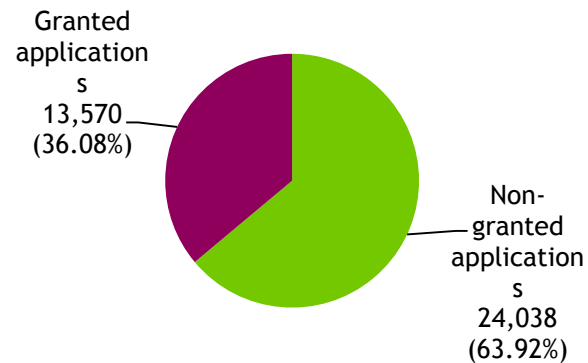
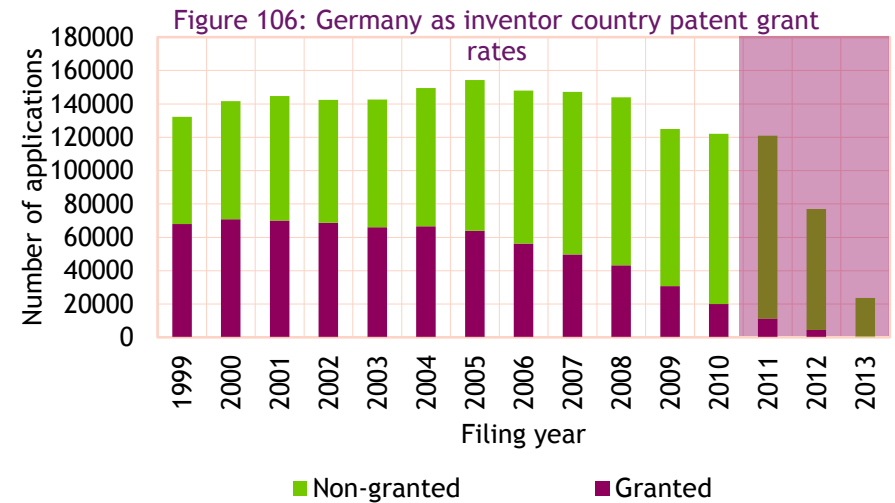
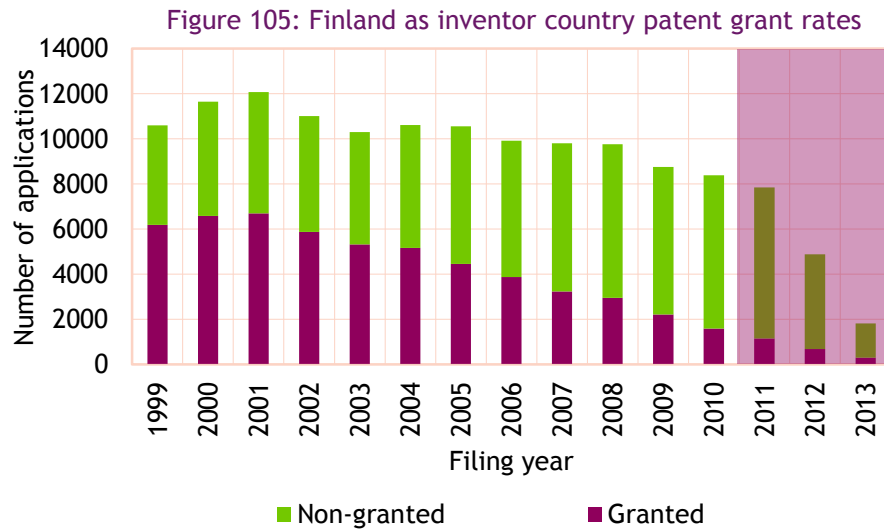
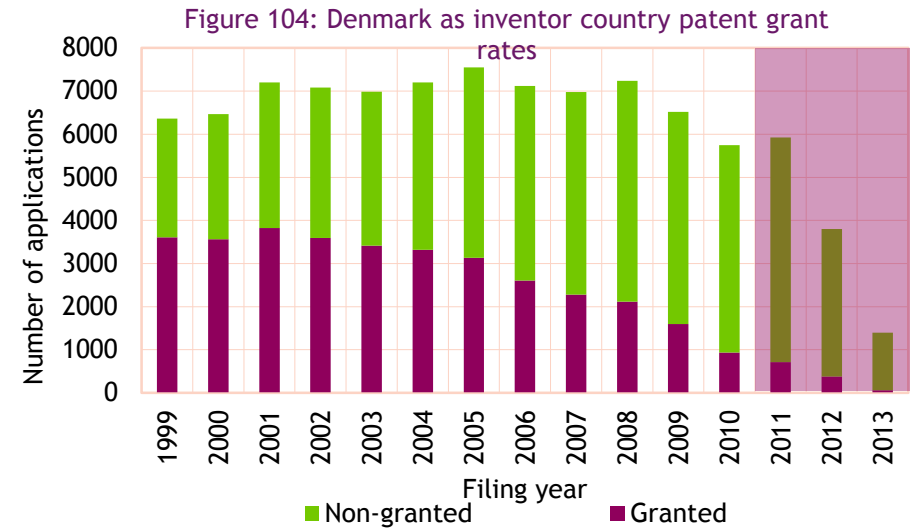
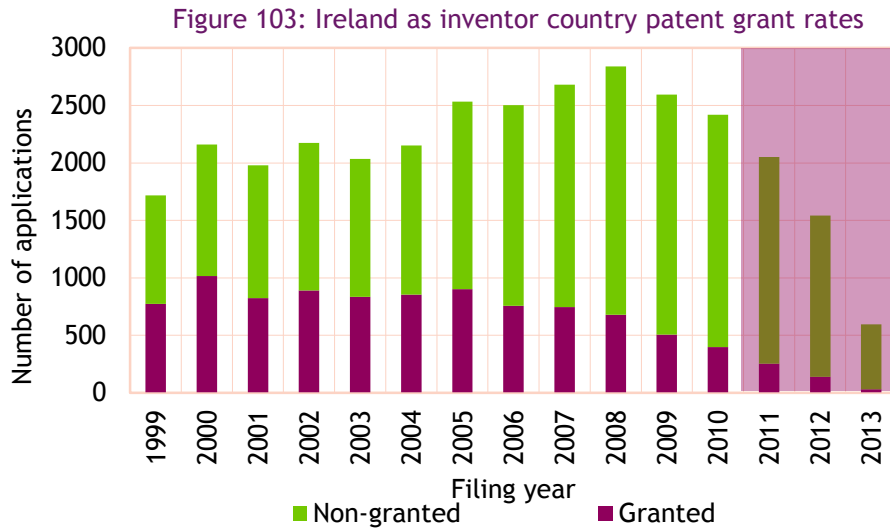


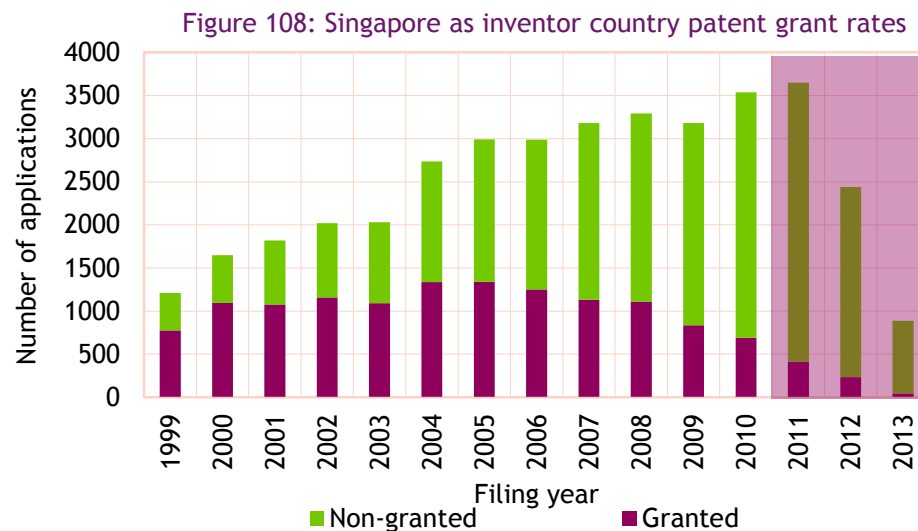
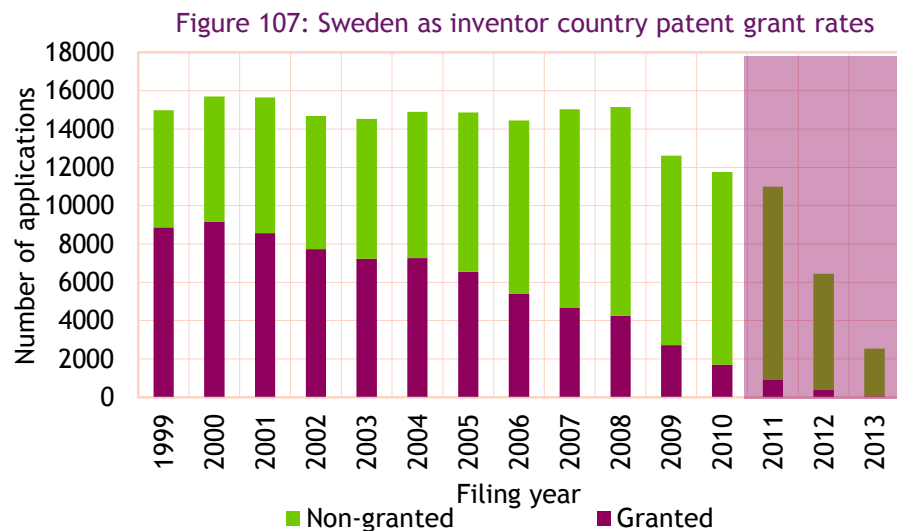
Figure 102: Singapore inventors granted vs non-granted



3.4.19 Grant rate trends: Inventor country



3.4.20 Grant rate trends: Inventor country



These graphs of granted applications versus non-granted applications for inventor country show similar trends as observed for applicant country; exhibiting a grant rate which is lower than for the comparison countries, with only 30% of filed applications being granted for Irish applicants. This compares to the average of 38% for the comparator countries. This low value for Ireland can be seen to be a combination of an increase in filings up to 2008, but with a non-increasing number of granted patents. Consequently a greater proportion have not been granted in 2008 (24%).

Other comparator countries have experienced a distinct and sustained drop in grant rates coupled with maintained high volumes of filing, particularly noticeable for Sweden and Denmark, leading to respective grant rates of 28% and 29% in 2008 - considerably lower than their averages of 39% and 38% over the whole period.

Singapore saw the only growth in granting rates, but this has now reduced with marked increases in their patenting activity over the last ten years not matched by grant rates.

3.5.1 Co-applicant filing: Irish applicants

Table 21: Top ten Irish applicants by patent filings with any nationality co-applicants

Applicant	Organisation type	Nr of patent filings
Tibotec Pharma Ltd***	Company	178
National University of Ireland	HEI	173
Trinity College Dublin	HEI	119
Elan Pharma Ltd	Company	108
Alimentary health Ltd	Company	94
Janssen Alzheimer immunotherapy	Company	85
University College Cork	HEI	66
University College Dublin	HEI	61
Depuy Ireland Ltd	Company	54
IVAX Pharmaceuticals Ireland**	Company	51

Table 23: Top ten Irish applicants by patent filings with Irish co-applicants

Applicant	Organisation type	Nr of patent filings
University College Cork	HEI	47
National University of Ireland	HEI	47
University College Dublin	HEI	36
Enterprise IE (Bioresearch IE)	Government Institute	30
Trinity College Dublin	HEI	26
TEVA Pharmaceuticals Ireland	Company	24
IVAX Pharmaceuticals Ireland**	Company	21
Teagasc Agric Food Dev Authority	Government Institute	17
Fournier Lab Ireland Ltd	Company	15
University of Limerick	HEI	14

* The National University of Ireland was historically assigned for all colleges within that federal university system, and therefore this is an aggregation of various institutions.

Table 22: Top ten Irish applicant, foreign co-applicant pairings

Applicant	Co-applicant	Nr of patent filings
Tibotec Pharma Ltd	Medivir AB	130
Janssen Alzheimer immunotherapy	Wyeth LLC	66
Alimentary health Ltd	IAMS Company	47
Elan Pharma Ltd	Wyeth Corp.	44
National University of Ireland	Degussa	43
Alimentary health Ltd	Procter & Gamble	34
Loctite	Henkel Corp.	27
Element Six Ltd	Baker Hughes Inc	25
Trinity College Dublin	Texas A&M University	24
Trinity College Dublin	Inhibitex Inc	20

Table 24: Top ten Irish applicant, Irish co-applicant pairings

Applicant	Co-applicant	Nr of patent filings
University College Cork	Teagasc	23
IVAX pharmaceuticals Ireland**	Norton Waterford***	21
Enterprise IE (Bioresearch IE)	University College Cork	16
Fournier lab Ireland Ltd	Elan Pharma Ltd	14
Enterprise IE (Bioresearch IE)	National University of Ireland	13
National University of Ireland	Digitaloptics	13
National University of Ireland	Trinity College Dublin	7
Dublin inst of technology	Minmet PLC	5
Janssen Alzheimer immunotherapy	Neotope biosciences ltd	5
National Digital Research Centre	University College Dublin	5

** IVAX Pharmaceuticals was acquired by Teva Pharmaceuticals in 2006

*** Norton Waterford merged with IVAX in 2001

**** Tibotec was acquired by Johnson and Johnson in 2002

3.5.1 Co-applicant filing: Irish applicants

The entities with the greatest number of co-applicants within Ireland are shown in table 21, which presents the number of patent filings that each Irish organisation has applied for with another entity of any nationality as co-applicant.

Table 22 shows co-applicant filings from Irish applicants and Irish co-applicants. HEIs and government research institutes account for seven of these top ten.

Table 23 shows the individual pairings for Irish applicants and foreign co-applicants: in this case corporate entities dominate the list.

Table 24 shows the individual pairings for Irish applicants and Irish co-applicants. From this we can see a large number of co-applications between HEIs and Government research institutes.

3.5.2 Co-applicant filing: Network analysis

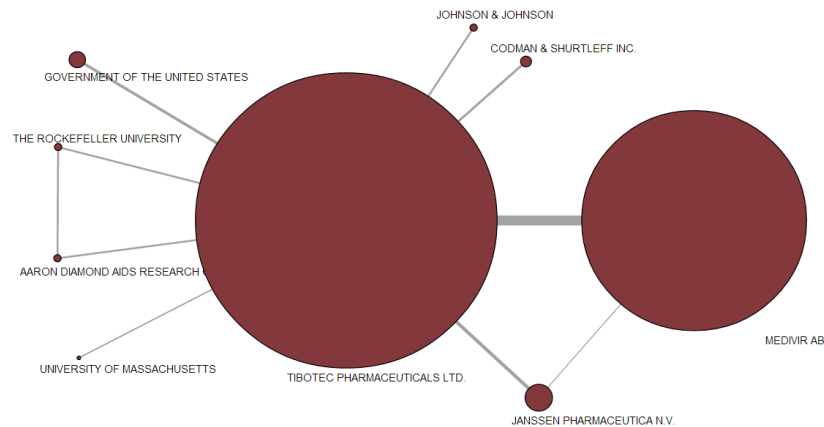
Network analysis provide a visual representation of the collaboration and co-filing activities of patent assignees.

The node size is representative of the number of patents filed, and the thickness of the line is representative of the number of connections where the entities have co-filed a patent. We have visualised the patent networks for Tibotec and the University of Cork, as they are top Irish applicants patenting with any nationality and the top Irish applicant* by patent filings with Irish co-applicants, respectively.

Figure 102 represents the patent applicant network for Tibotec. As indicated, their largest co-applicant is Medivir by a large margin. Their network also shows that they have co-patented with three (3) other companies and four HEI/Government/Research Institutes.

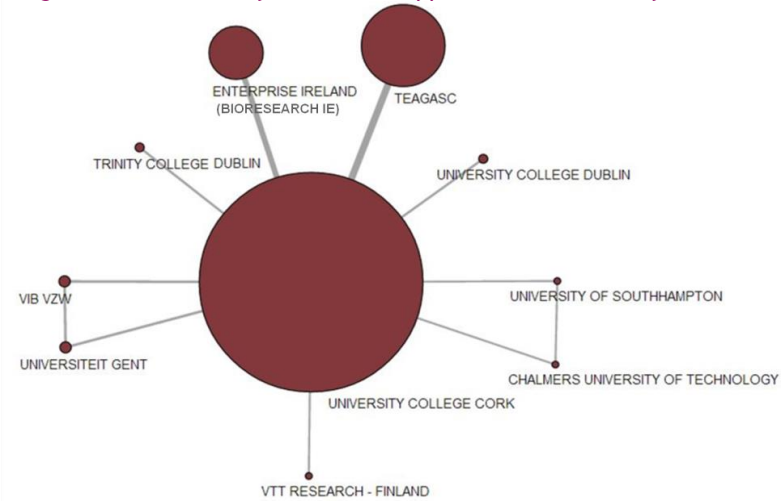
Figures 110a-d represent the patent applicant networks for the top collaborating

Figure 109: Tibotec* co-applicant network analysis



Irish HEIs. Figure 110a shows the applicant network for the University of Cork. The network analysis indicates that there are nine (9) co-applicants in the network, the most prevalent collaborative network being with Teagasc. All of the co-applicants of the University of Cork are HEI/Government/Research Institutes.

Figure 110a: University of Cork co-applicant network analysis



* The National University of Ireland was historically assigned for all colleges within that federal university system, and therefore this is an aggregation of various institutions.

** Tibotec was acquired by Johnson and Johnson in 2002

Figure 110b represents the patent applicant network for Trinity College Dublin. As indicated, their largest co-applicants are The Texas A & M University system and Inhibitex. Their network also shows that they have co-patented with a variety of other companies and four HEI/Government/Research Institutes.

Figure 110c represents the patent applicant network for the University College Dublin. The network analysis indicates that there are eight (8) co-applicants in the network, the most prevalent collaborative network being with Trinity College Dublin. American Biogenetic Sciences Inc. and Clearstone Technologies Limited are the only entities which are not HEI/Government/Research Institutes.

Figure 110d represents the patent applicant network for University of Limerick. The network analysis indicates there are nine (9) co-applicants in the network. Notably there are two Polish Universities: Wroclaw Medical University and Wroclaw University of Technology.

Figure 110b: Trinity College Dublin co-applicant network analysis

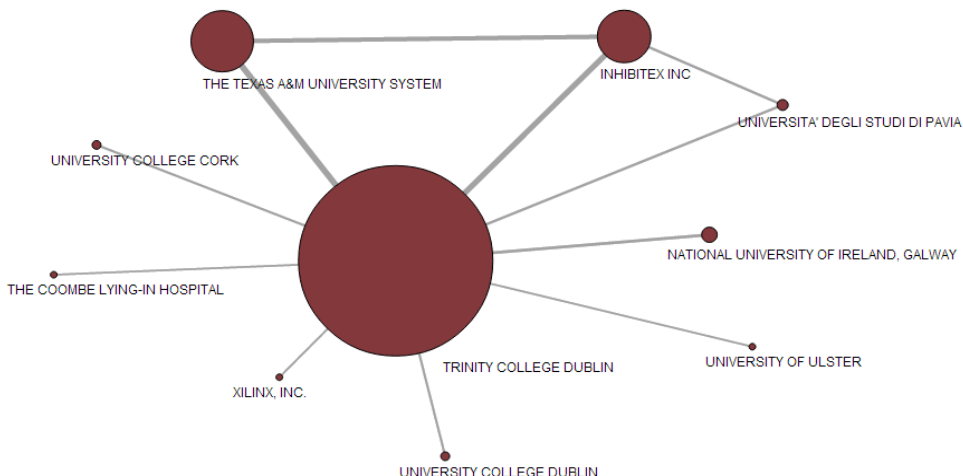


Figure 110c: University College Dublin co-applicant network analysis

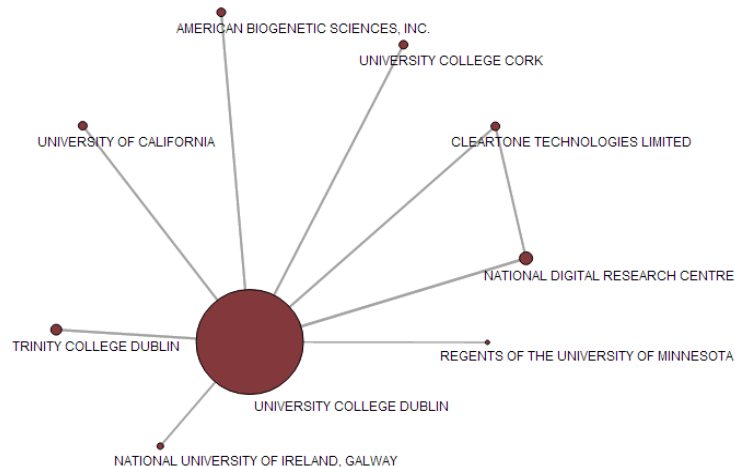
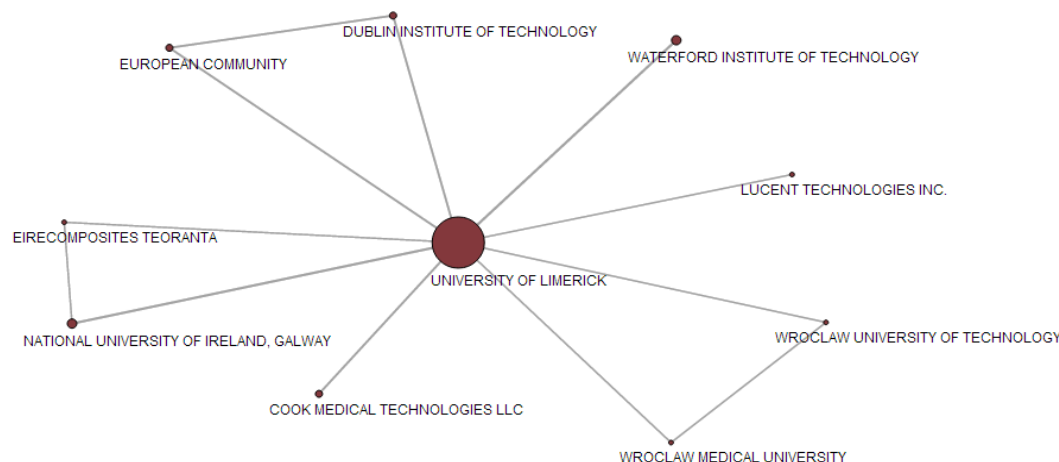


Figure 110d: University of Limerick co-applicant network analysis

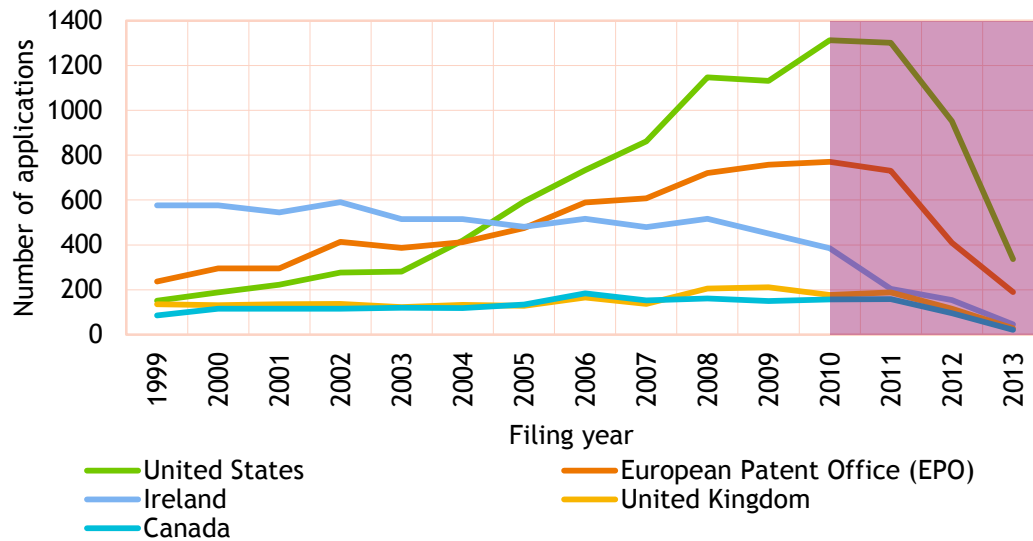


* The National University of Ireland was historically assigned for all colleges within that federal university system, and therefore this is an aggregation of various institutions.

3.5.3 Filing geography: Irish applicants

Figure 111 shows the patent application filings of Irish applicants over time. The graph indicates Ireland as a primary filing locations until 2004, from which point the United States and the EPO begin to emerge as more dominant filing offices. The data indicates a preference for filing in the EPO over national offices in recent years.

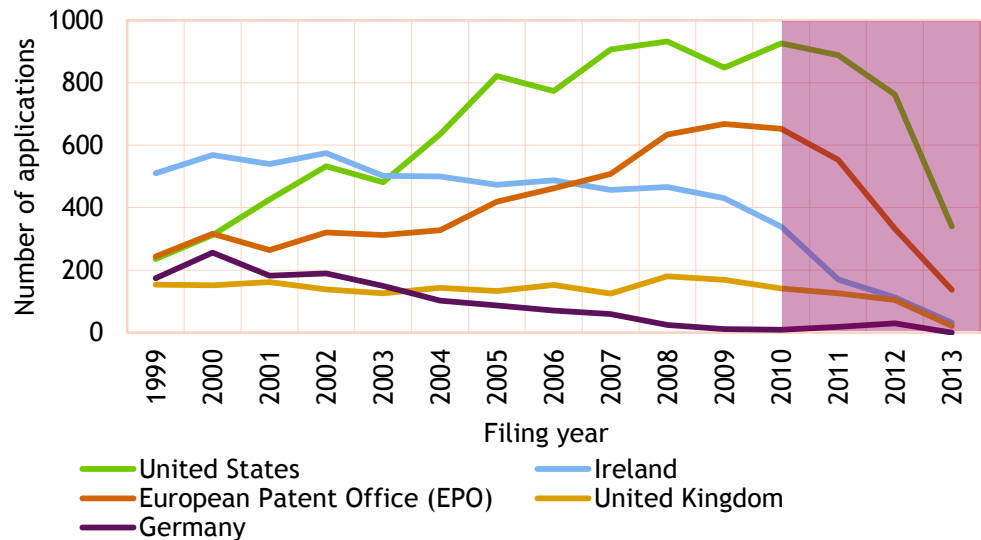
Figure 111: Patent applications over time by Irish applicants in the top five filing offices



3.5.4 Filing geography: Irish inventors

Figure 112 shows patent applications for Irish inventors by filing location. As indicated on the graph up until 2003 Ireland was the most popular filing location, however since 2003 the US has continued to rise as a primary filing location, followed by the growth of the EPO as a regional filing office for European patent filings.

Figure 112: Patent applications by Irish inventors over time in the top five filing offices



3.5.5 Combinations of applicant and inventor origin

Combining the origin of applicant and inventor in different ways reveals information about different aspects of the Irish patenting community.

Looking at filings that list both an applicant and an inventor as Irish, or Irish resident could be a good proxy for looking at the indigenous firm base of Ireland.

Looking at applications from applicants listing as Irish, but with no Irish resident inventors, may be a proxy for entities which use Ireland as a location for filing patents, with research and development for innovative technologies occurring elsewhere.

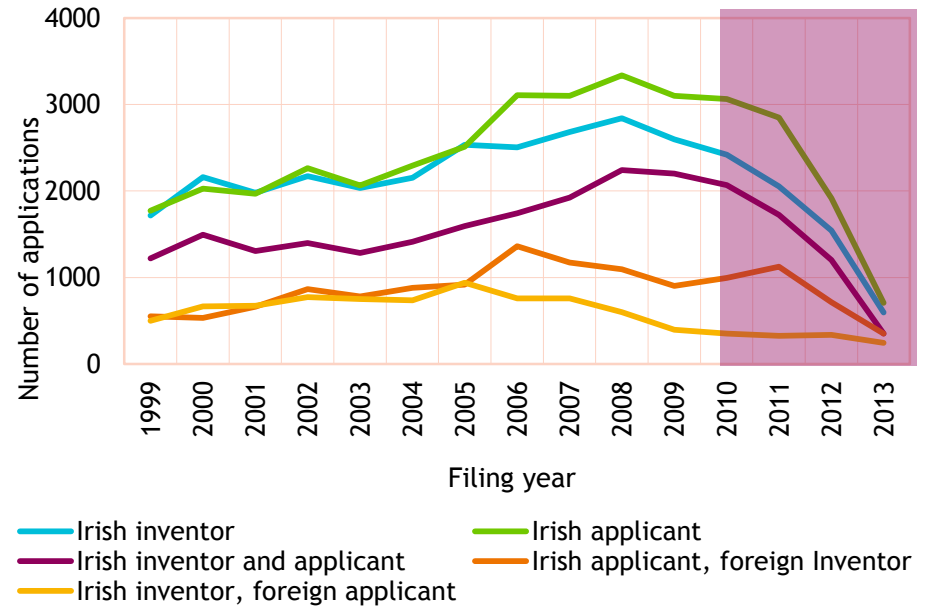
Furthermore, applications by applicants not listing as Irish applicant but with Irish inventors may provide a reflection of patenting by multinational corporations with active research and development in Ireland.

As can be seen from figure 113 both Irish applicant and Irish inventor defined patenting follow very similar trends, and indeed very similar volumes of patenting up until 2006. At this time, there is a sudden increase in filings by Irish applicants, which is not reflected in Irish inventors.

This difference can be attributed to the increase in Irish applicants with foreign inventors in 2006, whilst Irish inventors for foreign applicants begins a steady decline in this year.

Applications which list both an Irish applicant and an Irish inventor are significantly fewer in number than applications which list only one as Irish. This trend does, however, still match the overall time variance of patenting activity exhibited by the individual Irish listings.

Figure 113: Patent application trends for different definitions of applicant and inventor origin

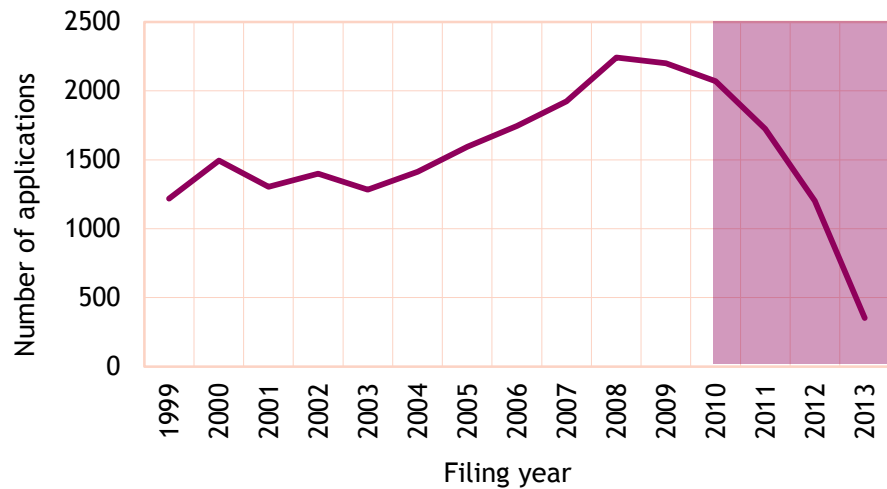


3.5.6 Patent filing trends: Irish applicants and Irish inventors combination

Irish inventors and Irish applicants give us a proxy for the indigenous firm base of Ireland, the trend in filing is shown on figure 114.

There has been growth in the patenting activity for the years leading up to 2008, but a decline appears to have followed.

Figure 114: Filing trend over time for the combination of Irish inventors and Irish applicants



3.5.7 NACE sectors: Irish applicants and Irish inventors combination

For the combination of applicant and inventor being listed as Irish, the pharmaceuticals sector dominates. However, over time, this large margin has fallen due to computing technologies and medical equipment growing in relative terms more than all other sectors.

Table 25: Top ten NACE sectors by the combination of Irish applicants and Irish inventors

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	5448
33.1	Medical equipment	4228
30	Office machinery and computers	4153
32.2	Signal transmission, telecommunications	3006
24.1	Basic chemical	1992
29.5	Special purpose machinery	1872
33.2	Measuring instruments	1704
26	Non-metallic mineral products	1394
25	Rubber and plastics products	1302
29.2	Non-specific purpose machinery	1095

Table 26: Top ten NACE sectors by the combination of Irish applicants and Irish inventors 1999 - 2005

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	2518
33.1	Medical equipment	1662
30	Office machinery and computers	1589
32.2	Signal transmission, telecommunications	1484
29.5	Special purpose machinery	1045
24.1	Basic chemical	974
25	Rubber and plastics products	719
33.2	Measuring instruments	698
26	Non-metallic mineral products	648
15	Food, beverages	628

Table 27: Top ten NACE sectors by the combination of Irish applicants and Irish inventors 2006 - 2013

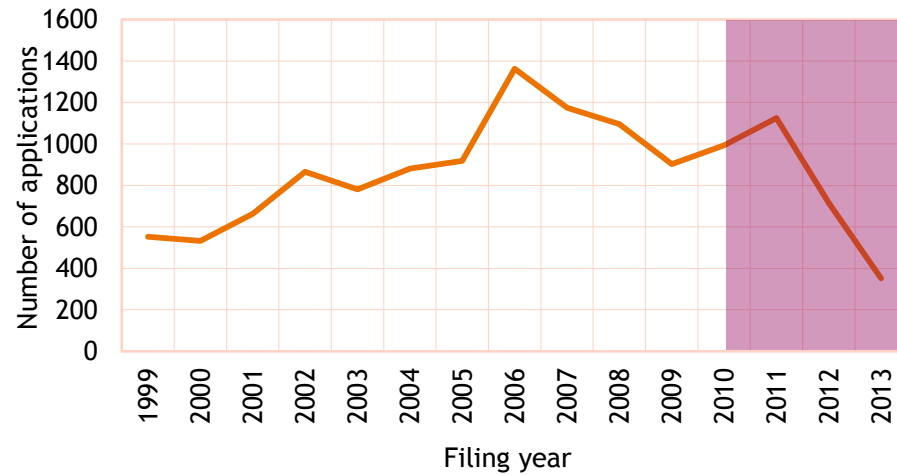
NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	2930
33.1	Medical equipment	2566
30	Office machinery and computers	2564
32.2	Signal transmission, telecommunications	1522
24.1	Basic chemical	1018
33.2	Measuring instruments	1006
29.5	Special purpose machinery	826
26	Non-metallic mineral products	746
29.2	Non-specific purpose machinery	588
25	Rubber and plastics products	583

3.5.8 Patent filing trends: Irish applicants and foreign inventors combination

The combination of Irish applicants with foreign inventors* may represent entities which use Ireland as a location for filing patents (figure 115), with research and development for innovative technologies occurring elsewhere.

Here there is a growth in patent application filings until 2006, followed by a steady decrease which has shown signs of reversing in recent years.

Figure 115: Filing trend over time for the combination of Irish applicants and foreign inventors



* No Irish Inventors

3.5.9 NACE sectors: Irish applicants and foreign inventors combination

For Irish applicants and foreign inventors*, Pharmaceuticals dominate over the whole time period. However, 2006-2013 have shown fewer NACE occurrences for pharmaceuticals than in 1999-2005. This is surprising, as overall Irish applicants show an increase into the second time period.

Consequently, the increase in Irish applicants' pharmaceuticals' NACE sector occurrences are due to increases with Irish inventors.

Table 28: Top ten NACE sectors by the combination of Irish applicants and foreign inventors

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	9599
33.1	Medical equipment	2415
30	Office machinery and computers	2297
32.2	Signal transmission, telecommunications	1234
24.1	Basic chemical	1222
26	Non-metallic mineral products	924
29.5	Special purpose machinery	531
33.2	Measuring instruments	459
15	Food, beverages	446
29.7	Domestic appliances	9599

* No Irish Inventors

Table 29: Top ten NACE sectors by the combination of Irish applicants and foreign inventors 1999 - 2005

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	5063
33.1	Medical equipment	1190
30	Office machinery and computers	639
24.1	Basic chemical	636
26	Non-metallic mineral products	492
32.2	Signal transmission, telecommunications	393
29.5	Special purpose machinery	344
15	Food, beverages	264
33.2	Measuring instruments	228
25	Rubber and plastics products	225

Table 30: Top ten NACE sectors by the combination of Irish applicants and foreign inventors 2006 - 2013

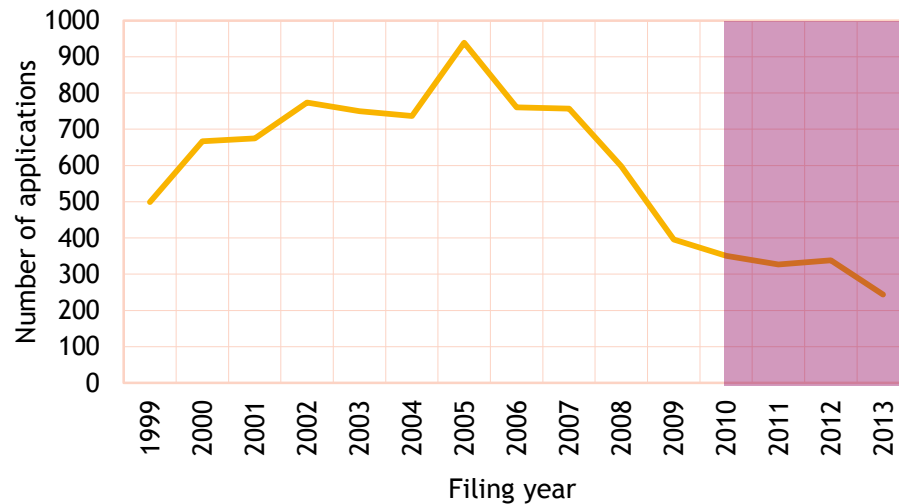
NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	4536
30	Office machinery and computers	1658
33.1	Medical equipment	1225
32.2	Signal transmission, telecommunications	841
24.1	Basic chemical	586
26	Non-metallic mineral products	432
29.7	Domestic appliances	258
32.3	Television and radio receivers, audiovisual electronics	251
33.2	Measuring instruments	231
24.4	Pharmaceuticals	4536

3.5.10 Patent filing trends: Foreign applicants and Irish inventor combination

The combination of Irish inventors with foreign applicants may represent multinational corporations, which have research and development operations within Ireland, and therefore having innovations developed by Irish resident inventors.

There is growth until 2005 whereupon a decline reduces the patent filing numbers to a third of their peak levels. This seems to match the profile of pharmaceutical filings.

Figure 116: Filing trend over time for the combination foreign applicants and Irish inventors



3.5.11 NACE sectors: Foreign applicants and Irish inventors combination

For the combination of Irish inventors and foreign applicants, a relatively large proportion of NACE sector occurrences were for Telecommunications based technologies. This is due to high volumes filed for this sector in 1999-2005, whereas a significant drop off occurs for 2006-2013, where we see this sector coming fourth after Pharmaceuticals, Medical equipment, Computing.

The sector trends overall are influenced heavily by 1999-2005, as the global filing trends for Irish inventors with foreign applicants has shown a general decrease since 2005.

Table 31: Top ten NACE sectors by Irish inventors and foreign applicants 1999-2013

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	3275
33.1	Medical equipment	2018
32.2	Signal transmission, telecommunications	1803
30	Office machinery and computers	1792
24.1	Basic chemical	730
32.1	Electronic components	680
33.2	Measuring instruments	578
29.5	Special purpose machinery	555
25	Rubber and plastics products	550
29.4	Machine-tools	272

Table 32: Top ten NACE sectors Irish inventors and foreign applicants 1999 - 2005

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	2147
32.2	Signal transmission, telecommunications	1220
33.1	Medical equipment	1137
30	Office machinery and computers	1023
24.1	Basic chemical	463
25	Rubber and plastics products	396
32.1	Electronic components	386
33.2	Measuring instruments	381
29.5	Special purpose machinery	369
29.4	Machine-tools	200

Table 33: Top ten NACE sectors by Irish inventors and foreign applicants 2006 - 2013

NACE code	NACE description	Number of Occurrences
24.4	Pharmaceuticals	1128
33.1	Medical equipment	881
30	Office machinery and computers	769
32.2	Signal transmission, telecommunications	583
32.1	Electronic components	294
24.1	Basic chemical	267
33.2	Measuring instruments	197
29.5	Special purpose machinery	186
25	Rubber and plastics products	154
33.4	Optical instruments	83

3.5.12 Filing geography: Irish applicants and Irish inventors combination

This data set investigates patent filings that list Irish applicants and at least one Irish inventor. There are 23,168 patent filings with this data filed since 1999.

Figure 117 shows the top five filing offices of patents listing Irish applicants with Irish inventors. The US and EPO have increased since 2004, while individual filings in national patent offices in Europe have decreased as primary filings locations.

Figures 118 and 119 indicate the top filing office for the time periods of 1999 - 2005 and 2006 - 2013, respectively. Ireland as a national filings office, as well as 'Other' filing offices appears to be decreasing, this is likely due to the increased use of the EPO as a regional filing office and consolidation across EU countries.

Figure 117: Patent applications trends by the combination Irish inventors and Irish applicants in the top five filing offices

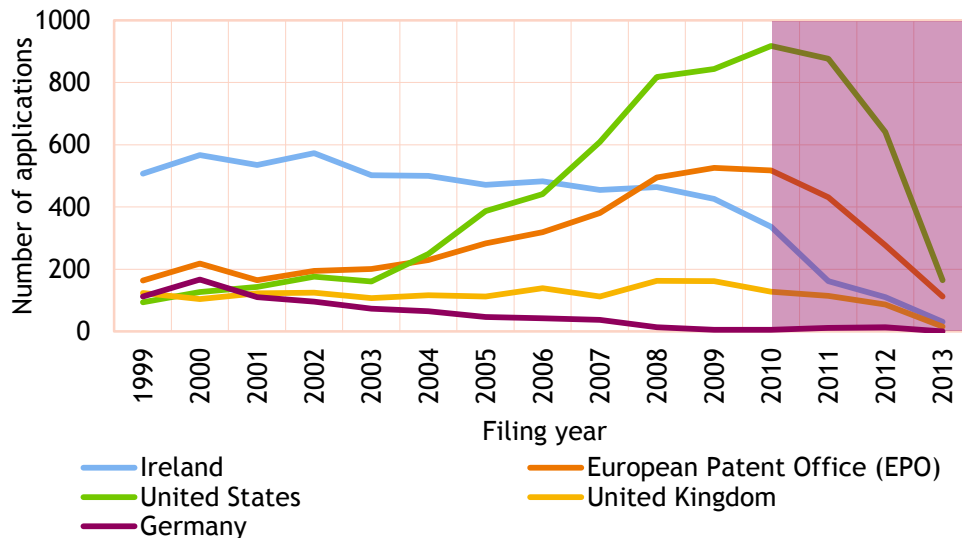


Figure 118: Patent applications trends by the combination Irish inventors and Irish applicants in the top five filing offices for the period 1999 - 2005

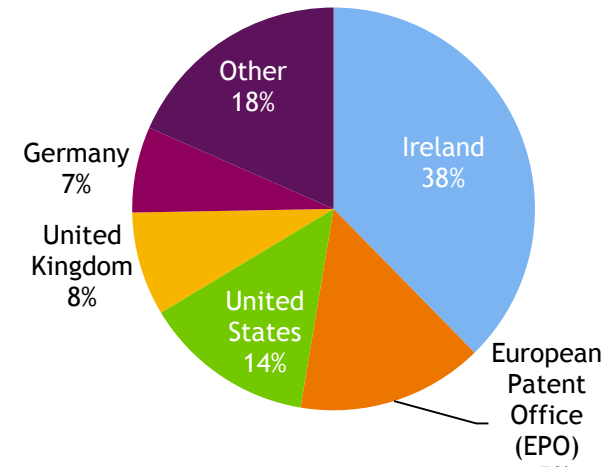
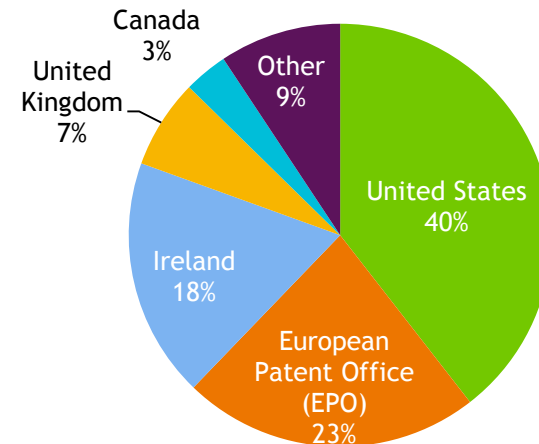


Figure 119: Patent applications trends by the combination Irish inventors and Irish applicants in the top five filing offices for the period 2006 - 2013



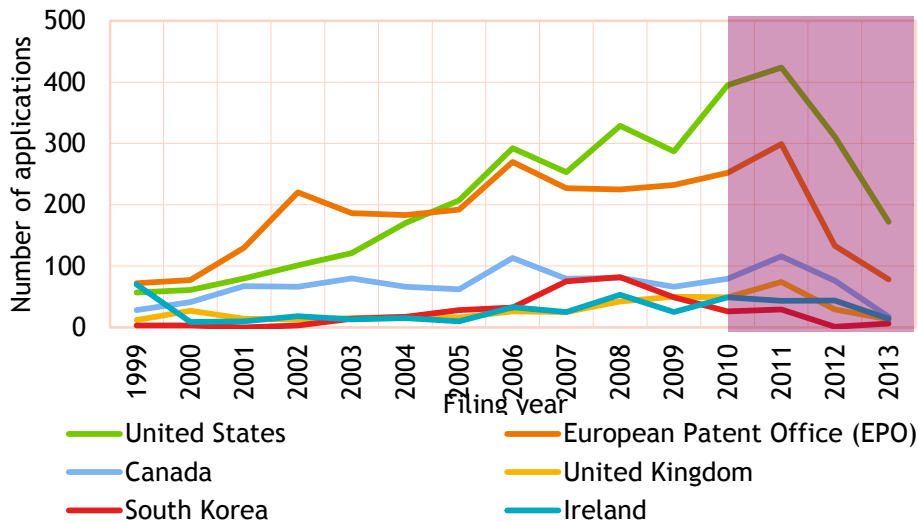
3.5.13 Filing geography: Irish applicants and foreign inventors combination

This data set investigates patent filings that list Irish applicants and only foreign inventors*. There are 12,913 patent filings with this data filed since 1999. One interpretation of this data is that it accounts for foreign companies that are domiciled in Ireland, but have research centres located abroad.

Figure 120 shows the top five filing offices of patents listing Irish applicants with foreign inventors. The US and EPO account for the highest of filings, the 6th most popular filing office in this dataset was Ireland.

Figure 121 and 122 indicate the top filing office for the time periods of 1999 - 2005 and 2006 - 2013, respectively. 'Other' filing offices appears to be decreasing, this is likely due to the increased use of the EPO as a regional filing office and consolidation of EU countries.

Figure 120: Patent applications trends by the combination of Irish applicants and foreign inventors in the top five filing offices



* No Irish Inventors

Figure 121: Patent applications trends by the combination of Irish applicants and foreign inventors in the top five filing offices for the period 1999 - 2005

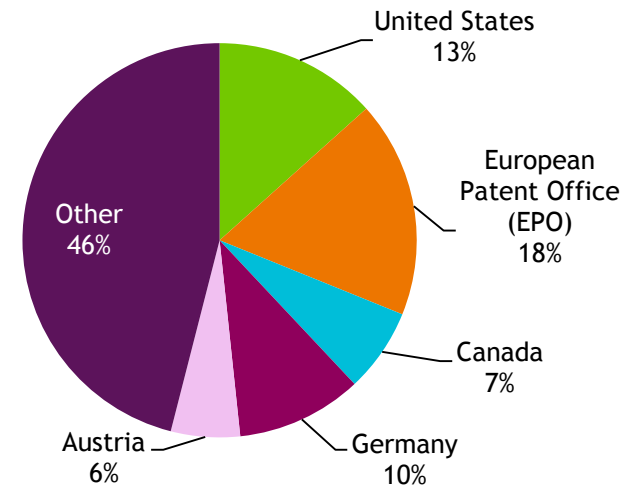
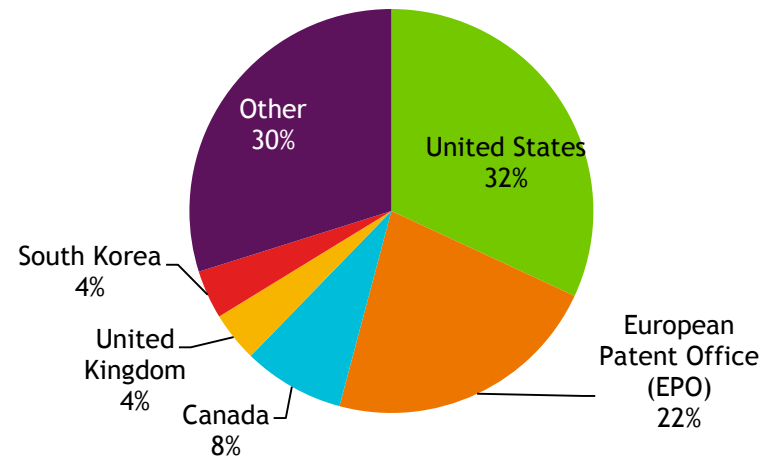


Figure 122: Patent applications trends by the combination of Irish applicants and foreign inventors in the top five filing offices for the period 2006 - 2013



3.5.14 Filing geography: Irish inventors and foreign applicants combination

Figure 123 shows the top five filing offices of patents listing Irish inventors with foreign applicants. The US features heavily until a strong drop in filings in 2009 - 2011, while the EPO appears to rise slightly starting in 2001. This significant drop in US filings is anomalous, with USPTO data not showing such a drastic reduction in patenting over these years. This stems from an issue at the data source and is currently under investigation by PATSTAT.

Figure 124 and 125 indicate the top filing office for the time periods of 1999 - 2005 and 2006 - 2013, respectively. What is apparent is the strong growth of South Korea and Taiwan as a filing location and decrease in the US. This could indicate a shift in market focus, technology sector, or foreign investment priorities of foreign applicants working with and employing Irish inventors.

Figure 123: Patent applications trends by the combination of foreign applicants and Irish inventors in the top five filing offices

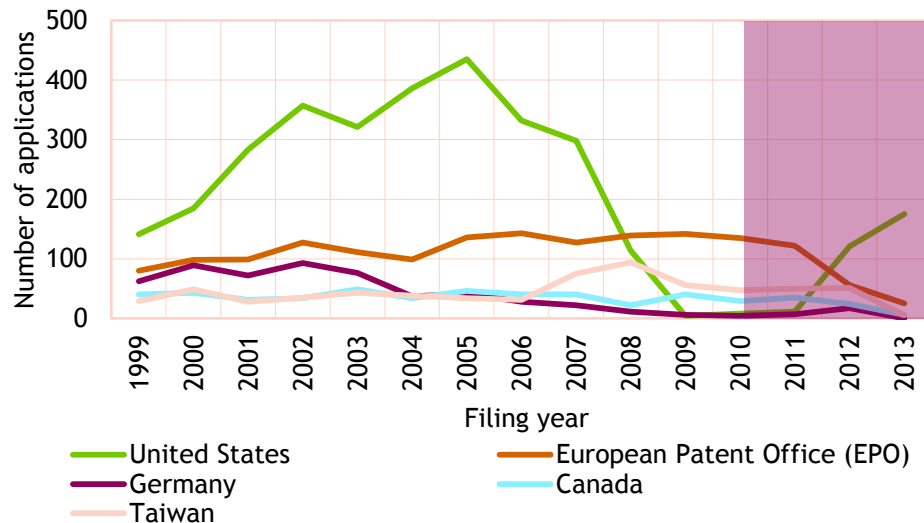


Figure 124: Patent applications by the combination of foreign applicants and Irish inventors in the top five filing offices for the period 1999 - 2005

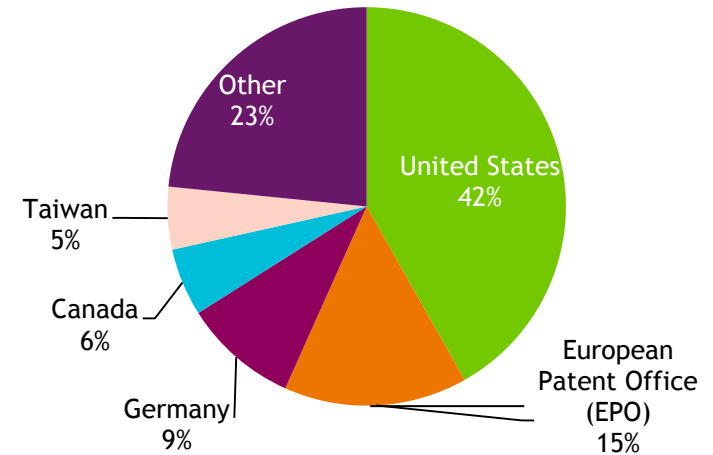
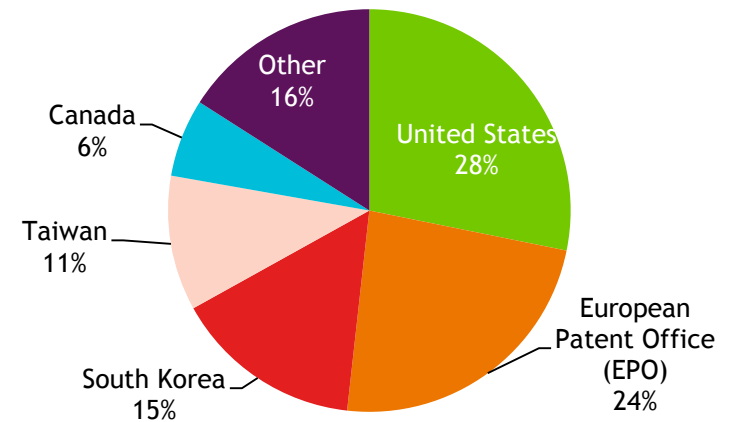


Figure 125: Patent applications by the combination of foreign applicants and Irish inventors in the top five filing offices for the period 2006 - 2013



TM

4. Trademarks



4.1 Trademarks: Data, methodology and context

Trademark data includes direct filings at the national level, regional offices (including OHIM), and designations received by the relevant offices via the Madrid systems.

Legal protection of trademarks is generally limited to the territory where they have been registered. Therefore, trademarks should be registered in all markets in which the protection of product or brand is sought. There are three routes to trademark registration:

1. National application
 - Applications can be made directly to the trademark offices of interest
 - The application must be filed according to the language requirements of the national office
 - Fees must be paid to the required office
2. Regional application
 - Application to a central office provides protection to designated member jurisdictions
 - Regional offices include:
 - OHIM (The Office for the Harmonization of the Internal Market of the European Union) - this filing covers all EU member countries.
 - ARIPO (The African Regional Industrial Property Office)
 - BOIP (The Benelux Trademark Office)
 - OAPI (The Organisation Africaine de la Propriété Intellectuelle)
3. The Madrid system
 - A international administration system for facilitating trademarks in multiple jurisdictions
 - Administered by WIPO
 - More than 70 countries are party to the system

Trademarks in context

Recent statistical reporting produced by WIPO ('2013 World Intellectual Property Indicators' report available here: <http://www.wipo.int/ipstats/en/>) cites that residents of China filed approximately 1.58 million applications based on class counts in 2012. This number was significantly higher than other countries across the world, with the US filings at the next highest level with 599,896. The report cites a 6% increase on 2011 class count filings, but attributes much of this to China which was responsible for 67.7% of all growth between 2010 -2012. Additionally, the report cites the growth of OHIM as a filing location for EU countries, over single country patent offices.

Trademark limitations

The Trademark data in this report is from the WIPO IP Statistics Database. While there are other commercial suppliers and regional suppliers of Trademark data (i.e., OHIM) the WIPO database provided the most comprehensive publically available statistical data relevant to the interest of the report. The inherent limitation was the ability to query statistical data aspects published by the IP Statistics Data Centre. For instance, the WIPO Statistics Database provides data on annual number of filings, applicant origin and NICE classification but does not provide full trademark documentation with such components as applicant information.

The data published by the WIPO statistics database for trademarks was last updated in December 2013 and only published results up until 2012. WIPO indicates that there could be up to a 6 month data index and publication lag, so the data presented here should not show any indication of publication lag, therefore no shaded boxes were used.

4.2 Filing trends: Ireland as applicant of origin

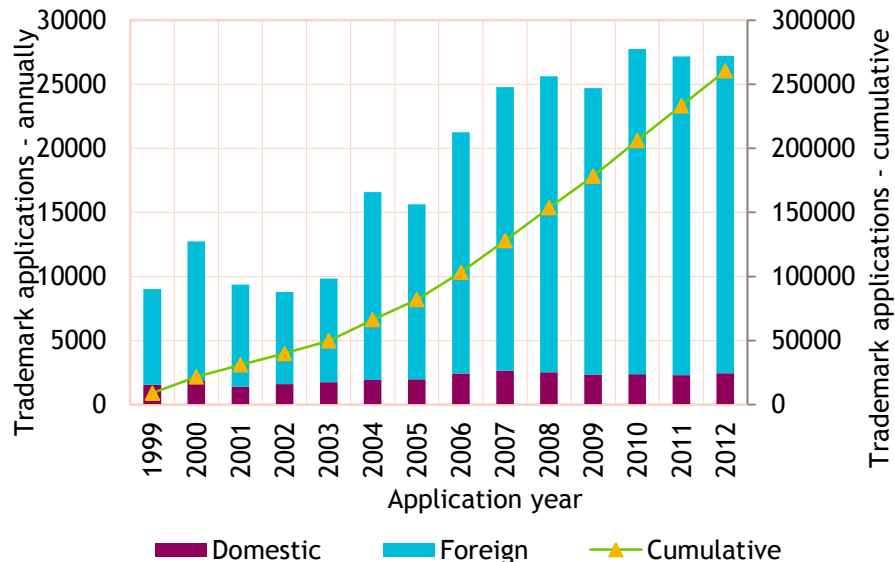
Figures released by the World Intellectual Property Organisation indicate that in absolute terms, trademark filings have nearly doubled since 1999 from just over 2.2 million applications per year to 4.2 million in 2011.

Figure 126, shows the number of trademark applications filed by Irish applicants; the filing trend indicates that Irish applicants are increasing their rate of filing year-on-year at a rate similar to the global average. In 2011, Irish applicants filed 27,177 trademark applications, this accounts for ~0.675% of global filings.

There was a drop in the number of filings in 2009, to levels below that of 2007-08, but figures recovered in 2010 which produced the highest level of filings on record.

Figure 126 also indicates the level of trademark applications that Irish applicants

Figure 126: Annual trademark filings of Irish applicants 1999 - 2012



made domestically compared with those applications made to foreign offices. Irish applicants, on average, file 10-12% of annual trademarks domestically and the remainder are filed in other foreign jurisdictions.

Table 34 provides a sample of recently registered trademarks in Ireland by Irish applicants.

Table 34: Examples of recently registered Trademarks by Irish applicants

Registration date	Mark Name	Holder Name
09.01.2014	ISOPRINOSINE	Newport Pharmaceuticals Limited
15.01.2014	UROSTEROL	Chefaro Ireland Ltd
02.04.2013	M BRACE	Sports & Supports Limited
02.12.2013	YOLLIES	Zenbury International Limited
03.12.2013	Irminix	Cti Science Ltd
04.02.2013	IPIFNI	Gilead Sciences Limited
04.02.2013	FINLIZA	Gilead Sciences Limited
06.02.2013	OPENET EXPRESS SOLUTIONS	Openet Telecom Limited
06.11.2013	PANEL DUCT	Walsh Mechanical Engineering Holdings Limited
07.08.2013	JOHN WEST STEAM-POTS	Irish Seafood Investment Limited

4.3 NICE classifications: Ireland as applicant of origin

The Nice Classification system is a method for classifying goods and services for the purpose of registering trademarks. The classification system is designated by the World Intellectual Property Organization (WIPO) and is updated every five years. The current edition (10th) has been in effect since 1 January 2013. The system is recognised in numerous countries and coordinates trademark filings across a single reference system.

Nice Classifications assignment data is available for the date range of 2004 - 2012.

Nice code [35] is ascribed to ‘Advertising, business management, business administration...’ and is the most commonly ascribed classification. Recent examples of trademark applications include: ARI from Aer Rianta International and Centric Health from Áras Sláinte Ltd.

Figure 127: Nice Classifications: % of total occurrences of domestic applicants filings in Ireland (2004 - 2012)

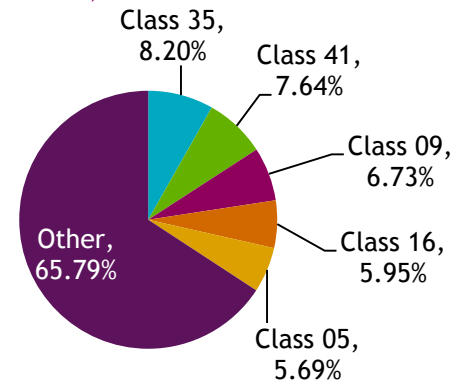


Table 35: Frequently occurring Nice Classifications in Ireland (domestic applicants 2004 -2012)

Nice code	Description	% of all
Class 35	[Nice Nr: 35] Advertising; business management; business administration; office functions	8.20%
Class 41	[Nice Nr: 41] Education; providing of training; entertainment; sporting and cultural activities	7.64%
Class 09	[Nice Nr: 9] Scientific, nautical, surveying, photographic, cinematographic, optical, weighing, measuring, signalling, checking (supervision), life-saving and teaching apparatus and instruments; apparatus and instruments for conducting, switching, transforming, accumulating, regulating or controlling electricity; apparatus for recording, transmission or reproduction of sound or images; magnetic data carriers, recording discs; compact discs, DVDs and other digital recording media; mechanisms for coin-operated apparatus; cash registers, calculating machines, data processing equipment, computers; computer software; fire-extinguishing apparatus	6.73%
Class 16	[Nice Nr: 16] Paper, cardboard and goods made from these materials, not included in other classes; printed matter; bookbinding material; photographs; stationery; adhesives for stationery or household purposes; artists' materials; paint brushes; typewriters and office requisites (except furniture); instructional and teaching material (except apparatus); plastic materials for packaging (not included in other classes); printers' type; printing blocks	5.95%
Class 05	[Nice Nr: 5] Pharmaceutical and veterinary preparations; sanitary preparations for medical purposes; dietetic food and substances adapted for medical or veterinary use, food for babies; dietary supplements for humans and animals; plasters, materials for dressings; material for stopping teeth, dental wax; disinfectants; preparations for destroying vermin; fungicides, herbicides	5.69%
Other	Other	65.79%

4.4.1 Cumulative filing trends: Country comparisons by applicant country of origin

Figure 128 and 129 show the trends in trademark filings by applicant country normalised by GDP (PPP constant 2011 Int\$) and by population. Table 36 shows the absolute number of trademark applications filed by applicants from Ireland and the comparator countries.

Ireland in absolute terms accounts for the second lowest volume of trademark filings, however when normalised Ireland advances in the ranking to a level similar to Finland and well above Singapore based on GDP. While Germany and Denmark appear to lead for both normalised analysis.

Table 36: Trademarks: Number of applications filed 1999 - 2012

Trademark: Applications (Direct & Madrid)	Trademark Applications
Ireland	260,471
Denmark	444,539
Finland	304,839
Germany	6,606,520
Sweden	712,806
Singapore	150,464

Figure 128: Trademarks: Number of applications filed 1999-2012 normalised by GDP/GNP (PPP constant 2011 Int\$)

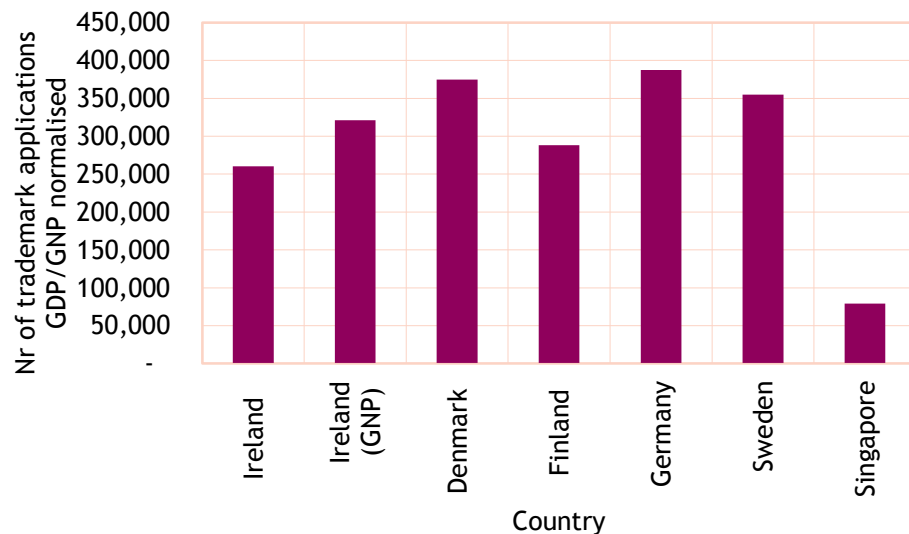
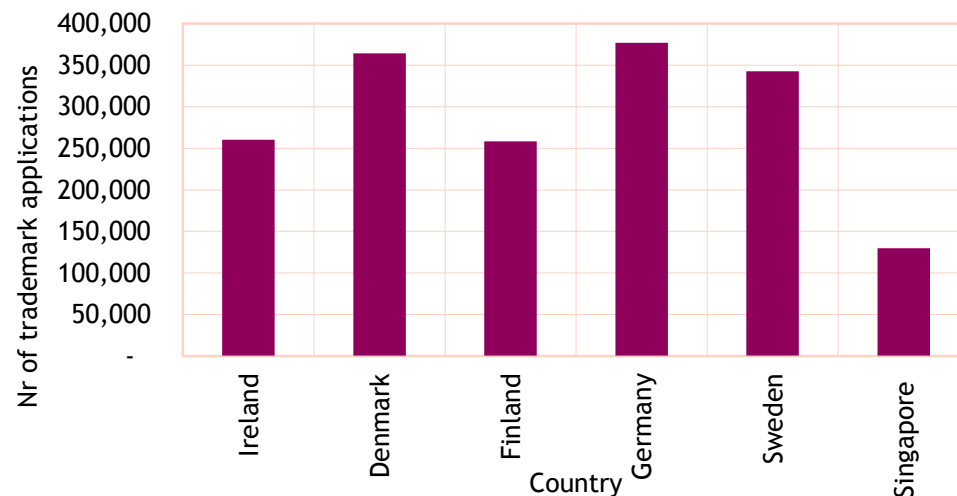


Figure 129: Trademarks: Number of applications filed 1999-2012 normalised by population



4.4.2 Filing time trends: Country comparisons by applicant country of origin

Annual filing trends from Irish applicants and comparator countries show an early peak in 2000 across all applicant countries, this could be linked to the demand for new trademark registrations during the dotcom expansion, followed by a contraction as the economy consolidated in the early 2000s. Applications, across all applicant countries, shows another slight decline after 2007, this is likely linked to the onset of the global financial crisis and a shrinking demand and finance for new applications.

The trend in trademark filings however has quickly rebounded and by 2009-10 was already showing pre-crisis level of filing.

Figure 130 and 131 show that Irish applicants kept pace and suffered from similar market impacts as comparator countries. When normalised based on GNP (PPP constant 2011 Int\$) and population Ireland shows measures well against comparator countries and has a global filing rate higher than that of Singapore and Finland. Since 2010 the rate of filing has slowed, and across all comparator countries there appears to be a stagnation in growth in filing.

Figure 130: Annual trademark trends by applicant country from 1999-2012: normalised by GDP/GNP (PPP constant 2011 Int\$)

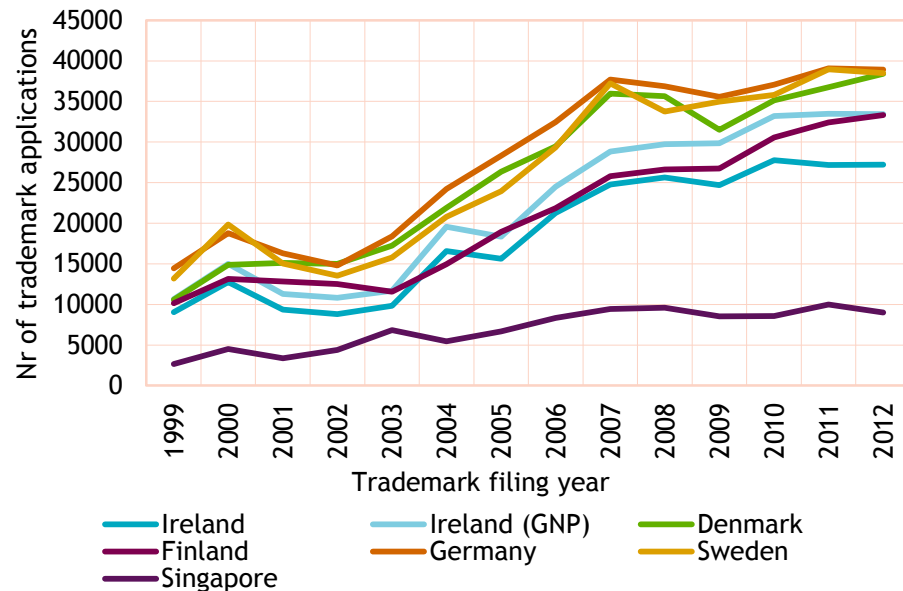
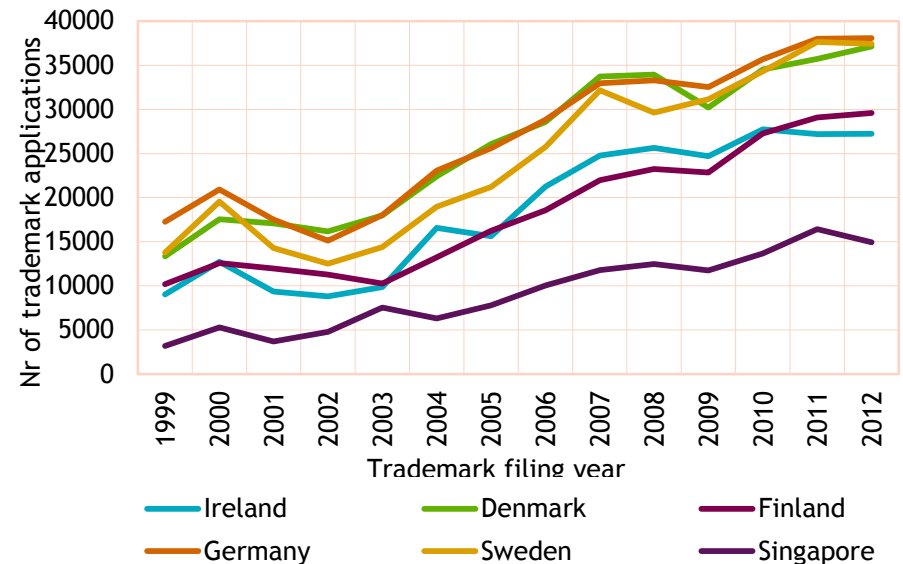


Figure 131: Annual trademark trends by applicant country from 1999-2012: normalised by population



4.5 Filing location: Ireland as a filing location

As previously indicated, trademarks are generally registered through one of three routes: directly through in-country intellectual property offices, through the use of regional offices or through international application systems to multiple jurisdictions. The analysis provided here considers trademark applications that were made through the Madrid International Trademark System (administered by WIPO), regional offices as well as the Trade Mark Register of the Irish Patent Office.

Figure 132 shows the annual filing trends of trademark applications seeking trademark protection in Ireland (or designating Ireland as an office for protection through the Madrid system). From 1999 - 2012 there have been 69,937 trademark applications filed. The period of 2002-2007 appears to be the most active in terms of trademark volumes, with decreasing level of filing since 2008. Figure 132 also shows that the proportion of trademark filings from domestic firms and individuals has increased over the past decade.

Figure 132: Annual trademarks filed or designating protection in Ireland

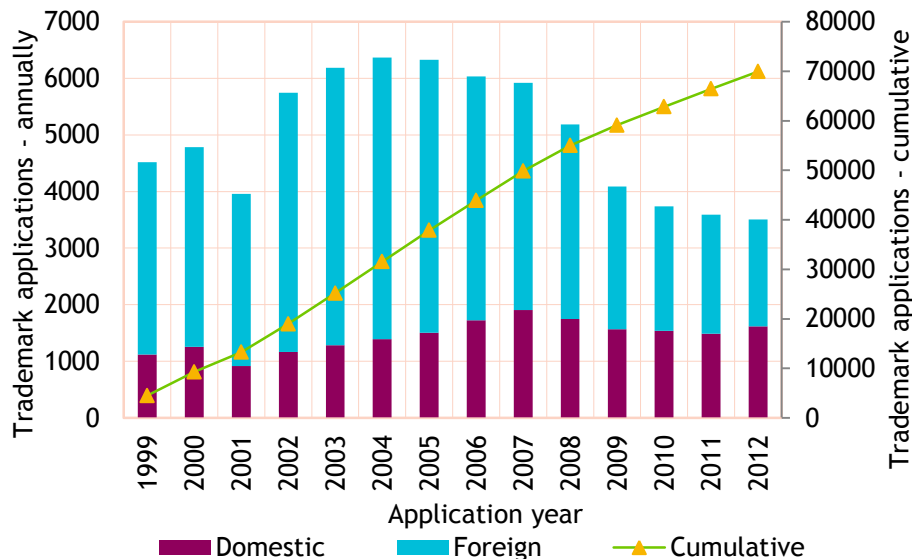
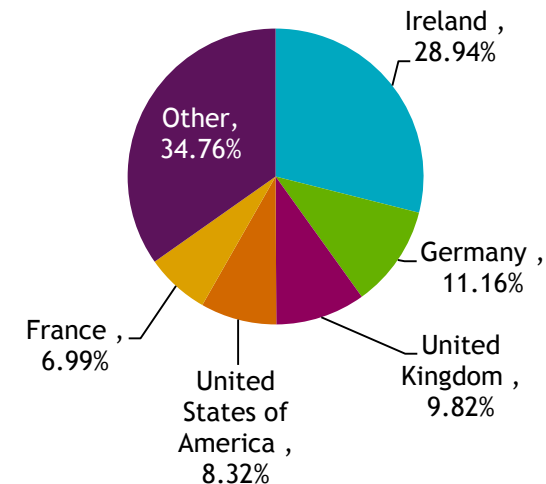


Figure 133 shows office of origin of trademarks filed since 1999-2012. The highest proportion of applications is domestic applications with Irish applicants accounting for 29.9%, following by the Germany (11.2%), the UK (9.8%) and US (8.3%) applicants.

Figure 133: Office of origin of applications filed or designating protection in Ireland: 1999-2012



4.6 Filing location: Domestic & abroad

The figures presented here show the proportion of filings based on the applicant country, identifying what proportion of filings are made domestically compared to foreign (abroad) filings.

Comparison indicates that Irish applicants have a higher proportion of foreign filings than their comparators.

Possible reasons for this trend could be:

- Higher proportion of software/online companies that would necessitate a higher proportion of global filings
- Higher levels of export for goods and services

Figure 134: Irish applicants: Trademarks filed domestically and abroad

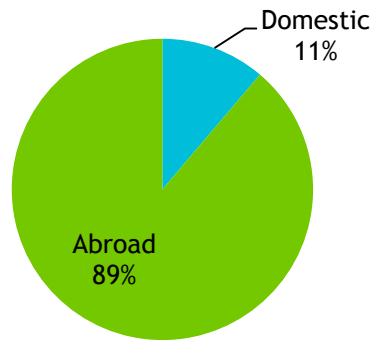


Figure 135: Danish applicants: Trademarks filed domestically and abroad

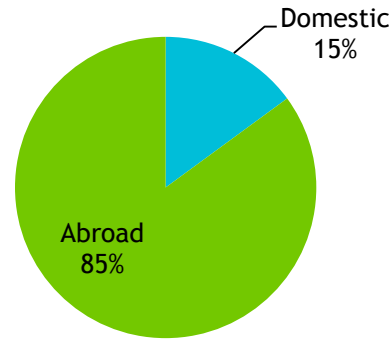


Figure 136: Finish applicants: Trademarks filed domestically and abroad

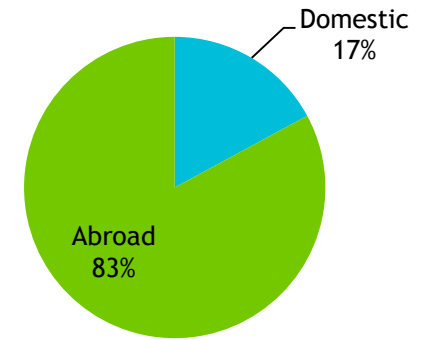


Figure 137: German applicants: Trademarks filed domestically and abroad

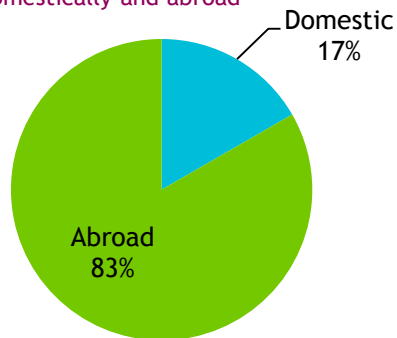


Figure 138: Swedish applicants: Trademarks filed domestically and abroad

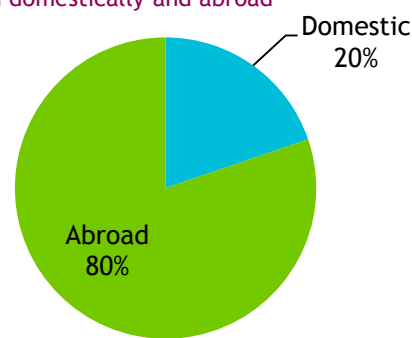
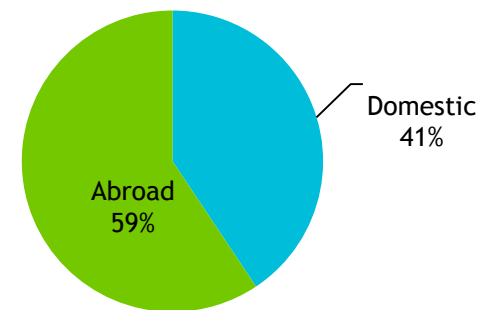


Figure 139: Singapore applicants: Trademarks filed domestically and abroad



5. Industrial Design Rights



5.1 Industrial design rights: Data, methodology and context

Design rights in context

Global industrial design counts have been reported to have strong growth in recent years, this follows a stagnation in both 2008 and 2009. Data from WIPO indicates that in absolute numbers residents of China filed almost 650,000 industrial design rights across the world in 2012, with the next closest residents filing from Germany (76,369). This is a clear indication of the sizable influence of the filing activity of China in the global activity.

Additionally, the report cites that among the Top 20 patent offices the Office for Harmonization in the Internal Market (OHIM), experienced one of the highest rates of growth (+12%), behind Russia (29.5%), SIPO (26.1%) and Turkey (12.4%).

Design rights are generally registered through one of three routes: directly through in-country intellectual property offices through the use of regional offices or through international application systems to multiple jurisdictions. The analysis provided here considers industrial design applications that were made through the Hague Agreement Concerning the International Registration of Industrial Designs (administered by WIPO), as well national patent offices, such as the Irish Patent Office.

Following the registration of a design, the term of protection is generally five years, with the capacity for renewal of up to 15 years (in most cases).

Figures released by WIPO indicate that design applications in 2010, 2011 and 2012 recorded double-digit growth, but that this was heavily influenced by residents of China.

Design rights limitations

For Industrial design right IP considered in this report we used the WIPO IP Statistics Database as it provided the most comprehensive publically available data source relevant to the interest of the report. The inherent limitation was the ability to query data aspects published by the IP Statistics Data Centre. For instance, the WIPO Statistics Database provides data on annual number of filings, applicant origin and Lacarno classification but does not provide full design rights documentation with such data information as applicant names.

The WIPO Statistics database last update was January 2014, and WIPO cites that publication deferrals can be up to a 30 month delay in publication from the date of filings*. Shaded boxes have been incorporated onto graphs where this data limitation exists.

Lacarno classifications assignment data is available for the date range of 2008 - 2012.

Ireland is not signed up to the Hague agreement for registration of industrial design rights, however the data we present is for the resident country of applicant, and not office of registration, so Ireland is still represented.

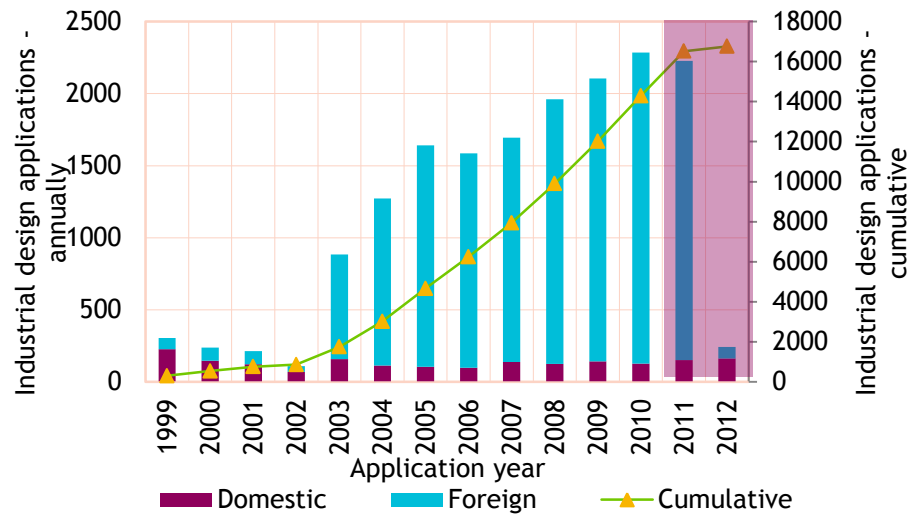
*http://www.wipo.int/edocs/mdocs/hague/en/ompi_di_san_11/ompi_di_san_11_14.pdf

5.2 Filing trends: Ireland as applicant of origin

Figure 140, shows the number of industrial design applications filed by Irish applicants. In 2011, Irish applicants filed 2,228 industrial design applications, accounting for -0.22% of global filings.

Figure 140 also indicates the level of industrial design applications that Irish applicants made domestically compared with those applications made to foreign offices. Irish applicants, on average, file 10-12% of annual design rights domestically and the remainder are filed in other foreign jurisdictions.

Figure 140: Annual industrial design filings by Irish applicants



5.3 Locarno classifications: Ireland as applicant of origin

The Locarno Classification is an international classification system for industrial designs which was established in accordance with the Locarno Agreement of 1968. The classification system is designated by WIPO and is updated every five years. The system is recognised by the contracting parties to the agreement as well as OHIM to classify filings across a single reference system. The Locarno Classification comprises a list of 32 classes and 223 subclasses.

Lacarno classifications assignment data is available for the date range of 2008 - 2012. Lacarno code [11] that is ascribed to 'Articles of adornment' is the most commonly ascribed classification during the time frame analysed.

Figure 141: Locarno Classifications from Irish applicants: % of total occurrences (2008 - 2012)

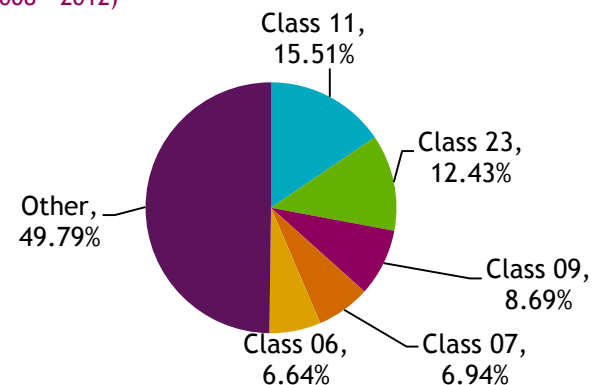


Table 37: Frequently occurring Locarno classifications from Irish applicants (2008 - 2012)

Lacarno	Description	% of all
Class 11	Articles of adornment	15.51%
Class 23	Fluid distribution equipment, sanitary, heating, ventilation and air-conditioning equipment, solid fuel	12.43%
Class 09	Packages and containers for the transport or handling of goods	8.69%
Class 07	Household goods, not elsewhere specified	6.94%
Class 06	Furnishing	6.64%
Other	Other	49.79%

5.4.1 Cumulative filing trends: Country comparisons by applicant country of origin

Figure 142 and 143 show the trends in industrial design applications by applicant country normalised by GDP (PPP constant 2011 Int\$) and by population. Table 38 shows the absolute number of industrial design applications filed by applicants from Ireland and the comparator countries.

Table 38: Industrial Designs: Number of applications filed 1999 - 2012

Country	Design right: Applications
Ireland	16,762
Denmark	98,243
Finland	58,776
Germany	972,788
Sweden	140,300
Singapore	14,793

Figure 142: Industrial Design rights: Number of applications filed 1999-2012 normalised by GDP/GNP (PPP constant 2011 Int\$)

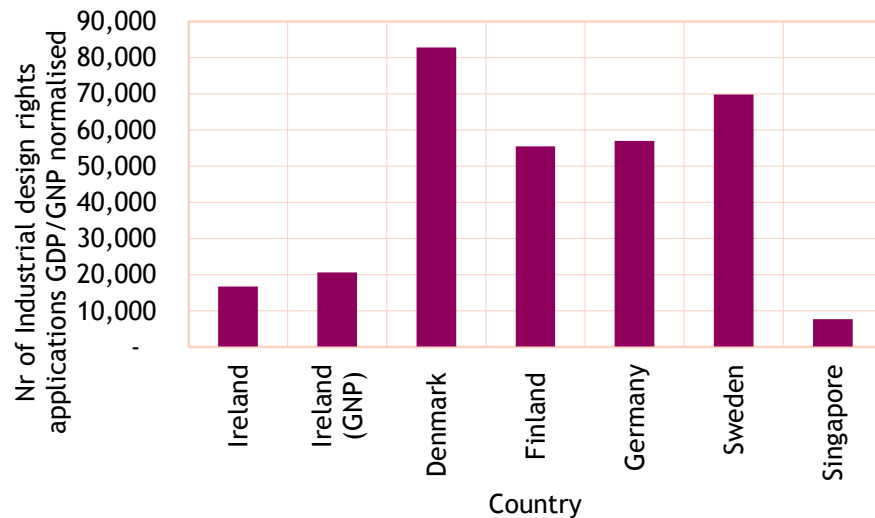
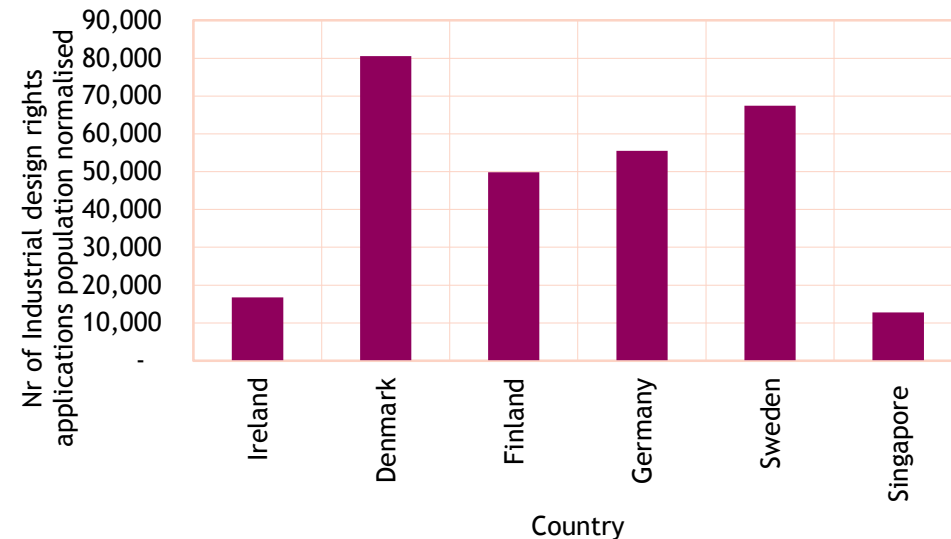


Figure 143: Industrial design rights: Number of applications filed 1999-2012 normalised by population



5.4.2 Filing time trends: Country comparisons by applicant country of origin

Figure 144 and 145 show the annual filing trends in industrial design applications by applicant country normalised by GDP (PPP) 2012 (Int\$) and by population. Annual filing trends across the European countries appear to show a similar filing trend increase year-on-year until about 2007 where there appears to be stagnation in most jurisdictions while showing signs of increasing growth rates moving into 2012.

This data reflects the industrial design data presented in the WIPO report, that indicates the exponential growth rates of filings from Asia are pulling the global growth rate.

Figure 144: Annual industrial design rights filing trends by applicant country from 1999-2012: normalised by GDP/GNP PPP 2012 (I\$)

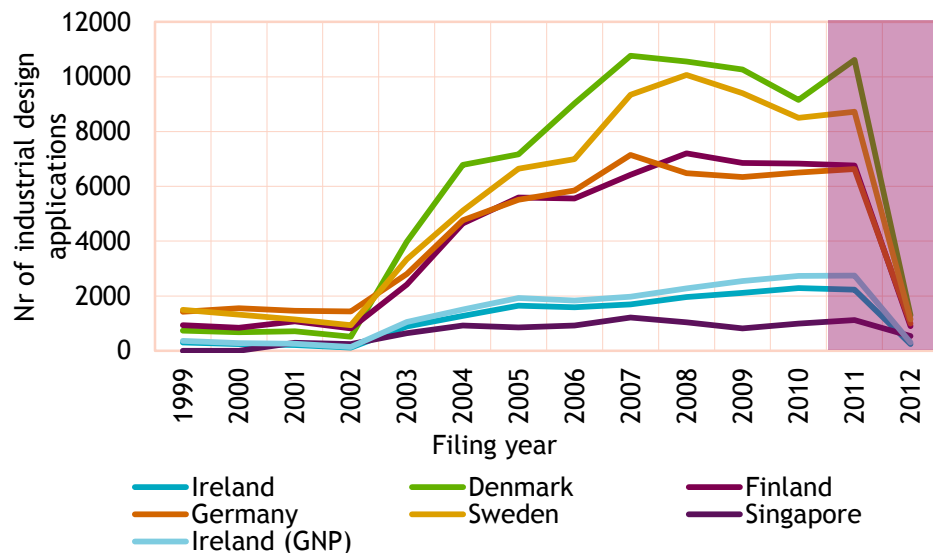
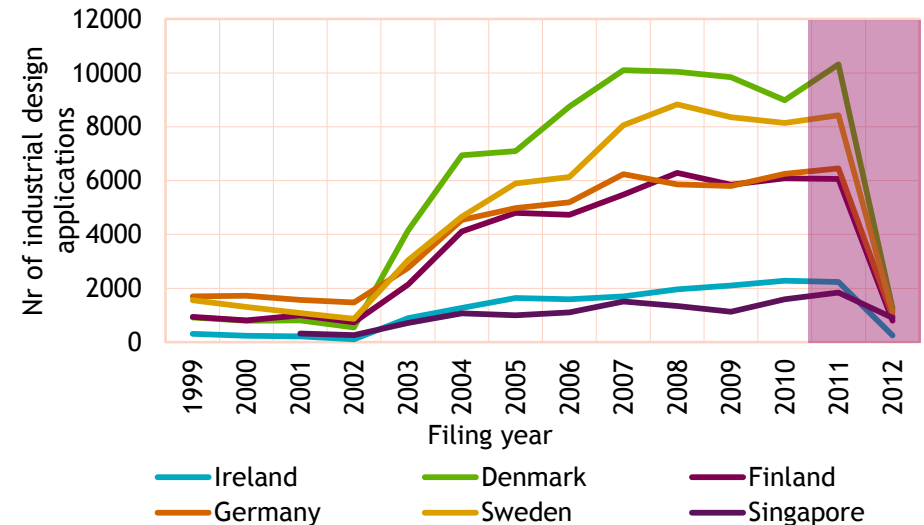


Figure 145: Annual industrial design right trends by applicant country from 1999-2012: Normalised by population



5.5 Filing location: Domestic & abroad

The figures presented here show the proportion of filings based on the applicant country, identifying what proportion of filings are made domestically compared to foreign (abroad) filings. In order to account for OHIM coverage the figures are based on equivalent counts. This method was established by the statistical office of WIPO, where the data was sourced for this analysis, and multiplies each design application filed with OHIM by the corresponding number of member states. Therefore, an Irish applicant filing in OHIM would count for one domestic design

and twenty-seven foreign filing counts. This is also likely why Singapore appears to have a higher domestic proportion.

This data is reflected in the findings of the WIPO Statistics report that cites the OHIM multiplier effect for why EU member states have the highest application design counts filings abroad.

Figure 146: Irish applicants: Industrial designs filed domestically and abroad

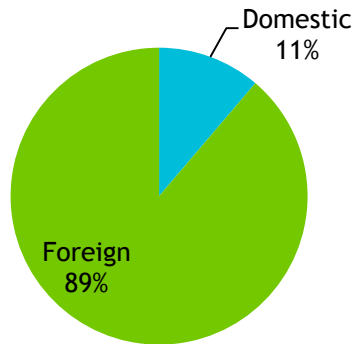


Figure 147: Danish applicants: Industrial designs filed domestically and abroad

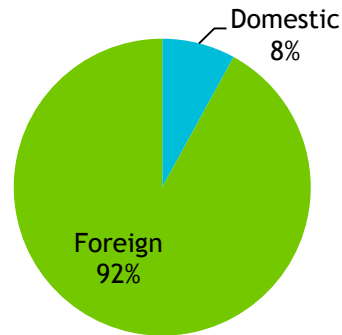


Figure 148: Finish applicants: Industrial designs filed domestically and abroad

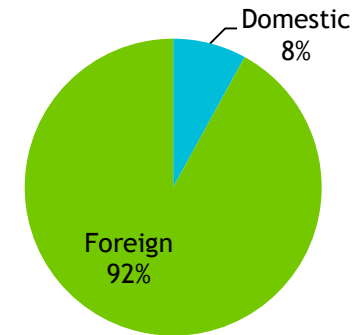


Figure 149: German applicants: Industrial designs filed domestically and abroad

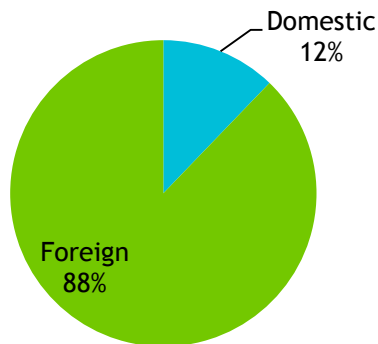


Figure 150: Swedish applicants: Industrial designs filed domestically and abroad

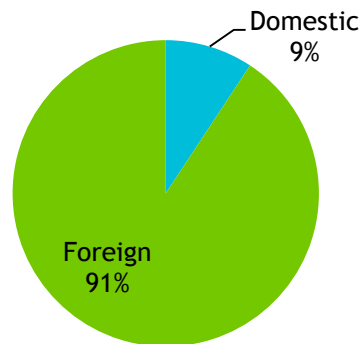
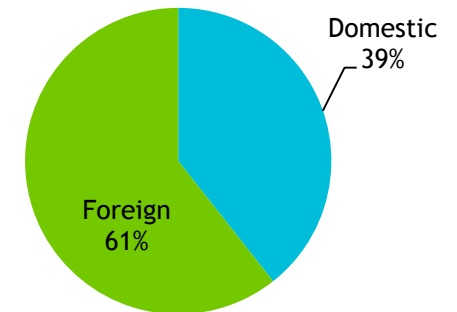


Figure 151: Singapore applicants: Industrial designs filed domestically and abroad



6. Other forms of IP



6.1 Other IP: Data, methodology and context

Plant variety rights

In Ireland, Plant Breeders' Rights (Plant Variety Rights) are registered by the office of the Controller of Plant Breeders' Rights, a corporate body, which is staffed by the Department of Agriculture, Fisheries & Food. A variety is eligible for Rights if it is distinct, stable, uniform, and new, and if it has an approved name. Irish Plant Breeders' Rights are valid only in Ireland. Fees are payable to the Office of the Controller for the services provided, and renewal fees are payable each year to maintain rights.

Figure 140 and 141 show the normalised data for the registration of the plant variety rights by country based on national listings and plant breeder's rights. The distinction between the two varieties of applications is a matter of designation at the application phase. To be designated as a 'national listing' the applicant must meet the legal requirements of the country of filing, whereas to be designated as a 'Plant Breeder's Right' you must meet the guidelines listed under the UPOV convention. The implications for the application processes are largely dependent on the applicants' interest in developing protection in a single national market as compared to multiple national markets.

Plant variety rights context

In 2012 there were 13,386 applications filed globally, with the largest proportion of those filings coming from offices in Europe. The Community Plant Variety Office (CPOV), an application route for plant variety protection across the EU in 28 member states, received the largest number of applications in 2012 (2,868). Indicating the increasing interest of cross-border protection. The paper also cites that there is substantial year-on-year fluctuations in applications numbers, which is reflected in the annual trends of registrations in Ireland.

Offices in Europe (including CPOV) account for the largest recipients of plant variety applications globally (45.3% in the world). While the Asian region, holding the second highest regional share at 25.7%, is increasing its share of globally filings in recent years with an average annual growth of 3.7% (2007-2012 data).

Geographical indications

Three European Union schemes of geographical indications and traditional specialities known as protected designation of origin (PDO), protected geographical indication (PGI), and traditional speciality guaranteed (TSG) promote and protect names of quality agricultural products and foodstuffs. These laws protect the names of wines, cheeses, hams, sausages, seafood, olives, beers, Balsamic vinegar and even regional breads, fruits, raw meats and vegetables.

Geographical indication context

Generally, across jurisdictions there are low levels of filing in geographical indication protection. A report on 'The Economics of Geographical Indications' in 2009 however cites the growing demand for attention to 'qualities' of agrifood, including culinary heritage and socio cultural status.

Copyrights

Due to the lack of primary data available on copyrights. CambridgeIP established a summary of reports outlining a variety of legal, technological and economic issues prevalent in the field. The varying degrees of legal protection for copyright materials across jurisdictions provides a rich arena in which reports analyse effective methods of enforcement and submit recommendations of cross-border resolutions. Additionally, the rapidly evolving technological advancement and diminished barriers to infringement of copyright materials in the era of digitization is a key area of study in published reports.

Trade Secrets

Based on the inherent confidential nature of the data, systematic review and studies are implicitly challenging. Any study would require a high level of statistical aggregation and anonymity to ensure protection of sensitive material. Additionally, data collection would largely be based on survey and externally reported data which is not within the scope of this report.

Reports identified by CambridgeIP primarily focus on the legal protection across jurisdictions for trade secrets and discuss possible frameworks adjustments and recommendations to harmonise protection across borders.

6.2 Plant Variety Rights filing trends: Irish applicants

Based on data from the International Union for the Protection of New Varieties of Plants (UPOV), an intergovernmental organization promoting an effective system of plant variety protection and operating a plant variety database of member authorities, Ireland has registered 217 Plant Variety Rights between 1999 - 2013 (figure 152). The 217 Plant Variety Rights comprise 163 National Listings, 54 Plant Breeder's Rights and 0 Plant Patents (which are not available in Ireland).

The number of applications registered in Ireland is nominal (17 in 2013), however considering the popularity of the CPOV route to register plant variety protection across Europe, we find this value to be consistent with comparator countries across Europe.

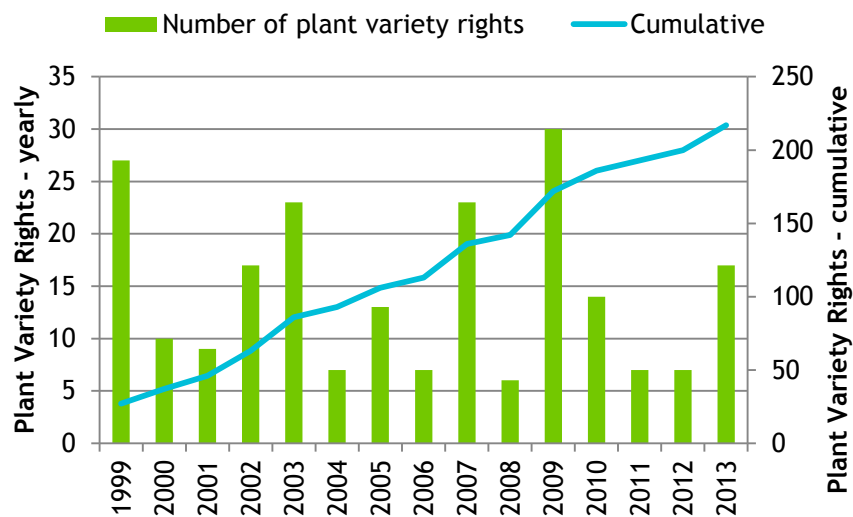
Table 39 provides a list of recent plant variety applications from Ireland to

demonstrate relevant botanical interest registering and developing in Ireland.

Table 39: Ten recent Irish plant variety rights

UPOV Code	Type	Botanical Name	Application Date	Final Denomination
SOLAN_TUB	NLI	Solanum tuberosum L.	10/06/2013	SIMBA
SOLAN_TUB	PBR	Solanum tuberosum L.	10/06/2013	SIMBA
SOLAN_TUB	NLI	Solanum tuberosum L.	06/12/2012	CASINO
SOLAN_TUB	NLI	Solanum tuberosum L.	06/12/2012	TORNADO
SOLAN_TUB	NLI	Solanum tuberosum L.	06/12/2012	MAXIMA
SOLAN_TUB	PBR	Solanum tuberosum L.	06/12/2012	CASINO
SOLAN_TUB	PBR	Solanum tuberosum L.	06/12/2012	TORNADO
SOLAN_TUB	NLI	Solanum tuberosum L.	21/12/2011	BIKINI
SOLAN_TUB	NLI	Solanum tuberosum L.	21/12/2011	BIKINI
SOLAN_TUB	PBR	Solanum tuberosum L.	21/12/2011	BIKINI

Figure 152: Filing trends of plant variety rights registered in Ireland



6.3 Plant Variety Rights filing trends: Country comparisons by applicant country of origin

Figures 140 and 141 below indicate normalised data trends of plant variety rights registered by Ireland and the European comparator countries between 1999 - 2013. Based on normalised data, Denmark demonstrates a higher rate of filing than other comparator countries.

Figure 153: Comparative data trends from 1999-2013 of plant variety rights GDP/GNP PPP 2012 (IS)

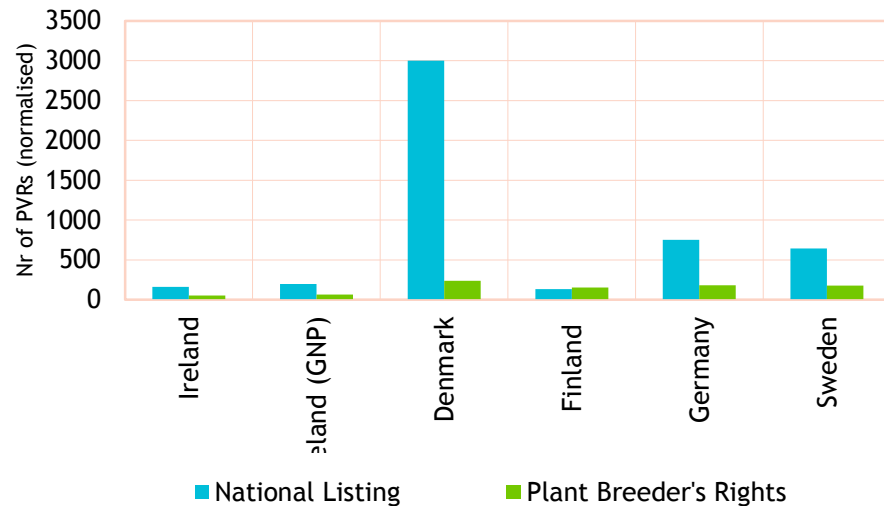
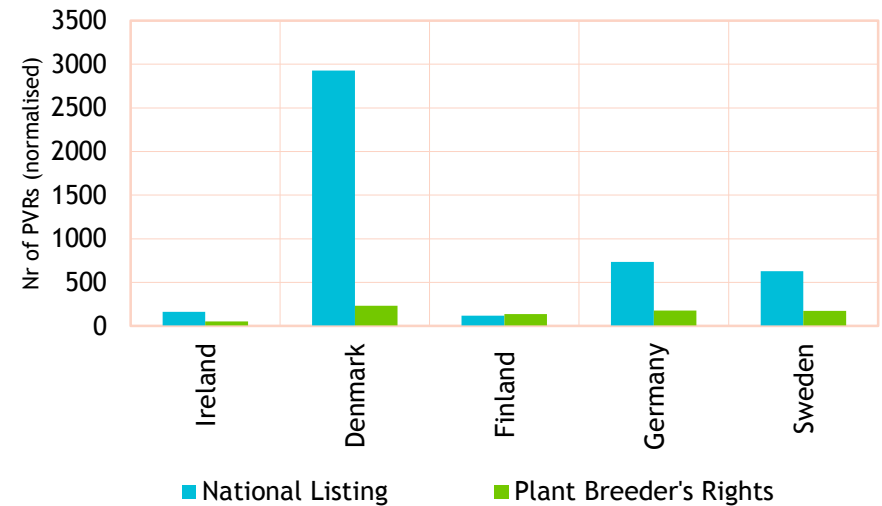


Figure 154: Comparative data trends from 1999-2013 of plant variety rights (Population)



6.4 Geographical indications and traditional specialities: Irish applicants

Ireland currently holds six (6) protections of geographical indications and traditional specialities, five (5) are listed as protected geographical indications and one (1) is a protected designation of origin (see table 40).

Table 40: Geographical indications and traditional species from Ireland

Designation	Status	Type	Product Category	Publication date
Waterford Blaa / Blaa	Registered	PGI	Class 2.4. Bread, pastry, cakes, confectionery, biscuits and other baker's wares	14/05/2013
Irish Salmon	Applied	PGI	Class 1.7. Fresh fish, molluscs, and crustaceans and products derived there from	
Connemara Hill lamb ; Uain Sléibhe Chonamara	Registered	PGI	Class 1.1. Fresh meat (and offal)	23/05/2006
Timoleague Brown Pudding	Registered	PGI	Class 1.2. Meat products (cooked, salted, smoked, etc.)	25/01/2000
Imokilly Regato	Registered	PDO	Class 1.3. Cheeses	11/11/1998
Clare Island Salmon	Registered	PGI	Class 1.7. Fresh fish, molluscs, and crustaceans and products derived there from	07/01/1999

6.5 Geographical indications and traditional specialities: Country comparisons by applicant country of origin

Figure 155 and 156 show the normalised geographical indications and traditional specialities across Ireland and the comparator countries (except Singapore as comparable data was unavailable). All countries demonstrated low levels of filings in this form of IP.

Figure 155: Comparison of geographical indications datasets (GDP)

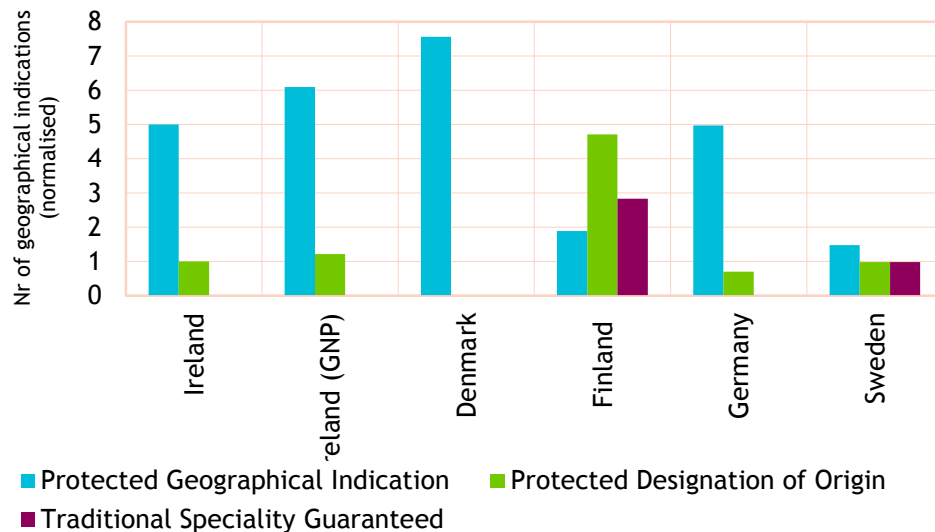
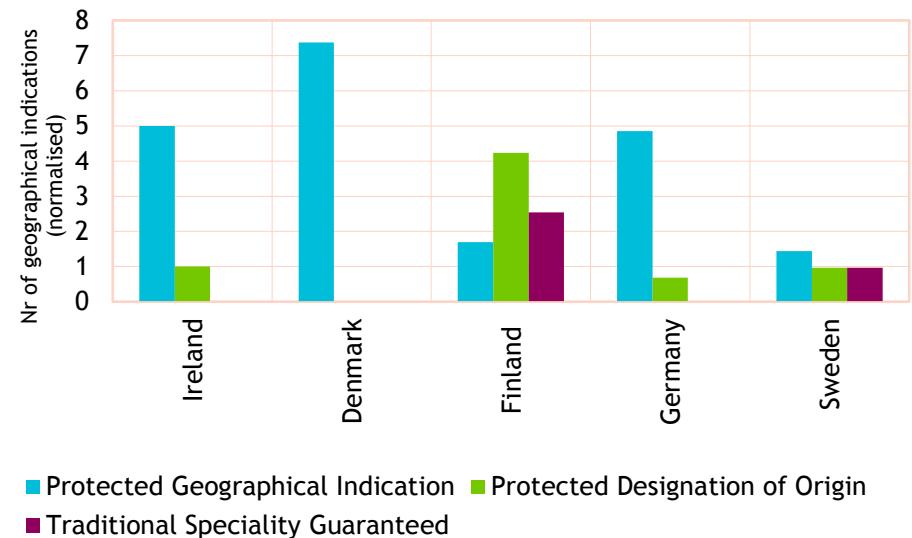


Figure 156: Comparison of geographical indications datasets (Population)



6.6 Copyright in Ireland

In Ireland, there is no registration procedure for owners of a copyright work. The act of creating a work also creates the copyright, which then subsists in the physical expression of the work. Copyrights are protected by law and illegal use of these rights can be contested in the Courts, the technical term for this misuse is infringement. The legislation provides for criminal offences and consequently infringers could face both civil liability and criminal convictions. Professional advice should be sought by copyright owners with regard to the options and the remedies available where infringement of their work occurs.

It is most important that the originator of a work can show subsequently when the work and the consequential copyright were created as it may be necessary to commence or defend infringement proceedings, at some later stage. One way of doing this is to deposit a copy of the work with an acknowledged representative who may be a bank or solicitor in such a way as to allow the date and time of the deposit to be recorded or notarised. Alternatively, one may send a copy of the work to oneself by registered post (ensuring a clear date stamp on the envelope), retaining the original receipt of posting and leaving the envelope containing the

copyright work unopened thus establishing that the work existed at that date and time.

Table 41 provides a summary table of reports that have been published on the topic of copyright data. The materials presented here are a collection of secondary research conducted by CambridgeIP.

The reports outlined in the table deal with a variety of legal, technological and economic interests. The varying degrees of legal protection for copyright materials across jurisdictions provides a rich arena in which reports analyse effective methods of enforcement and submit recommendations of cross-border resolutions. Additionally, the rapidly evolving technological advancement and diminished barriers to infringement of copyright materials in the era of digitization is a key area of study in published reports.

Table 41: Summary table of copyright data

Report title	Summary	Year Published	Publishing body
Economic Analysis of the Territoriality of the Making Available Right in the EU	In the European Union, the protection of copyright and related rights is territorial in the sense that these rights are provided by national laws and their geographical scope is limited to the territory of the state granting them. As a result, enforcement of rights occurs on a country-by-country-basis which leads to the question: Is the current European legal framework for copyright and related rights outdated with respect to the provision of online on-demand services?	2014	Charles River Associates
Study on the legal framework of text and data mining	The amount of available information is growing at an exponential rate, and it becomes more and more difficult to read, on any given topic, even if very specific and narrowly defined, whatever has been published, be it by publishers in subscribed periodicals or databases, in print materials or on the Web. TDM is, according to some, a growing and very promising economic sector. Its applications seem to be full of potentialities, in a whole range of sectors, from forensic investigation, to predictive marketing and scientific research in all kinds of sectors (be they commercial or not). At the same time, in today's world, most information becomes available in a digital format, either from its first creation or because of the growing digitization of existing print archives.	2014	De Wolf & Partners

Report title	Summary	Year Published	Publishing body
Study on the application of Directive 2001/29/EC on copyright and related rights in the information society	The Study comprises an assessment of the extent to which the implementation of the Directive 2001/29/EC (“the InfoSoc Directive”) is appropriate to the economic and technological realities of digital markets and has as its objective to evaluate whether and, if so, to what extent, further harmonisation in some areas of copyright is needed in order to enable the EU to capitalise on the opportunities of a digital single market. It takes into account the numerous and recent important decisions taken by the Court of Justice of the European Union (CJEU) and national courts since the last implementation report on the InfoSoc Directive, completed in 2007.	2013	De Wolf & Partners
Assessing the economic impacts of adapting certain limitations and exceptions to copyright and related rights in the EU	The objective of this report is to develop a framework for economic analysis of copyright exceptions and from the public policy perspective. We aim to make the framework useful in particular in the assessment of the merits of current claims for changes to the scope of exceptions. These calls for changes have recently become louder in light of technology improvements. The improvements allow for new channels of distribution and for new uses of creative work. They also reduce the cost of copying and affect transactions costs. With these changes taking place, changes in the scope of exceptions may be required.	2013	Charles River Associates
Study on the implementation and effect in Member States’ laws of Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society	Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society entered into force on 22 June 2001. ¹ The objectives of the Directive were twofold: (1) to adapt legislation on copyright and related rights to reflect technological developments, and (2) to transpose into Community law the main international obligations arising from the two treaties on copyright and related rights adopted within the framework of the World Intellectual Property Organisation (WIPO) in December 1996. This study, commissioned by the European Commission, examines the application of the Directive in the light of the development of the digital market. Its purpose is to consider how Member States have implemented the Directive into national law and to assist the Commission in evaluating whether the Directive, as currently formulated, remains the appropriate response to the continuing challenges faced by the stakeholders concerned, such as rights holders, commercial users, consumers, educational and scientific users	2005	Institute for Information Law, University of Amsterdam
The Recasting of Copyright & Related Rights for the Knowledge Economy	This study on the ‘Recasting of copyright and related rights for the knowledge economy’ was carried out by the Institute for Information Law on commission by the European Commission. Chapters 1 and 2 describe and examine the existing ‘acquis communautaire’ in the field of copyright and related (neighbouring) rights, with special focus on inconsistencies and unclarities, while Chapters 3-6 deal with distinct issues that were identified a priori by the European Commission as meriting special attention: possible extension of the term of protection of phonograms (Chapter 3), possible alignment of the term of protection of co-written musical works (Chapter 4), the problems connected to multiple copyright ownership, including the issue of ‘orphan works’ (Chapter 5), and copyright awareness among consumers (Chapter 6). Finally, Chapter 7 provides an overall assessment of the benefits and drawbacks of the fifteen years of harmonisation of copyright and related rights in the EU and dwells on regulatory alternatives	2005	Institute for Information Law, University of Amsterdam

Report title	Summary	Year Published	Publishing body
The contribution of Copyright and Related Rights to the European Economy	This study shows that the copyright industries are significant contributors to the economy, providing nearly 5.3 percent of total value added in the EU and 3.1 percent of total employment. The contributions of the copyright industries are far greater than many other industries that receive significant attention from policy makers. The core copyright industries—those in which copyright content is created, processed, and distributed—are the foundation and central economic generator of European copyright industries. Across the EU, the core industries and activities create the greatest wealth evidenced in higher value added from the core sectors than the copyright-dependent activities. The core industries also provide greater employment and produce higher productivity than the dependent industries.	2002	Media Group Business Research and Development Centre Turku School of Economics and Business Administration
Legal Protection of Databases	We received a total of 44 answers (25 answers to the questionnaire as sent on 17 June 2002 plus 19 answers to the questionnaire as sent on 8 June 2002). The respondents included private (9) and public (2) database right holders; private (4) and public (4) database users; as well as various organisations and individuals. Certain respondents were right holders and users at the same time. Some had turnovers in excess of 19 or 7 billion EUR. In spite of our best endeavours to widen the consultation process, these respondents may not form a fully representative sample of all concerned parties. Although we consulted the fifteen national authorities in charge of implementing the Directive, only the UK Copyright Directorate of the UK Patent Office - who proved very helpful throughout the study - and the Italian Ministry of Culture sent in their views.	2001	Nautadutilh
Conditions Applicable to Contracts Relating to Intellectual Property	All in all however, a review of the international instruments reveals that the main treaties and directives in the field of copyright and related rights offer little or no protection to authors and performing artists regarding the conclusion of exploitation contracts, nor do they contain any rule regarding the formation, execution, and interpretation of exploitation contracts. They merely imply, without more, that the economic rights of authors and performing artists may be freely transferred to third parties. Moreover, while the general rules of civil law can, in certain circumstances, be of some use to soften the harshness of restrictive agreements, these rules are generally not sufficient to protect the interests of authors and performing artists in their contractual relations with exploiters. It is therefore not surprising to note that a number of national legislators have filled the gaps left by private law with the adoption of measures to protect authors and performing artists in their contractual relations concerning the exploitation of their works and other subject matter.	2000	Institute for Information Law, University of Amsterdam
International Protection of Expressions of Folklore under Intellectual Property Law	Folklore is universal to human culture and dynamic. It permeates all cultures and every nation. Competing views exist between and within nations, organisations, and cultures with regard to the different aspects of folklore and its protection at international level under IP-law. Differences exist about how to define folklore, about what “expressions of folklore” are, if, and if so, why folklore should be protected, how it should be protected and how IP law might be used in that process. Differences in perspective will help enrich the discourse as we outline in this report.	2000	Stephen Palethorpe and Stefaan Verhulst Programme in Comparative Media Law and Policy University of Oxford
Moral rights in the context of the exploitation of works through digital technology	Except the United Kingdom which has heard of complaints with the British moral rights system (however no official complaint has ever been made to the government), no government has received any requests or complaints of authors and authors' organisations to change moral rights. There is no lobbying to change moral rights. With no exception, no government believes that moral rights have an impact on the internal market and more specifically on the free circulation of works inside the EC. Except the Italian government and Mrs. Kallinikou personally (Greece) who are in favour of harmonisation because the protection of moral rights is much lower in other Member states than in theirs, no governments sees a need for harmonising moral rights.	1999	Mrs Marjut Salokannel and Mr Alain Strowel with the collaboration of Mrs Estelle Derclaye

6.7 Trade secrets

A trade secret is information that companies and/or individuals keep confidential either within their own organisation or within networks of partners to obtain or keep a competitive advantage.

Broadly, trade secrets contain two types of information:

- technical (manufacturing processes, recipes, chemical compounds, etc.)
- commercial (lists of customers, results of marketing studies, product launch data, etc.).

Based on the inherent confidential nature of the data, systematic review and

studies are implicitly challenging. Any study would require a high level of statistical aggregation and anonymity to ensure protection of sensitive material. Additionally, data collection would largely be based on survey and externally reported data which is not within the scope of this report.

Table 42 provides a summary table of third-party reports identified by CambridgeIP. The reports mainly focus on the legal protection across jurisdictions for trade secrets and discuss possible frameworks adjustments and recommendations to harmonise protection across borders.

Table 42: Summary table of trade secret data

Report title	Summary	Published	Publisher
Approaches to protection of undisclosed information (trade secrets) - Background paper	This paper takes stock of the available legal protection for trade secrets (undisclosed information) in a broad sample of countries. Drawing on national and international material, the paper develops and presents an indicator of the stringency of protection of trade secrets (the Trade Secrets Protection Index) and provides an assessment of variation in the available protection. The result is a finding that while the sample countries have some similarities, notably with respect to definition and scope of trade secrets, they have many more substantial dissimilarities with respect to implementation of protection for trade secrets.	Jan-14	OECD
The Corporate Preference for Trade Secret	Many inventions can be legally protected either by patent or by trade secrecy, and a conventional wisdom exists on how to select between them. This Article adds to that literature by showing that corporations should have an inherent preference for trade secret over patent for reasons relating to their legal form. Among them is the idea that corporations are perpetual entities and therefore perfectly suited to reap the perpetual returns that only a trade secret can offer. The Article also addresses the potential for a conflict between the inherent corporate preference for trade secret and the preferences of corporate managers, who may prefer patent for reasons of their own	Dec-13	SSRN-University of Colorado Law
Economic espionage and trade secret theft: An overview of the legal landscape and policy responses	In the face of increasing threats of cyberespionage and theft of trade secrets, the United States is taking, and the European Union is actively considering, steps to update their respective laws, policies and practices. This article describes the United States' trade secret protection and enforcement system. It also provides a summary of the inconsistencies of trade secret protection across EU Member States, and brief discussions of perceived deficiencies and efforts to address them in both systems.	Sep-13	Covington & Burling LLP
Study on Trade Secrets and Confidential Business Information in the Internal Market	This Study investigates the legal and economic structure of trade secrets protection in the European Union. Extensive surveys of the economic literature and of the legal framework in Member States are matched by a comparative analysis with advanced economies representing different economic, legal and political models, namely Switzerland, the United States of America and Japan. The research is complemented by a statistical on-the-field survey on the perceived needs of European businesses, stratified across industry sectors and business dimensions. Based on the results of this combined analysis, the Study describes the current fragmented scenario, its commonly perceived weaknesses and the widespread appetite for a harmonized approach. The final recommendations advocate for legislative initiative on trade secrets protection at the EU level and highlight the areas where intervention would be most beneficial in terms of balanced economic growth and competitiveness for the Internal Market.	Apr-13	European Commission
Study on Trade Secrets and Parasitic Copying (Look-alikes)	Study providing clarification on the legal framework and practices, in the 27 Member States of the European Union, of trade secret protection and protection against parasitic copying (look-alikes) (the "Study").	Jan-12	European Commission

7. IP Trade

7.1 IP Trade: Introduction

IP trading generally refers to the buying, selling, licensing and transfer of IP rights under mutually agreed terms and conditions. Licensing terms and conditions can include:

- An exclusive licence provides that only the licensee (and, where permitted, persons authorised by the licensee) the ability to exploit the rights licensed under the agreement—even the patent holder is prevented from exploiting such rights
- A sole licence permits both the patent holder and a licensee to exploit a patented invention, but prevents the patent holder from licensing the rights to any other entity.
- A non-exclusive licence allows the patent holder to license some or all of the rights under a patent to an unlimited number of third parties, and also to retain the right to exploit a patented invention itself.
- Compulsory licensing provides that the owner of a patent or copyright licenses the use of their rights against payment either set by law or determined through some form of arbitration
- Cross-licensing is a contract between two or more parties where each party grants rights to their intellectual property to the other parties
 - Patent pooling is a form of cross-licensing in which a consortium of at least two companies agreeing to cross-license patents relating to a particular technology or sector

7.2 IP Trade in Ireland: analysis based on patent legal events

As patents evolve through the patent process they are assigned various legal status codes. The codes vary by national and regional patent offices, and cover a wide range of potential legal events associated with a patent processing. The type of information that can be recorded as a legal event includes:

- Change of Owner / Applicant
- Correction / Amendment / Modification in Specification
- Entry (incl. translations) of EP/EA patent
- Examination Request / Search Report / Exam. Proc.
- Fee Payment or In Force Announcement
- Lapse (non-payment of fees)
- Licensing / Exploitation
- Notice of new or withdrawn publication
- Nullification of Parts of Rights / Limitation
- Opposition Proc. / Re-examination / Appeal to Court
- Reinstatement / Restoration
- Term Extension of Rights (e.g. SPCs)
- Time Extension (e.g. Payments, Completion of Specs., etc.)

Of primary interest in this section of the study is the legal status data relating to the Licensing/Exploitation of patents. CambridgeIP analysed the legal status data associated with the patents filed listing an Irish applicant. Of the 36,071 patents analysed in the dataset 142 legal licensing events associated with 133 distinct patents were listed (the higher value of legal events accounts for multiple license registrations on a single patent document).

The low volume of legal assignments could be due to a number of reasons, including:

- lack of legal requirement to file documentation
- additional transactional cost of submitted documentation
- lack of legal infrastructure at national patent offices to process legal event
- lack of knowledge/awareness of system
- data confidentiality

Table 43: Irish applicant data of legal events relating to IP trading

Legal event	Patent office				Total
	DE	EA	EP	GB	
Licensing / Exploitation	1	6	91	44	142
Assignments for licence or security reasons				44	44
Concession to grant licenses			5		5
Licenses			7		7
Registering of licences or other rights			79		79
Registration of a license in a contracting state		6			6
Willingness to grant licenses	1				1

(DE = Germany; EA = Eurasian Patent Organization; EP = European patent office; GB = UK Patent office)

7.3 IP Trade in Ireland: analysis based on firm survey data

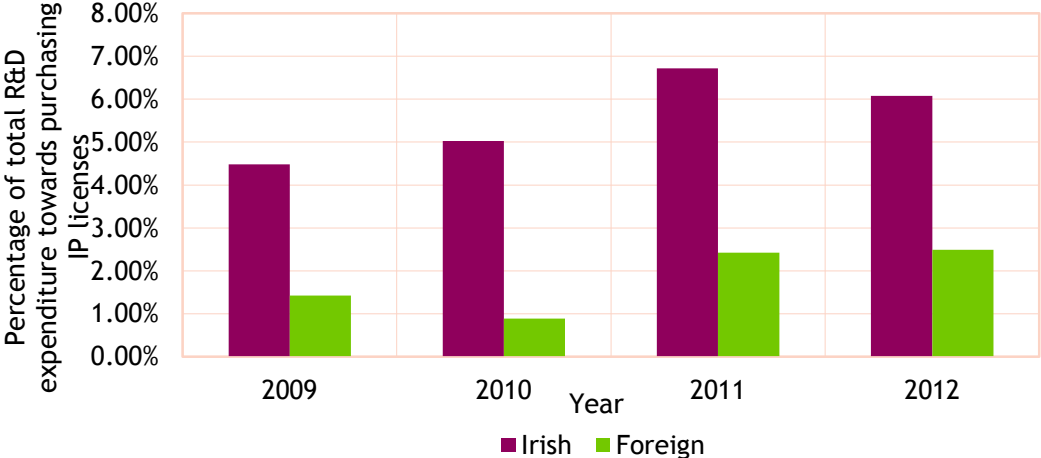
Context and summary

Ireland’s Central Statistics Office surveys the entities within Ireland for Business Expenditure on research and development (BERD). This has been reviewed for BERD 2007-2008, BERD 2009-2010 and BERD 2011-2012. There was no licensing expenditure data for BERD 2007-2008.

Data and findings

From figure 157, it can be seen that the survey reports that IP Licence purchasing relates to a much greater proportion of the R&D expenditure by Irish-owned firms than is the case for foreign owned firms operating in Ireland. Over the period 2009-2012, Irish firms reported spending 5.58% of their total R&D expenditure on IP Licence purchasing in contrast to the 1.81% reported by foreign owned firms.

Figure 157: Licensing expenditure as an average percentage of total R&D expenditure for Irish and foreign owned entities purchasing IP licences 2009-2012



7.4 IP Trade in Ireland: based on analysis of HEI licensing activities

Context and summary

In May 2014 Enterprise Ireland published 'A review of the Performance of the Irish Technology Transfer System 2007-2012' which aimed at evaluating the Technology Transfer Strengthening Initiative programme (TTSI1).

Data and findings

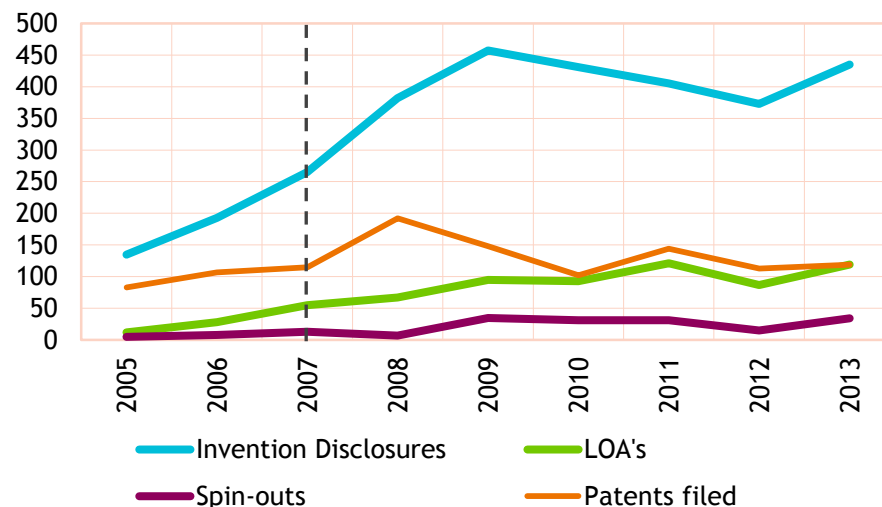
The report presents annual data (see figure 158) on four key metrics of technology transfer and IP to underpin its findings and assessment. The data includes: number of inventions disclosures to the technology transfer office (TTO); number of new patents filed by the TTO; number of licences, options or assignments (LOA) agreements contracted by the TTO; and number of new spin-out companies created.

The CambridgeIP analysis, based on Irish applicant data returned slightly higher numerical findings* for patent filings for HEIs, but with similar trends for the period of 2005 - 2008. The data begins to diverge in the period of 2009-10, when the CambridgeIP data continues to show an increase in patent filings, while the TTO data starts to decrease. This is likely due to the patent publication lag as the TTO data was collected in December 2013. Therefore the CambridgeIP patent analysis complements the rise indicated by the other metrics indicators through to the peak in 2009.

In consideration of the patent publication lag, we would recommend re-reviewing data pertaining to patent filings in 2010-12 in a two to three year period from now.

* Numerical variances are likely due to difference in data collection methodology, such as patent family count compared to patent application filings. A background note has been developed to provide an explanation of further methodological variations.

Figure 158: Annual performance by HEIs in receipt of funding under TTSI1 under the TTS1 programme that commenced in 2007 (based on data from the TTO)



7.5 IP Trading reports

Various reports published by the European Commission and the OECD note the growing body of ‘anecdotal evidence’ to suggest the increased volume and value of patent licensing. The OECD report on ‘Who licenses out patents and why? Lessons from a Business Survey’ identifies that ‘statistics on this topic are scarce’ and indicated this was largely a factor of the limitations of data collection

through firm surveys and interviews as well as the commercially sensitive nature of the information requested. Key challenges identified include: lack of response due to data confidentiality, difficulty identifying key knowledge holders, different types of licensing strategies across business units (often with respect to larger firms) and lack of resources to participate (often from smaller firms). Accounting for these limitations, the table below summaries the key findings and data across key licensing topic areas.

Table 44: Comparison table of IP trading reports

Survey population	European Commission report (2013)	OECD report (2009)
	330 European firms during the time from March 2012 to April 2013	600 European firms responded in the second half of 2007
Overall	Patent licensing has to be mostly understood as ‘technology licensing’, as patents are rarely out-licenced on their own	About 20% of European companies holding patents license out at least one of their patents to an unaffiliated partner. Among EU companies doing licensing in 2006, 45% declared licensing revenue increases. Rise seems to be associated to the number of contracts, not to increases in licensing fees.
Licensing activity by firm type	Statistically significant differences for out-licensing to non-affiliated firms between firms that have subsidiaries abroad. Firms without subsidiaries out-license more of their patent portfolios to non-affiliated firms than firms with subsidiaries. SMEs tend to out-license higher shares of their stock of out licensed patents to non-affiliated parties than large firms.	The relationship between size and probability to license out among patent holding companies is U-shaped: the smallest ones and the largest ones are more often involved in licensing out than
Activity by geography		Highest proportion of firms license-out in Europe is found in the UK, followed by Nordic countries.
Licensing activity by sector	Considerable differences across industries when it comes to licensing behaviour. There are industries where patents are used mostly internally (such as in Industrial engineering). In healthcare patents are a currency for doing business with other firms and licensing is more commonplace.	
Geographical licensing interactions between firms	Trade in patents via (out-)licensing occurs predominantly within Europe. The second most important trading region is North America, leaving behind Asian regions to a considerable extent.	
Motivations for licensing	There are differences between SMEs and large firms, with SMEs placing more importance on revenue generating motives, while large firms out-license more to ensure FTO and stop (perceived) infringement.	Earning revenue is the major motivation for licensing out, followed by sharing technology with other companies. “Constrained licensing” (pressuring alleged infringers to take a license) is also important in Europe.
Barriers to licensing	By far most important barrier for patent out-licensing is the potential loss of their competitive/technological edge, followed by difficulties to identify the right partners.	Main hampering factor by far is the difficulties to find partners (25% of European companies). Other factors have lower importance: the complexity and cost of drafting and negotiating contracts, the lack of readiness of the invention, the too low level of the price offered
IP trading support	We see a cascade of measures by which patents are shared/transferred to third parties. (Bilateral) out-licensing of patents is the means probably used most, followed by sale of patents and entering joint ventures. Patent pools are rarely used with the exception of groups of companies in specific technology fields where standards play an important role. Patent auction events are currently irrelevant for the majority of firms.	Collective mechanisms (patent pools, clearing houses, patent auctions) for organising transactions involving patents still concern a small number of firms in Europe

8. Observations & Insights

8.1 Observations: Patents

Patents: Filing Volume, Trends, and Grant Rates

- There were 36,081 applications filed since 1999 with Ireland listed as an applicant country: there have been 11,233 granted patents. The filing trend shows an increase in patenting until 2008, from which point there has been a slow decrease in the number of filings.
- There were 31,980 applications filed since 1999 with Ireland listed as an inventor country: there have been 9,601 granted patents. The filing trend shows that there was an increase in patenting until 2008, from which point there has been a slow decrease in the number of filings.
- In 1999, Ireland was positioned 5th of the 6 countries compared. Based on both applicant and inventor country analysis: based on raw patent volumes and normalised by GDP and population. However In 2010, Ireland was positioned 6th of the 6 countries compared for raw patent volumes. This was because Ireland was surpassed by Singapore in 2003. When normalised by population, Ireland was 6th in the rankings for both applicant and inventor country analysis. When normalised by GDP and GNP, Ireland was in 5th position in the rankings for both applicant and inventor country analysis. The European comparator countries were chosen for their 'Innovation Leader' status, and consequently are amongst the highest European filers.
- Finland, Germany, Sweden, Denmark, Singapore and Ireland demonstrated broadly similar trends- with some growth or periods of approximately constant patenting volumes demonstrated between 1999-2008, followed by varying levels of decline or plateauing in patenting volumes between 2008-2010. This was found to be the case for both applicant country and inventor country analysis for normalisations by GDP and population: the exception to this is for Singapore which demonstrated a continuing increase in absolute patent volumes for both applicant and country between 1999-2010, and when normalised by population.
- The relative decline in absolute patenting terms between 2008 and 2010 was smaller for Ireland compared to the declines for Finland, Germany, Denmark and Sweden.
- For patent families, analysis by inventor countries indicates similar trends for all countries to that of the patent volume analysis.
- However, looking at patent family behaviour based on applicant country analysis indicates that Ireland shows growth in numbers of applications from 1999-2008 followed by a plateau to 2010. This is in comparison to other countries that indicate a drop in patent families from 2008-2010: the exception being Singapore which demonstrates continuing growth in absolute patent family volumes between 1999-2010 and when normalised by population.
- Ireland exhibits a grant rate that is lower than the comparison countries based on both applicant country and inventor country analysis, over the time period 1999-2013.

Patents: Organisation Type

- Based on Irish applications, the greatest contribution towards patent filings in Ireland over the 1999-2013 time frame was by companies at 65.6% of applications. However, the number of company applications peaked in 2006 and progressively decreased up to 2010.
- Based on Irish applications, HEIs accounted for 6.1% of patent filings in Ireland over the 1999-2013 time frame. The number of HEI patent applications increased year on year from 2000 up to 2009, with a decline measured in 2010.
- Over the 1999-2013 period, the top ten Irish applicants included 8 companies and 2 HEIs.
- Relative to Finland, Germany, Sweden, and Denmark, HEIs in Ireland accounted for a greater proportion of patent applications by country of origin between 1999 - 2013: HEIs in Singapore exhibit the same proportionate contribution to patent applications as Ireland.
- Ireland demonstrated the 2nd lowest proportion of companies contributing to the overall patent filings by country applicant amongst the comparator countries over the 1999-2013 time frame: Singapore demonstrated the lowest proportion of contribution by companies at 58%.
- Based on Irish applicant analysis, 358 companies had 10 or more patent applications over the 1999-2013 time frame. These 358 companies accounted for 17,111 applications. This equates to 77% of total applications by companies that made applications with Ireland as the country of origin over the time frame considered.
- Ownership status of 281 of these top 358 top patenting companies was assigned. Based on these 281 companies, the data indicated that Irish owned companies account for a larger proportion of these companies but the foreign owned entities patented more in terms of volume than their Irish owned counterparts.

Patents: Co-applications

- HEIs and government research institutes account for 4 of the top ten co-applicant entities, based on analysis of Irish applicants with any nationality co-applicant.
- HEIs and government research institutes account for 7 of the top ten co-applicant entities, based on analysis of Irish applicants with Irish co-applicant.
- HEIs figure 3 times in the top ten Irish applicant: foreign co-applicant applicant pairings.
- HEIs government research institutes figure 7 times in the top ten Irish applicant: Irish co-applicant pairings.

Patents: Technology and Sector Trends - IPC/NACE codes

- For Irish filings, both as applicant and inventor country, the IPC relating to 'Human necessities /Health' dominates over the 1999 - 2013 time frame.
- In more recent years the 'Human necessities/Health' IPC has been in decline, with technologies around physics coming to the fore.
- Ireland's technology interests are primarily focused on "human necessities" technologies, to a greater proportional extent than all other comparator countries.
- Based on applicant data, Ireland's patenting around computing has grown, as shown by the increase in IPC section G (Physics - containing computing technologies). Such growth is not seen to this extent in the comparator countries, except for Finland.
- Based on mapping of IPC codes to NACE sectors, it is determined that:
 - The patenting activity in the pharmaceutical sector has been in sharp decline since 2006.
 - The drop in the pharmaceutical sector in the inventor country analysis is entirely fuelled by Irish inventors with foreign applicants - with a drop of ~50% in applications between the time periods 1999-2005 and 2006-2013. Irish inventors with Irish applicants actually show an approximate ~10% increase between the two time periods.
 - Patenting applications in the office machinery and computing sector for both Irish applicant and Ireland as the inventor country has increased over the 1999-2013 time frame. Applications by Irish inventors patenting in the computing sector almost doubled when the two time frames 1999-2005 to 2006-2013 are compared, whereas for Irish applicants, an increase of approximately 50% was measured.
 - The increase in the office machinery and computing sector in the inventor country analysis is driven by Irish inventors with Irish applicants: Irish inventors with foreign applicants exhibit a decline in patent applications in this sector between the two time periods considered.
 - In examining the applications between 1999-2005 and 2005-2013, Irish inventors with foreign applicants exhibited a decline in patent applications across all of the top ten sectors highlighted for the 1999-2005 period.

Patents: Filing Location

- Ireland, the US and the EPO are the three main filing locations for Irish applicants and Irish inventors.
- Ireland was a dominant filing location for Irish applicants and inventors until 2003-04.
- The US began to emerge as a more popular filing location from 2004, and since 2004 has become the dominant filing location for both Irish applicants and Irish inventors.
- Filings at the Irish filing office by Irish applicants and Irish inventors have continued to drop over the time frame 1999-2010.
- In parallel, filings at the US and EPO by Irish applicants and Irish inventors continued to increase up to 2008, after which they reached a plateau: the exception is filings by Irish applicants at the US office which have continued to increase up to 2010.
- When the filing locations were investigated in terms of Irish applicants/Irish inventor, it was found that:
 - Filings at the Irish filing office declined year on year over the time frame, and from 2006, filings at the US filing office dominated.
 - Applications at the US filing office grew rapidly, year on year, from 2003-2008, after which they continued to grow at a slower year on year rate to 2010.
 - Filings at the EPO also grew year on year from 1999 to 2008 and then plateaued to 2010.
 - Based on a comparison between the time frames of 1999-2005 and 2006 -2013, it was found that the proportion of filings at the Irish Office fell from 38% to 18%, and the proportion of filings at the US office increased from 14% to 40% of all filings by the group of Irish applicants/Irish inventor.
- Filing location trends by foreign applicants/Irish inventor and Irish applicant/foreign inventor were more erratic over the 1999-2010 time frame than those of Irish applicant/Irish inventor. The key features are as follows:
 - Foreign applicant/Irish inventor:
 - The Irish filing office did not make the top 5 filing locations.
 - There was a gradual increase in the filing applications at the EPO up to 2005 after which the application numbers plateaued up to 2010.
 - Filings increased nearly three fold between 1999 and 2005 at the US office, but declined to zero between 2005 and 2009.
 - Irish applicant/foreign inventor:
 - Filings at the Irish office modulated throughout the 1999-2010 period, but did not exceed 55 applications in any one year.
 - Filings at the EPO increased quickly between 1999 and 2002, and have risen - though not continuously - at a slower pace between 2002 and 2010.
 - Filings at the US office have also shown significant growth between 1999 and 2010- though not in a continuous year on year fashion.

8.2 Observations: Other forms of IP

Trademarks

- In 2011, Irish applicants filed 27,177 trademark applications, this accounts for -0.675% of global filings.
- Global filing trends cite a 5.7% annual growth rate for the period of 2005-2012. For the same period, Ireland records an annual rate of increase of 7.1% in trademark filings.
- Ireland demonstrates similar trends in Trademark applications to Finland, Germany, Sweden, and Denmark over time, with a rapid rise in Trademark registrations since 2003: Singapore has demonstrated a much slower pace of growth over the 1999-2012 time frame considered, and ranks lowest in terms of Trademark applications when normalisation is by GDP or population.
- Ireland ranked 4th after Germany, Sweden and Denmark and ahead of Finland and Singapore with regards to the number of Trademark applications (normalised to GDP/GNP and population) in the 1999-2012 period .
- Irish applicants, on average, file 10-12% of annual trademarks domestically and the remainder are filed in other foreign jurisdictions.
- Country level comparison indicates that Irish applicants have a higher proportion of foreign filings than the comparator countries.

Industrial design rights

- In 2011, Irish applicants filed 2,228 industrial design applications, accounting for -0.22% of global filings.
- Irish applicants, on average, file 10-12% of annual design rights domestically and the remainder are filed in other foreign jurisdictions: these proportions are similar to those reported by comparator countries except for Singapore.
- Out of the 6 countries compared, Ireland ranks 5th in 1999 and 2011 in terms of volume of Industrial design applications (both when normalised by GDP/GNP and population): Singapore ranks 6th in both of these years.
- Annual filing trends across the 4 European comparator countries appear to show a similar filing increase year-on-year until about 2006-2007 where there appears to be a stagnation. However Irelands shows a slow but steady growth in industrial designs from 2002 onwards.

Plant variety rights

- Ireland has registered 217 Plant Variety Rights since 1999. The 217 Plant Variety Rights comprise 163 National Listings, 54 Plant Breeder's Rights.

- Irelands IP activity is comparable to that of Finland for this IP type, but below the levels of activity in Germany, Denmark and Sweden.

Geographical indications

- Irelands IP activity is comparable to that of Finland for this IP type, but below the levels of activity in Germany, Denmark and Sweden.
- Ireland currently holds six (6) protections of geographical indications and traditional specialities , five (5) are listed as protected geographical indications and one (1) is a protected designation of origin.
- The comparator countries also exhibited low levels of this type of IP.

Copyright

In Ireland, there is no registration procedure for owners of a copyright work. There was no quantifiable data found for Ireland for this IP type.

Trade Secrets

No quantifiable data found was for Ireland for this IP type.

8.3 Summary of IP activity in Ireland

IP Type	Ireland	EU comparators [Denmark, Finland, Germany, Sweden]	Singapore comparison
Patents			
Trends	In both applicant and inventor filings patent volumes increased year-on-year until 2008, from which point there has been a gradual decline	Demonstrates broadly similar trends of constant patent volume growth 1999-2008, followed by levels of plateauing (or decline) between 2008-2010	Demonstrated continued growth in absolute patent volumes through 2010.
Type of Organisation	Of applications filed 1999-2013: 65.6% Companies; 6.1% HEIs, 26.2% individuals; 0.4 % Gov/Non-Profit; 1.6% Other. The top ten Irish applicants included 8 companies and 2 HEIs.	Ireland shows a greater proportion of filing from HEIs.	Similar proportions of HEI contribution to applications.
Sector (IPC)	Human necessities/Health' dominates; however, in recent years Physics and computing have come to the fore.	Ireland has a greater proportion of 'human necessities' technologies than any other country. Ireland's growth in 'Physics' technologies (including computing) is unique across the comparators (with the exception of Finland).	Singapore shows a continued dominance in the 'Electricity' technology focus area.
Sector (NACE)	Activity in pharmaceutical sector has been in decline since 2006. Irish inventor with Irish applicants are driving the increase in office machinery and computing sector since 2006.		
Filing location	Ireland, the US and the EPO are the three main filing locations for Irish applicants and Irish inventors. With the US emerging as a dominant location in 2004.	The PCT system and EPO have reported considerable growth in their patenting systems in recent years.	The PCT system and EPO have reported considerable growth in their patenting systems in recent years.
Collaboration	4 of the top ten collaborating entities of Irish applicant/foreign co-applicant were HEI or govt. Whereas, 7 out of the top ten of Irish applicant/Irish co-applicant were HEI or govt.		

8.3 Summary of IP activity in Ireland

IP Type	Ireland	EU comparators [Denmark, Finland, Germany, Sweden]	Singapore comparison
Trademarks			
Trends	Irish applicants filed 27,177 trademark applications, this accounts for ~0.675% of global filings. Ireland records an annual rate of increase of 7.1% in trademark filings.	Comparators demonstrates similar filing trends over time, with a rapid rise since 2003. Normalised to GDP/GNP and population Ireland ranked ahead of Finland in application filings.	Normalised to GDP/GNP and population Ireland ranked ahead of Singapore.
Sectors (NICE)	'Advertising, business management, business administration...' most commonly ascribed classification.		
Other forms of IP			
Industrial Design Rights	In 2011 Ireland applicants accounted for ~0.22% (2,228) of global filings; on average filing 90% of applications in foreign jurisdictions.	Ireland ranks 5th in terms of volume and normalisation factors. Comparator countries show a stagnation since 2008 that is not reflected in the Irish trend.	Singapore consistently has slightly lower volumes of filings
Plant variety rights	217 registered since 1999	Comparators show similar low volumes	Data not available
Geographical indications	6 protections held	Comparators show similar low volumes	Data not available

9. Appendix

APPENDIX: Data sources and coverage

Here we outline the data sources and coverage analysed in the report.

Data was queried and analysed using a series of tools and methodologies. Patent data specifically was indexed and integrated into CambridgeIP's proprietary internal patent analysis system DiscoverIP, particularly for the development of network analysis. Data queries were developed using SQL coding and exported into .csv file formats for further analysis.

Table 45: Data source table

Data type/ Source		Coverage		
Research Focus	Data Resource	IE	EU	Global
Patents	PATSTAT (including DOCDB)	x	x	x
Trademarks	WIPO (including Madrid)	x	x	x
Plant Variety	UPOV Variety Finder	x	x	x
Geographical indication	Database of Origin and Registration (EU)	x	x	x
Design rights	WIPO statistics (including Hague database)		x	x
Copyright	various reports		x	
Trade Secrets	various reports		x	
R&D, Financial and Business Data	BERD	x		
	CIS	x	x	
	World Development Indicators Database	x	x	x

APPENDIX: Patent information - INID codes

Here is the list of INID code numbers and their accompanying explanation :

- (10) Data concerning the registration/renewal & Identification of the publication
- (11) Number of the publication
- (12) Kind of the publication
- (13) Kind of document code (according to ST.16)
- (19) Country code (ST.3), or other identification, of the country of publication
- (20) Data concerning the application & local filing details
- (21) Number given to the application
- (22) Date of making application
- (23) Other date(s) of filing, such as of complete application
- (24) Date from which industrial property rights may have effect
- (25) Language in which the published application was originally filed
- (26) Language in which the application is published
- (30) Data relating to priority under the Paris Convention & Priority details
- (31) Number assigned to priority application
- (32) Date of filing of priority application
- (33) Country in which priority application was filed
- (34) Priority filings under regional or international arrangements. At least one Paris Convention member state (or WTO member) must be named
- (40) Dates(s) of making information available to the public & Date of publication
- (41) Date of making available to the public by viewing, or copying on request, an unexamined specification which has not yet been granted
- (42) Date of making available to the public by viewing, or copying on request, an examined specification which has not yet been granted
- (43) Date of publication by printing of an unexamined specification which has not yet been granted
- (44) Date of publication by printing of an examined specification which has not yet been granted
- (45) Date of publication by printing of a granted patent
- (46) Date of publication by printing of the claim(s) only
- (47) Date of making a granted patent available to the public by viewing, or copying on request
- (48) Date of issuing a correction
- (50) Technical information
- (51) International Patent Classification
- (52) Domestic or national Classification
- (53) Universal Decimal Classification
- (54) Title of the invention
- (55) Keywords
- (56) List of prior art documents
- (57) Abstract or claim
- (58) Field of search
- (60) Reference to other legally related domestic document(s)
- (61) Related by addition
- (62) Related by division
- (63) Related by continuation
- (64) Related by reissue
- (65) Related by being the same application
- (66) Related by filing after abandonment
- (67) Related by filing as a utility model after filing as a patent
- (68) Related by filing for a Supplementary Protection Certificate (SPC)
- (70) Identification of parties concerned with the application or registration
- (71) Name of applicant
- (72) Name of inventor
- (73) Name of grantee
- (74) Name of attorney or agent
- (75) Name of inventor who is also applicant
- (76) Name of inventor who is also applicant and grantee
- (80) - (90) Identification of data related to International Conventions and to legislation with respect to SPCs
- (81) Designated State(s) according to the Patent Cooperation Treaty (PCT)
- (83) Information relating to deposit of microorganisms under e.g. the Budapest Treaty
- (84) Designated contracting states under regional patent conventions
- (85) Date of supply of the international patent application to the national patent office
- (86) Filing data of the international application
- (87) Publication data of the international application
- (88) Date of deferred publication of the search report
- (91) Date on which an international document filed under the PCT fails to enter the national or regional phase
- (92) For an SPC, number and date of the first national authorization to place the product on the market
- (93) For an SPC, number, date and where applicable country of origin of first authorization to place the product on the market within a regional economic community
- (94) Calculated date of expiry of the SPC, or the duration of the SPC
- (95) Name of the product protected by the basic patent and the SPC
- (96) Regional filing data
- (97) Regional publication data

Appendix: Comparator countries normalisation

year and for each comparator country. The factors are shown below, and are using international dollars at the fixed pricing taken from 2011 (2011int\$)

Applications for comparator countries were normalised by GDP/GNP for each respective year. This was achieved through creating normalisation factors for each

Table 46: GDP values for all comparator countries

	1999	2000	2001	2002	2003	2004	2005
Ireland	136,526,059,970	151,063,819,793	158,594,438,877	167,185,721,764	173,421,308,887	180,704,638,068	191,692,359,836
Ireland GNP	115,511,530,149	128,341,210,930	131,748,043,796	136,127,839,184	146,350,336,908	153,044,048,964	163,403,349,721
Denmark	209,929,303,835	217,336,986,578	218,868,851,777	219,888,448,559	220,732,448,949	225,801,541,040	231,322,722,733
Finland	161,917,597,300	170,537,687,531	174,432,337,697	177,631,652,838	181,206,371,489	188,680,900,492	194,182,948,507
Germany	2,860,947,902,016	2,948,425,659,292	2,993,075,764,568	2,993,379,506,781	2,982,141,044,908	3,016,767,657,163	3,037,422,127,631
Sweden	296,564,366,476	309,767,983,151	313,678,216,723	321,468,155,126	328,976,692,622	342,908,400,612	353,746,997,864
Singapore	188,663,413,978	205,724,096,401	203,349,221,341	211,893,869,778	221,599,145,249	241,895,624,489	259,724,293,908
	2006	2007	2008	2009	2010	2011	2012
Ireland	202,245,365,960	212,297,344,472	207,710,898,884	194,449,711,989	192,382,393,712	196,554,581,176	196,863,235,406
Ireland GNP	175,452,222,537	182,522,393,218	179,072,368,383	160,803,186,736	160,669,772,836	159,500,382,496	160,182,091,918
Denmark	239,175,459,246	242,962,233,611	241,057,768,736	227,398,674,804	230,552,374,026	233,022,250,301	232,186,333,632
Finland	202,747,566,742	213,564,606,039	214,191,568,603	195,902,580,395	202,490,847,502	208,012,246,214	206,292,614,325
Germany	3,149,806,746,354	3,252,775,356,480	3,288,009,453,161	3,118,825,040,652	3,243,966,832,310	3,352,099,060,054	3,375,183,468,224
Sweden	368,948,139,450	381,175,986,026	378,837,791,020	359,790,794,462	383,381,719,507	394,624,726,777	398,287,537,037
Singapore	282,120,078,600	307,566,039,407	312,941,201,908	310,478,990,566	356,370,225,761	374,760,236,070	379,703,195,944

Appendix: Comparator countries normalisation

year and for each comparator country. The factors are shown below, and are using international dollars at the fixed pricing taken from 2011 (2011int\$)

Applications for comparator countries were normalised by GDP/GNP for each respective year. This was achieved through creating normalisation factors for each

Table 47: GDP normalisation values for all comparator countries

	1999	2000	2001	2002	2003	2004	2005
Ireland	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ireland GNP	0.85	0.85	0.83	0.81	0.84	0.85	0.85
Denmark	1.54	1.44	1.38	1.32	1.27	1.25	1.21
Finland	1.19	1.13	1.10	1.06	1.04	1.04	1.01
Germany	20.96	19.52	18.87	17.90	17.20	16.69	15.85
Sweden	2.17	2.05	1.98	1.92	1.90	1.90	1.85
Singapore	1.38	1.36	1.28	1.27	1.28	1.34	1.35
	2006	2007	2008	2009	2010	2011	2012
Ireland	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ireland GNP	0.87	0.86	0.86	0.83	0.84	0.81	0.81
Denmark	1.18	1.14	1.16	1.17	1.20	1.19	1.18
Finland	1.00	1.01	1.03	1.01	1.05	1.06	1.05
Germany	15.57	15.32	15.83	16.04	16.86	17.05	17.14
Sweden	1.82	1.80	1.82	1.85	1.99	2.01	2.02
Singapore	1.39	1.45	1.51	1.60	1.85	1.91	1.93

Appendix: Comparator countries normalisation

Applications for comparator countries were normalised by Population, using 2012 population.

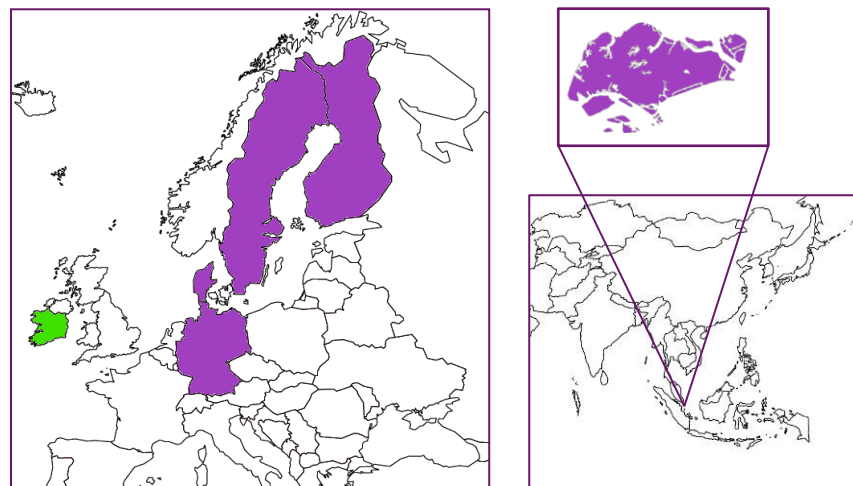
Table 48: Population for comparator countries

Comparator country	Population (millions)
Ireland - IE (GDP)	4.59
Ireland - IE (GNP)	4.59
Denmark - DK	5.59
Finland - FI	5.41
Germany - DE	80.43
Sweden - SE	9.52
Singapore - SG	5.31

Table 49: Normalisation factors for comparator countries

Comparator country	Population
Ireland - IE	1.00
Ireland - IE (GNP)	N/A
Denmark - DK	1.22
Finland - FI	1.18
Germany - DE	17.53
Sweden - SE	2.08
Singapore - SG	1.16

Figure 158: Comparator countries



APPENDIX: Geographical indication reference tables

Table 50: Geographical indication reference table

PDO/PGI	Description
Class 1.1	Fresh Meat(and offal)
Class 1.2	Meat products (cooked, salted, smoked, etc.)
Class 1.3	Cheeses
Class 1.4	Other products of animal origin (eggs, honey, various dairy products except butter, etc.)
Class 1.5	Oils and fats (butter, margarine, oil, etc.)
Class 1.6	Fruit, vegetables and cereals fresh or processed.
Class 1.7	Fresh fish, molluscs and crustaceans and products derived therefrom
Class 1.8	other products of Annex 1 of the treaty (spices etc.)
Class 2.1	Beers
Class 2.2	Natural mineral waters and spring waters (discontinued) (1)
Class 2.3	Beverages made from plant extracts
Class 2.4	Bread, pastry, cakes, confectionery, biscuits and other baker's wares
Class 2.5	Natural gums and resins
Class 2.6	Mustard paste
Class 2.7	Pasta
Class 3.1	Hay
Class 3.2	Essential oils
Class 3.3	Cork
Class 3.4	Cochineal (raw product of animal origin)
Class 3.5	Flowers and ornamental flowers
Class 3.6	Wool
Class 3.7	Wicker
Class 3.8	Scutched flax
Class 2.8	Beverages made from plant extracts
Class 2.9	Ice-creams and sorbets

APPENDIX: Geographical indication reference tables

Table 51: Geographical indication reference table

TSG	Description
Class 1.1	Fresh Meat(and offal)
Class 1.2	Meat products (cooked, salted, smoked, etc.)
Class 1.3	Cheeses
Class 1.4	Other products of animal origin (eggs, honey, various dairy products except butter, etc.)
Class 1.5	Oils and fats (butter, margarine, oil, etc.)
Class 1.6	Fruit, vegetables and cereals fresh or processed.
Class 1.7	Fresh fish, molluscs and crustaceans and products derived therefrom
Class 1.8	other products of Annex 1 of the treaty (spices etc.)
Class 2.1	Beers
Class 2.2	Chocolate and other food preparations containing cocoa
Class 2.3	Confectionery, bread, pastry, cakes, biscuits and other baker's wares.
Class 2.4	Pasta, whether or not cooked or stuffed.
Class 2.5	Pre-cooked meals
Class 2.6	Prepared condiment sauces
Class 2.7	Soups or broths

APPENDIX: IPC Structure

The International Patent Classification, or IPC, is administered by the World Intellectual Property Organization (WIPO). The scheme was conceived as an indexing system to organize patent documents from around the world based on the technical field of the invention, thereby providing a retrieval system by subject matter, independent of keyword searching. It provides a hierarchical system of language independent symbols for the classification of patents and utility models according to the different areas of technology to which they pertain.

Full technology descriptions and details of the classification system can be found here: <http://www.wipo.int/classifications/ipc/en/>.

Table 52: IPC structure table

IPC Symbol		
Example	IPC level	Technology description
A	Level 1 [L1]	Section
A02	Level 2 [L2]	Class
A02B	Level 3 [L3]	Subclass
A02B 30/00	Level 4 [L4]	Main Group
		Sub-group (sometimes this level is not used - and information is contained in sub-groups)
A02B 30/10	Level 5 [L5]	
A02B 30/102	Level 6 [L6]	Full details

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