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June 2015

Enhancing the intellectual property activities in the firm base in Ireland

An independent report for the Department of Jobs, Enterprise and Innovation

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Acknowledgements: We would like to thank the participating firms and stakeholders who provided their views through survey and interview, and the expert IP Advisory Group and Strategic Policy Division, Department of Jobs, Enterprise and Innovation for their support and guidance throughout the study.

Preface

The Action Plan for Jobs 2015 highlighted that management of intellectual property (IP) assets will be a valuable source of enterprise growth into the future and that there is opportunity for firms in Ireland to strengthen their performance in this area. As part of the Action Plan, DJEI committed to bring forward a set of recommendations as to how Ireland might best support the enhancement of the IP activity in the firm base in Ireland.

An Advisory Group, which was chaired by the Department of Jobs, Enterprise and Innovation, provided guidance for this work.

The Technopolis Group was commissioned by the Strategic Policy Division of the Department of Jobs, Enterprise and Innovation to assist in developing an understanding of the IP activity and strategies in firms in Ireland, and the following report sets out the key findings and recommendations from the research that was undertaken.

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Executive summary

Introduction

Intellectual Property (IP) is a topic of high global importance for fostering innovation, doing business and succeeding in markets and for creating jobs and growth. Recent studies show that 39% of total economic activity and 26% of employment in the EU is generated by IP-intensive sectors, and jobs in these sectors enjoy a wage premium, with 40% higher remuneration compared to non-IP-intensive sectors.

The growing significance of IP is also reflected in the more multi-facetted uses of IP for business purposes. The use of patents has increased from the traditional 'insurance premium' to also cover income generation (out-licensing), marketing functions, enabling functions for collaborations (in, for example, open innovation), and attracting investors. IP Rights (IPRs) are not limited to patents, though, with other registrable and unregistrable IPR instruments such as trademarks, copyrights, industrial designs, trade secrets and forms of informal IP such as complexity of design each adding to the toolbox of business. These have become, through clever combinations, building blocks of entire business models, making the skill of good IP management a decisive success factor for business in many innovative industries, and the topics of IP and IP management an important focal activity of innovation policy.

Given the growing importance of IP in knowledge based economies, the Department of Jobs Enterprise and Innovation (DJEI) felt that it was timely for Ireland to review the IP activities in the firm base in Ireland. The overall goal is to develop an understanding of the IP activity in Ireland and what role the State has in best supporting IP activity in the firm base into the future.

This report provides quantitative and qualitative data on the use of IP (both formal and informal) by firms in Ireland, including the rationales and barriers for such usage. It builds upon the analysis of quantitative data undertaken for Forfás/DJEI by CambridgeIP in 2014 on the observable trends in IP filing and registration, across a number of quantifiable forms (patents, trademarks, industrial design rights, plant variety rights and geographical indications) in Ireland and specially-selected comparators (Denmark, Finland, Germany, Sweden and Singapore). This report also examines the supports in place in these six countries.

The report was prepared by Technopolis for DJEI, with guidance provided by an Advisory Group, which was chaired by the Department of Jobs, Enterprise and Innovation.

The research approach

This study utilised a number of pillars in its approach: desk research, consultation with businesses and stakeholders in Ireland via a survey and interview programme, and consultation and guidance from an IP expert Advisory Group.

The desk research reviewed recent quantitative data on formal IPRs for Ireland and the selected comparators, as well as reviewing relevant literature and broader studies on the use of both formal and informal IP to build a context for the empirical research. The firm-level consultation targeted innovative firms, who are more likely to engage in IP.

The key findings

Activity in formal and registered IP is low in Ireland relative to the selected comparator countries, but there are other factors to consider, such as economic structure.

- Ireland performs no better than 4th out of the six comparator nations across all forms of formal and registered IP, even when data is normalised for population size and GDP. Patenting in particular is noticeably low compared to the innovation leaders, and more recently compared to Singapore, which has now overtaken Ireland in filing volume.
- Ireland demonstrates a decline in patent filing, driven largely by decreasing firm-level filing, which displays a year-on-year decline since it reached a peak in 2006. Meanwhile, the proportion of total patents that are assigned to the Higher Education Institutions (HEIs) in

Ireland is greater than in other countries. The proportion of patents assigned to HEIs continued to increase steadily until 2008.

- A small number of firms are responsible for the majority of patent applications. Approximately 0.2% of firms in Ireland account for 77% of applications between 1999-2013.[1]

- Data show that the patent filing trend of Irish inventors with foreign applicants (a proxy for foreign-owned multinational firms) has been in general decline since a peak in 2005. The trend is that of a steep decline from 2007 to 2010. Conversely, the filing of Irish inventors with Irish applicants (a proxy for indigenous firms) has demonstrated a positive trend, growing to 2008 and then steadily tapering away.
- Sectorally, patenting appears to be focused in pharmaceuticals, medical devices and ICT hardware, with some activity in the food and drink sector. Data suggests that the pharmaceuticals sector is a major contributor to the decline in patent filing, including the filing activity of foreign-owned multinationals in the sector.
- Trademarks display significant growth since 2003 across the comparator countries and, while Ireland remains lower than some (between 4th and 5th of the 6 countries compared, depending on the normalisation factor), the gap between the innovation leaders and Ireland is much narrower than for patents. Trademarks are widely used across a range of sectors, with growing awareness of their applicability reported among firms. Trademarks appear to be particularly well utilised among firms operating in national and international markets.
- Industrial design rights experienced slow and steady growth from 2002 and, while other comparators demonstrate stagnation from 2006, Ireland's trend remains positive. In terms of volume, Ireland remains low in the comparative list, at 5th out of six.
- Based on an analysis of agency-client firms, the economic structure of Ireland highlights that key growth sectors[2] – in terms of Value Added to the economy and employment share - are, for multinational firms: chemicals (including pharmaceuticals), medical device manufacturing and computer, electronic and optical products (ICT hardware). For indigenous firms, these key sectors are: food and drink, business services, and computer consultancy. The latter of these are not traditionally patenting sectors.

Informal and unregistered IPRs are of significant importance across the key sectors of the Irish economy.

- While difficult to statistically quantify from other sources, such as those used in the quantitative data study, research shows that informal and unregistered forms of IPR are used by a wide range of sectors, firm sizes and firm ages.
- Unregistered forms, such as copyright, are associated with a number of sectors with high employment, with the highest importance indicated by services firms, with the software sector and food and drink sector also stating importance. Copyright is also an important form of IP in many of the creative sectors such as music, film, literature and the arts.
- Informal mechanisms: trade secrets, complexity of design and lead time advantage were all regarded as important by a majority of firms surveyed. These are often used in combination with formal mechanisms.
- Certain forms of IPRs are not suited to some sectors (for example, the software sector uses patenting sparingly), and accordingly less usage of these forms is seen in those sectors.

[1] With Ireland having approximately 189,000 firms in its economy – Business in Ireland 2011, Central Statistics Office, 2013

[2] It is recognised that the creative industry is IP intensive and also a strong contributor to the economy. While firms from the creative industry were not excluded from this study, there has been a focus towards firms with a technological underpinning rather than those with foundations in music, film, literature and the arts.

Barriers to engagement in IPR use vary according to firm size and firm age, though there are also sectoral and ownership-based factors impacting IP management.

- Barriers to use of IP strategies mostly stem from firm size or firm age, however there are sectoral considerations, as some sectors do not make use of patents (e.g. the services sector and the software sector). Business perceptions (at least) of costs of protecting IP overall is reported as a barrier to more use of formal IPR, followed by the ability to enforce rights.
- It is apparent that the issue of cost is complex and dependent on the individual business context and IP strategy followed. Variables include: experience and awareness; whether the firm is operating only in Ireland or abroad, and; whether it is itself filing or only maintaining freedom-to-operate by taking action against potentially damaging third-party IP. We stress that firms' perceptions may change if they were 'fitter' in IP management issues.
- A detailed quantitative examination of costs was outside the scope of this study and thus costs are differentiated in this report only qualitatively, based on particular statements heard in interview. As such, this research could not systematically and in a quantitative manner differentiate the extent to which the cost barrier is based on perception or experience. Furthermore, the research should not be used to make inferences on the degree to which the cost barrier relates to costs in Ireland or abroad, nor which specific cost components[3] the cost issues pertain too. Neither did this study look to compare legal costs internationally, and, as such there is no inference in this study that Ireland is a more expensive location than elsewhere for firms to engage in IP activities.
- A further piece of research would be required to rigorously probe the specific topic of IP costs so as to gain a more in-depth view on the many aspects of IP costs.
- The research indicates that perceptions (at least) of costs associated with formal IPR are a particular issue for micro and small firms – particularly patenting, as other forms such as trademarks and industrial designs are cheaper. The perception (at least) amongst these firms is that the costs of engaging in IP activities, particularly engaging external expertise[4], were a barrier.
- The next most selected barrier – enforcement of IP rights – is seen to be mostly reported by firms who employ more than 10 full-time equivalent (FTE) employees.
- Small firms stated that a lack of internal capacity to manage IP was a main barrier to increasing their IP activities.
- More mature firms – those operating for more than 20 years – reported that pursuing IP is too complicated.
- There are reported know-how issues with smaller and younger firms being unaware of how to pursue IP or how to resolve particular issues. In broader terms, there is also a lack of value traditionally given to IP management by indigenous Irish firms, and a lack of understanding and awareness of the potential value to their business.
- Research shows that there are a number of sectors, such as food and drink, financial and business services that could potentially benefit from greater awareness and education on how to beneficially utilise formal IPRs.

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[3] Cost components for IP protection include (but are not limited to) costs in preparing an application and costs in enforcing and maintaining IP after grant, for example performing regular research via databases to identify potentially harmful IP, taking opposition actions, and so forth.

[4] Due to the scope, the survey did not disaggregate costs relating to services for preparing and filing applications, statutory fees, costs of enforcing IPRs nor whether the associated activity is within Ireland or abroad. Though statutory fees (which have remained relatively static over the last 30 years) were not highlighted as a cost issue within the interview phase of the study.

Ireland's (firm level) innovation performance compares reasonably with comparative countries.

- According to the latest comparative data, Ireland ranks well among the selected European comparators when considering the percentage of firms reporting innovation activity.
- Based on the latest Community Innovation Survey (CIS2012) and the international comparison data from 2010 for turnover from product innovation, there does not appear to be Ireland-specific innovation issues giving rise to the low IP activity measured.
- As a related measure, Business Expenditure on Research and Development, while lower than selected European comparators and being slightly below the EU28 average, has demonstrated a proportionally higher growth in Ireland than many comparators.

There is most scope to support indigenous firms to improve their IPR management capabilities.

- IP supports for firms in Ireland are available through both the tax system and general R&D support schemes[5]. The indirect supports for IP available to firms in Ireland include a number of tax specific measures for the purchase and management of IP, and the development of a Knowledge Development Box is currently under consideration in Ireland. However, comparator countries were found to have a number of direct explicit IP support schemes/programmes already in place, which include financial support and/or non-financial supports for building IP management capability.
- Based on experience in other countries, there is scope to provide support to micro and small firms financing their first patent, to include support for accessing external professional services, and also capacity building. The objective would be to guide and educate firms through the process as funding is released.
- There is also an opportunity to educate and raise awareness on the value of a broad range of IPRs that can be used by enterprises. This should be sectorally oriented due to the usage conditions dictated by sector, and should be aimed at various levels of know-how, from the basic to the more sophisticated. It is important to ensure that a broad appreciation of IP and IPRs exists across all firms, so that informed decisions can be made on how and whether to utilise it. Given the importance of informal and unregistered forms of IP, education on IP management will play an important role.
- There is a range of tax and R&D supports available to multinational firms in the area of IP, and the introduction of the Knowledge Development Box should contribute to increased IP activity among these firms[6]. However, a key requirement for the future is building knowledge capacity across the complex area of IP at a senior level in Irish-based subsidiaries of multinational firms, as a means of aiding these local sites in managing existing IP, where relevant, and in identifying and pursuing opportunities associated with IP, if and when they arise.

Supports and conditions for IP use by firms should be connected to the broader innovation and business support landscape, not treated as a separate, specialist subject.

- While it is difficult to highlight particular 'impactful' IPR supports, international good practice highlights the importance of keeping IP connected to broader innovation and business supports. Integrated support and services feature among a number of high-performing comparators. This means that even in the case of establishing new programmes or supports, IP should remain an integrated topic with broader innovation and development

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[5] Currently direct IP supports for firms are embedded in two support programmes in Ireland (through the High Potential Start Up and the R&D grants programmes). However, the supports mentioned here are primarily financial, and without broader coverage. There are currently no specific IP schemes offering direct support on IP to firms. There are a number of tax measures offered as an indirect support (incentive) for IP engagement: these are outlined in Chapter 5. R&D tax credits are not considered here as we distinguish between support for R&D and specific support for IP activities – though the link between R&D as an activity for IP generation is acknowledged.

[6] Tax and R&D supports are also available for indigenous firms.

supports, particularly in terms of helping firms through the IPR systems and its pathways for protection and enforcement (examples of this in practice can be seen in many of the comparator nations profiled here).

- IPR systems should be kept under review and prioritise and value the ease of access and use for firms.
- International good practice also highlights the importance of consistent information, education, communication and co-ordination across the IPR support system.

Technopolis consideration of the findings.

We have taken the findings from the research and applied Technopolis' broader knowledge and experience of IP in the interpretation of these findings. This is particularly important when considering issues related to IP, and the reported views of firms in discussion.

The first consideration is whether the low IP activity in Ireland is problematic, and to what extent. We note that patent filing counts, for example, should not be overvalued as an indicator of Ireland's innovation performance, but that the level of overall IPR usage relies on innovation and economic performance. However, we judge that in Ireland, the current low IPR usage can be improved. A number of IPR-specific barriers have been uncovered in the consultation with firms, which, if properly addressed, could improve the qualified usage of IP. We stress here, however, that the focus should be on both quality and quantity of IP, and that policy should address all forms of IPR, from formal to informal.

Perceptions (at least) of cost were raised as a barrier to start-ups and non-VC backed micro, small and medium firms. The research indicates that this issue does not relate to statutory fees which have remained the same as 30 years ago, rather the cost issue was relayed by firms to the expense of acquiring external expertise: for smaller firms these expenses are a greater proportion of turnover and these firms may not have experience of the process and value of protecting IP.

Broader experience shows that cost manifests differently for different types of firms, particularly those who undertake regular monitoring and opposition procedures against potentially dangerous third-party IP, who in turn may welcome more dissuasive, higher fees.

Perceptions (at least) of issues relating to enforceability is another barrier related intrinsically to cost, taking in the aforementioned monitoring and opposition, as well as defending against litigation. It is apparent that enforceability in this context does not relate to the legal framework. A detailed quantitative examination of costs was outside the scope of this study and as such this research could not systematically and in a quantitative manner differentiate the extent to which the cost barrier is based on perception or experience. Furthermore, the research should not be used to make inferences on the degree to which the cost barrier relates to costs in Ireland or abroad, nor which specific cost components[7] the cost issues pertain too. However, the research did indicate that costs are perceived (at least) to be an issue for small and micro firms and this would merit further work. Our conclusion is that small and micro-firms with resource constraints may have indeed a problem with costs of IP, for example if these costs make up a significant share of turnover.

For other firms, the perception (at least) of costs as a prime barrier may be high, though a considerable part of this perception may be due to lack of awareness of the potential benefits of IPR. This brings us to another consideration. Inexperience and perceptions of high costs can often fuel a negative view of the value of IP management activities. We believe that the most important barrier to tackle is IP awareness and culture: once the skills are in place, firms will be in a better position to gauge the cost issues and define organisation-specific IP strategies. This relates to developing information and fostering IP management skills in the broader business base. As such, many of our recommendations focus in this area.

[7] Cost components for IP protection include (but are not limited to) costs in preparing an application and costs in enforcing and maintaining IP after grant, for example performing regular research via databases to identify potentially harmful IP, taking opposition actions, and so forth.

In addressing issues of direct IP support and navigation, we suggest that developing a number of direct supports, and simplifying access for firms will be important in raising the level of IP in Ireland. Raising awareness of supports and the development of the Knowledge Development Box will, we believe contribute to the overall attractiveness of IP management capability development by firms. Against this backdrop, the study has spelled out eight recommendations to improve the usage of IPR in Ireland. These are included in the table under Figure 1, below, which links the recommendations to key actors and sets out what we believe is necessary to achieve the vision for IP in Ireland.

The vision for IP in the Irish Firm Base

The research indicates that there is a basis for policy to help increase firm usage of IP. We recommended that Ireland looks to steadily increase the usage of IPR with a view to deriving more economic value from knowledge generation:

- Focusing on increasing IP filings and increased usage of unregistered and informal forms of IP, with a dual focus on quality and quantity.
- Focusing on innovation active firms, and internationally trading firms.

The Recommendations

The overall focus of our recommendations is to achieve an improvement in IP knowledge and management skills in the enterprise base in Ireland, to develop a proper recognition of IPR in relevant innovation and sectorial policies and to develop a focus on quality IP as well as quantity at firm level.

Figure 1 presents a list of the 8 recommendations tabulated against the key public actors in the Irish innovation ecosystem that we believe will need to be involved in progressing this agenda with enterprises. The scope of this is not all firms in Ireland, but to focus on innovation active firms and internationally trading firms.

We have not separately itemised businesses or other stakeholders. However, we recommend the relevant communities in Ireland be involved in the implementation of each recommendation, whether as consultees, delivery partners (mentoring, visits, peer learning) or beneficiaries of these various services.

The creation of a national IP Statement and assignment of an IP Champion are key recommendations, and implementation will need to be driven by DJEI. Given the focus on IP as a platform for increased innovation and growth we would recommend DJEI be responsible for the establishment and implementation of the IP Statement. As part of the development of the IP Statement, further consideration of the remit, resourcing and hosting of the IP Champion function would be required. The IP Champion needs to be an experienced, high-calibre individual with the authority and political skill to drive change and will need to be supported with communications, tool development and operational activities. The IP Champion will have a key role in promoting IP management capability amongst the firm base in Ireland, and should work through appropriate agencies and offices of DJEI.

The launch of a national IP Statement and the creation of an IP Champion would improve visibility around IP and IP inter-service coordination immediately, and provide a focal point for IP information and tool development. This will in turn provide the platform for strengthening the IP commitment and capacity of key public sector actors in the innovation system in Ireland and will also provide the wherewithal for those actors to bake-in IP advice to their wider service offer.

The new tools and information should build on existing resources and there is a range of material available in the public domain through various other countries' IP support services, which is freely available for re-use and modification. There is however a need to develop Ireland-specific case material, to bring to life these more generic tools.

These data, case studies and tools would also provide the basis for extension of other business support measures and the implementation of a very much larger programme of seminars and other introductory events, to bring IP to the attention of Ireland's numerous non-users.

We see a need for an information campaign too, with a focus on the chief executives and senior management teams across all of the key actors in Ireland's research and innovation system.

This would be achieved via the on-going meetings and revolving topics of the broader stakeholder group to be established by the IP Champion (information updates on topical developments, e.g. around the Unitary Patent). This should also provide an opportunity to put successful businesses and programme managers in front of the senior officials to explain the benefits of IP and where it fits within their world and the bigger national innovation support framework.

The other major cost item in our suite of recommendations is the design and implementation of a new national IP support measure that has several modules, beginning with a rolling programme of events to raise awareness and bring in new client businesses, a light-touch diagnostic, a needs-based subsidy for first patent filings (cf German SME Patent Action) and a more substantive programme of coaching and mentorship, as described in more detail in the course of each recommendation.

Figure 1 Summary table of recommendations and actors

Recommendation	**Public Sector Actors**
1. Seek to increase IP activity across all forms of IPR, with a focus on quality and quantity • IP is important to economic growth, job creation • There is scope to increase qualified usage of IP, meaning focusing on appropriateness (firm size/stage and sector) and quality, as opposed to simply increasing quantity • This should take in both formal and informal IPRs	DJEI Enterprise Ireland IDA
2. Establish and implement a national IP statement, which takes an holistic view of IP • Will provide an important and clear mandate for IP • Will support co-ordination of, and guidance for the support system actors and activity in IP. May also integrate specific sectoral strategies • Will ensure that IP is integrated as part of the innovation eco-system and is not treated in isolation • Will increase awareness of IP topics in Ireland, across registered/unregistered and formal/informal mechanisms • Should form part of the new SSTI and the new national enterprise strategy • Monitoring of IP activity is encouraged via additional questions in the Irish edition of the Community Innovation Survey, or repeating quantitative research at regular intervals (though statistical impact may not be overtly high) • IP Statement should be supported by a focused implementation team, which will have the IP Champion (below) as a key member	DJEI Enterprise Ireland Irish Patent Office Knowledge Transfer Ireland LEOs
3. Create an IP Champion • An important part of the national IP statement, supporting its implementation • Will raise awareness and profile of IP across the business community, promoting IP management capability amongst firms • Will establish a broader stakeholder group to act as a vehicle for: discussion and debate of IP topics; a mechanism to share information and a forum for peer-to-peer learning and networking	DJEI
4. Strengthen the IPR activities of the central actors in Ireland • We recommend increasing resources to Enterprise Ireland to establish funding and advice/guidance support for non-VC backed micro, small and medium firms and a 1:1 coaching programme for start-ups, and for resourcing the provision of IP-audit tools and services and respective follow-ups • We also recommend increasing resources and a mandate to the IP Office to add to its business information with case study examples, increase the focus on IPR strategies in the "Practical IP Guide", and to conduct its educational and awareness raising activities at a greater scale and frequency	DJEI Enterprise Ireland Irish Patent Office

Recommendation	Public Sector Actors
5. Develop tailored explicit IP supports for businesses according to levels of IP awareness / usage (finance and guidance, information, advice and diagnostics; IP mentoring; IP exchanges / training in IP management) • Direct support to firms to support IP capability building and exploitation of IP (finance and advice/guidance) addressing the points raised in consultation • Basic awareness raising, guidance and financial support for first steps in the IP area for non-IP users • Basic awareness raising, guidance, financial support plus 1:1 advice on-demand for entrepreneurs, for start-ups and new firms • IP-audit services and respective follow-ups for IP low-active firms • Facilitate exchange platform and advanced IP management education and training for sophisticated IP firms and IP sophisticated 'elsewhere' firms	Enterprise Ireland Irish Patent Office IDA HEIs IP Champion
6. Bake-in IP advice / support across management development and business support measures as well as research and innovation supports • IP should not be seen as a specialist topic in isolation • "Baking in" IP policies with general (business) strategies and respective support provided to firms means that IP topics will be delivered as part of general business support (by LEOs, Enterprise Ireland, IDA) • This increases IP exposure to, and consideration by, firms • This also brings IP into general innovation and sectoral strategies	Enterprise Ireland IDA LEOs
7. Invest in widespread IP education • Boosting IP knowledge and skills is highly important for the future Irish labour market • Integrating IP education into general education at the Second Level (for example as a module during the transition year) • Integrating mandatory IP education into relevant Third Level courses (engineering, business schools, creative/design) • Pockets of IP education do exist, though these need greater scale and systematising • We encourage Department of Education and Skills to mandate and enforce the inclusion of such courses across the education institutions • This will address knowledge and awareness of IP and may lead to future culture change	Department of Education and Skills Second Level: Schools Third Level: HEIs
8. Continue to review and provide an enabling environment for firms in Ireland. • Ireland's IP conditions should be reviewed regularly via consultation with firms and comparative international policy review	DJEI

1. Introduction

1.1 Background and objectives of the study

Intangible assets are increasingly becoming part of business models in knowledge-based economies. Intellectual Property (IP) is an intangible asset that is the result of creativity or invention. To ensure that those taking the investment risks to develop IP are preferentially positioned to benefit from gains arising from the IP generation, a number of legal forms have been developed to protect such assets. Formal intellectual Property Rights (IPRs) are the rights attached to these intangible assets, protected by law (see section 1.2 for definitions of the different types of IPRs). There is of course a balance to be struck with regard to protectionism and inhibiting innovation. This is considered through the legal forms available and the finite duration of protections.

As Ireland continues to move towards a knowledge based economy, it is important that the role of IPRs in the economy is more fully understood, both by the State and at the firm level (see section 2 for a discussion on the importance of IP in economic growth in knowledge-based economies). A recent study commissioned by Forfás/Department of Jobs, Enterprise and Innovation (DJEI)[8] based on quantifiable IP data[9] over the period 1999-2013 indicates that Ireland has low formal[10] IPR activity in its firm base, with filing activity across formal IPR lower than in the selected comparators of Denmark, Germany, Finland, Sweden and Singapore (see chapter 2 for more detail).

This current study has been commissioned by DJEI to investigate the reasons for this lower use of formal IPRs by Irish based firms; to foster a better understanding of the use of IP (both formal and informal) by Irish based firms as part of their business strategies; and to determine the barriers that firms face in engaging IPR strategies.

Specifically, the objectives of the study were to:

- Determine IP strategies of firms in Ireland and key issues that inhibit their engagement in IP activity
- Assess current IP policies and supports and current environmental conditions for IP in Ireland
- Determine key trends in IP policies and state supports internationally
- Identify:
  - Reasons for the relatively low IP activity in the firm base in Ireland
  - How the State should directly support firms with regards to engaging in IP activities
  - Changes that should be made to environmental conditions for IP in Ireland
- Develop recommendations as to how Ireland should support the enhancement of IP activity in the firm base in Ireland

It is important to note from the outset that enhancing the IP activity in the firm base is not merely an attempt to drive up the volume of IP filings. There is value in both formal and informal IPR[11]: sectoral considerations show that certain forms of IP are inappropriate for some firms. While this study primarily focused on the use of formal IP, as this is quantifiable, a holistic view is taken towards IPR. From a firm perspective, all types of IPR instruments are considered including informal ones. The actual choice of an appropriate IPR strategy is highly

[8] An analysis of Intellectual Property activity in Ireland based on existing data. CambridgeIP (2014): An independent report for Forfás/Department of Jobs, Enterprise and Innovation.

[9] The focus of the exercise was on IP types and IPR for which data can be acquired (patents, registered trademarks, registered design rights, plant variety rights, geographical indications)

[10] Formal IP refers to those IP Rights guaranteed by law (patents, trademarks, industrial designs, copyrights, plant variety rights, geographical indications).

[11] Formal and informal IP are described in section 1.2.

business and industry specific, and in some sectors it could mean the use of one IPR type while in other sectors it could mean a combination of IPR tools. This particular aspect makes IP policy development difficult, including finding appropriate success measures.

1.2 Intellectual Property Rights: definitions

There are several forms of IPR, applicable across different types of IP, including inventions, brand names, slogans, pictures, creative work (such as text or compositions), the elements that make products attractive or appealing, types of plants and origins of a product. These are formal types of IPR, and can be bought, sold, transferred and traded. There are also informal types of IPR that focus on secrecy, non-replicability and first-mover advantage. Figure 2, below, summarises definitions of the IPR forms discussed in this study.

It is worth clarifying the terms "formal", "informal", "registered" and "unregistered". Formal IPR covers those protections that grant innovators or inventors an exclusive right to use[12]. This incorporates patents, short-term patents, trademarks, industrial designs and copyright. These are often time-bound. Informal IPR incorporates those measures able to be taken by a firm in order to protect and maximise returns from their innovations, but that in contrast to formal forms of IPR, their enforcement is not guaranteed by law[13]. Most common among these is secrecy, but complexity of design and lead-time advantage are also used by firms. Not all IP, even formal measures, need to be registered. Copyright is a formal IP mechanism that does not require registration, and there are also both registered and unregistered trademarks and industrial designs.

Figure 2 Definition of IPR forms

Form	Description	Application
	Formal IPR	
Patent	A patent is a right granted by a government office to the owner of an invention that prevents others from making, using, importing or selling the invention without his/her permission. A patentable invention can be a product or a method/process that gives a new technical solution to a (technical) problem. Patents may be granted to an inventor to manufacture, use or sell an invention. This is a time-bound right (20 years full term in Ireland) that excludes other parties from making, offering or selling the invention. Patent holders are allowed to commercially exploit their invention on an exclusive basis during the patent period (subject to other regulations, such as safety or environmental regulations), but must publicly disclose their inventions to enable others to replicate the invention. The grant of a patent is governed by the national (e.g. Ireland, USA) or regional (European) patent offices that carry out examination of the application. Under regional systems, an applicant may request protection for one or more countries. The Patent Co-operation Treaty (PCT) system is an international treaty administered by WIPO. However, there is no such thing as an "international patent"; the decision of whether or not 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. The granting of a patent varies across jurisdictions, but indicative timescales are 12-18 months from application to granting, though the procedure may take longer, depending on examination or opposition proceedings.	Patents may apply to invented products or processes, but these must be novel, have an inventive step and be industrially applicable

[12] Fraunhofer ISI Discussion Papers: 'Innovation Systems and Policy Analysis', No. 20, 2009

[13] A specific exception may be trade secrets, which legally protect at least against industrial espionage.

Form	Description	Application
Industrial designs	Industrial design rights are formal and protect the elements that may make it attractive and appealing and add to the commercial value and marketability. Industrial design rights protect the owner from unauthorised copying or imitation. Industrial design rights may be registered or unregistered. Registered industrial designs may be renewed every five years up to 15 years in most cases, but Community Registered Designs can last up to 25 years subject to registration. Industrial design rights are generally limited to the jurisdiction within which protection is granted, though the Hague Agreement offers a procedure for international registration. The Community Registered Design offers a unitary design right at EU level.	Must be judged to be new or original, meaning that no identical or very similar design is known to have previously existed.
Trademark	A trademark is formal and is a distinctive sign, to distinguish certain goods or services produced or provided by an individual or company that gives the holder 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. Trademark registrations can be maintained indefinitely upon payment of renewal fees and active use of the trademark. Registering trademarks is governed by the rules and regulations of national and regional IP offices and trademark rights are limited to the jurisdiction of the authority that issues the trademark. An international application may be made through the Madrid system. The Community Trade Mark (CTM) offers a unitary trademark right fort the territory of the EU. The CTM must be, like the CD, registered with the OHIM agency oft he European Commission in Alicante, Spain. Trademarks may also be unregistered.	Trademarks can protect one or a combination of words, letters and numerals; drawings, symbols or signs; the shape and packaging of goods and certification marks given for compliance with defined standards.
Copyright	Copyright laws protect the works of creators (artists, authors, etc.) with the exclusive rights to use (or authorise use) of the work. This prohibits reproduction in all forms, copying, broadcast, translation and adaptation. The economic rights to a copyright are time bound, from creation to not less than 70 years after the death of the creator. Copyright is obtained without registration, automatically, though some countries offer optional registration that may facilitate the resolution of disputes related to creation or ownership.	Copyrights are highly applicable to novels, poems, advertisements, reference works, computer programmes, paintings, databases, sculpture, architecture and technical drawings.
Plant Variety Rights	A plant variety right is granted to new varieties of plants that, among other things, offer improved yield, pest-resistance, and better adaptation to climatic stress. The framework for IPR related to plant varieties is the International Union for the Protection of New Varieties of Plants. Also known as Plant Breeders' Rights	The plant variety must meet national and international agreed standards of novelty and distinction, as well as being distinct, stable and uniform.
Geographical Indications	Geographical indications are signs used on goods that have certain qualities or reputation based on specific geographical origin. This guarantees consumers that a product was produced in a certain place and has certain characteristics. Geographical indications are protected in accordance with national laws.	Agricultural products often have qualities that derive from their place of origin, though geographical indications may also be used to protect specific qualities due to human factors such as specific place-based manufacturing skills.
Informal IPR		
Trade secrets	Trade secrets are used to prevent unintended knowledge reaching competitors, and may include technical information about products and processes, customer lists, formulas, patterns or any piece of valuable information not generally known or reasonably ascertainable.	Trade secrets can be protected by non-disclosure agreements and other contractual obligations.
Complexity of Design	Complexity of design relies on the length of time and cost that it would take a competitor to figure out and imitate a product or process.	Broad applicability on technical aspects

Form	Description	Application
Lead Time Advantage	This is predicated on first mover advantage, which relates to a firm acting faster than competitors to implement their innovation projects – establishing a brand, standards or product and forming relationships with distributors ahead of competitors.	Broad applicability

Source: OECD, World Intellectual Property Organisation, World Trade Organisation, CambridgeIP, Thomä and Bizer

1.3 Methodology for this study

IP is a complex area, and as such this research takes a multifaceted approach. The methodology for this chapter is based around a number of pillars: desk research, consultation with firms via a survey and programme of interviews, consultation with other stakeholders of relevance in the IP system and consultation with an IP expert Advisory Group[14].

1.3.1 Desk research

The desk research included:

- The development of the contextual overview of the role and impact of IP in Knowledge Based Economies.
- A review of the quantitative analysis of IP data carried out by CambridgeIP[15] (cited in this report as the 'quantitative data study'). This work was commissioned to systematically review formal IP data available for Ireland and to position Ireland's IP activity relative to a number of comparator countries chosen. Denmark, Finland, Germany and Sweden were chosen for their status as innovation leaders[16], with the intention of assessing how Ireland compares to those countries with the strongest innovation performance. Singapore was included to add a non-European Union context, while also mirroring to some extent Ireland's mix of indigenous and foreign-owned firm base. Large amounts of data on filing activity from sources including patent databases[17] such as PATSTAT, the World Intellectual Property Organisation database (trademarks and Industrial designs), the EU database of origin and registration (geographical indications) and UPOV – the organisation dedicated to Plant Variety Rights, were analysed in this work. The quantitative analysis of IP data carried out by CambridgeIP is built on in this study through the further research carried out, and a narrative is developed to try and explain some of the features highlighted in the quantitative data set.
- A review of national practice in IP policy, support and environmental conditions for Ireland, Denmark, Finland, Germany and Sweden and Singapore and a focus on some elements of interest from other countries (along with a limited number of informal consultations with country experts in a selected number of the cases).

[14] A full list of Advisory Group members is viewable in Appendix A

[15] An analysis of Intellectual Property activity in Ireland based on existing data. CambridgeIP (2014): An independent report for Forfás/Department of Jobs, Enterprise and Innovation.

[16] European Commission Innovation Scoreboard, 2014

[17] The patent data used included, as per CambridgeIP: direct filings at national offices, regional offices [including the European Patent Office (EPO)] as well as PCT national phase entries (for more information see the discussion on Data Limitations)

1.3.2 Stakeholder Consultations

1.3.2.1 Firm Surveys

A survey[18] was undertaken to gain a deeper understanding of the use of particular forms of IPR by firms in Ireland, across indigenous and foreign-owned firms, and across a range of sectors. This included usage of both formal and informal IPRs, and the motivations for, and barriers against, usage of IPR.

Firms for the survey population were identified via three primary sources:

i) The top patenting firms as identified in the CambridgeIP analysis

ii) High Growth Firms that had been identified from an agency[19] list of firms

iii) Publicly-accessible information of companies participating in the 7th European Union Framework Programme (FP7).

This was designed to try to target a survey population that was innovation-active. Focusing specifically on innovation-active firms naturally invites a built-in bias, though this decision was taken deliberately due to the increased likelihood of innovative firms engaging in IP activity.

The survey covers 128 respondents from a total of 517 businesses contacted (a 25% response rate) among Irish-based firms, collected in November 2014 over a period of 3 weeks. Figure 3, below, summarises the survey population by sector, firm size and age. The survey had 128 firm responses. Of these, 13 included only company details, without the respondent completing any other questions; of these seven were foreign-owned multinationals, one was an Irish-owned multinational and four were independent indigenous Irish firms. The sectors represented here are: manufacturing (2), food and drink (3), medical devices (3), pharmaceuticals (1), software (2) and other (2).

When analysing which firms were IP active but not protecting, seven firms answered that they generate IP via research and development, but do not protect their IP. This was shown by firms indicating 'not used' against all IP protections. Of these seven firms, two were foreign-owned multinationals, two were Irish-owned multinationals and three were independent indigenous firms. The sectors represented here are: manufacturing (2), business services (1), medical devices (1), software (1) and other (2).

The analysis shows a number of instances where some firms have not provided information when answering some questions – this is reflected in differing 'n' values for certain questions (i.e. the number of firms answering a particular question; not all responding firms provided ownership, sectoral, size-band or age details, and not all answered every question). It should be noted that during analysis, self-identified sectors ("other") that could not be meaningfully aggregated have been omitted from sectoral breakdowns.

[18] Full survey questions are included in Appendix B

[19] IDA and Enterprise Ireland clients. High Growth Firms (HGFs) are defined according to the OECD definition as: those firms with average annualised growth greater than twenty percent per annum, over a three-year period, and with ten or more employees at the beginning of the observation period. Growth is thus measured by the number of employees or by turnover. HGFs were identified across 3 observation periods, and between 80-93% of HGFs were identified as being innovation active.

Figure 3 Sector, firm size and age distribution among survey respondents

Sector	Number of respondents
Food and drink	9
Business services	9
Financial services	4
ICT hardware	12
ICT software	26
Manufacturing	10
Medical devices	20
Pharmaceuticals	8
Other	25
Total	**123**

Firm size (FTE employees)	Number of respondents
0-9	29
10-19	17
20-49	21
50-249	39
250+	20
Total	**126**

Firm age	Number of respondents
5 years or less	13
6 to 10 years	32
11 to 20 years	44
21 to 50 years	20
51 years plus	5
Total	**114**

Source: Technopolis based on survey data

SMEs make up the majority of respondents, with one third identifying as employing 50-249 full-time equivalent (FTE) employees. Micro businesses, those with 0-9 FTEs, make up one quarter. Larger firms (with more than 250 FTEs) account for 16%.

Younger firms, i.e. those operating for 10 years or less, make up 36% of respondents. Ten per cent have been operating for 6 years or less.

The dominant respondent sector is software, with just over one fifth (21%) of respondents identifying themselves as working in that sector. The medical devices sector was next most popular, with 16% of respondents. The remaining sectors were ICT hardware (10%), Pharmaceuticals (7%), Food and Drink (7%) Business Services (7%) and Food and Drink (3%). 'Other' sectors make up 20%, with firms self-identifying across a number of technology-led sectors (including photonics and nanomaterials) and the creative industries. Manufacturing appears as a self-identified sector, albeit one with a large enough number of respondents (8%) to justify disaggregating out the responses.

While firms from the creative industry[20] were not excluded from this study, there has been a focus towards firms with a technological underpinning rather than those with foundations in music, film, literature and the arts.

The respondents are split 62%:38% in favour of indigenous, independent firms compared to those who are part of a group (i.e. multinationals). Of this latter group, 74% are foreign-owned multinationals. This is summarised in Figure 4.

Figure 4 Firm ownership among survey respondents (n = 125)

Ownership		Number of respondents
Independent		78
Part of a group	Total	47
	Foreign-owned	35
	Irish-owned	12

Source: Technopolis based on survey data.

[20] The UK Department of Culture, Media and Sport has defined the creative industry as comprising of: Advertising and marketing; Architecture; Crafts; Design - product, graphic and fashion; Film, TV, video, radio and photography; IT, software and computer services; Museums, galleries and libraries; Music, performing and visual arts; Publishing.

The majority of survey respondents (87%) are exporters. As shown in Figure 5, more than half of the companies who identified as exporters (56%) stated that the share of turnover from export is at least 90%. Almost three quarters of the companies stated a minimum of half of their turnover is generated from export.

Figure 5 Approximate percentage share of turnover from export per ownership type (n = 124)

		Approximate % share of turnover from export				
Ownership of the company / % of turnover from export		**10% and below**	**11-49%**	**50-89%**	**90-99%**	**100%**
Independent		10%	8%	11%	15%	10%
Part of a group	Foreign-owned		3%	2%	14%	11%
	Irish-owned	3%	1%	3%	5%	1%
Percentage of total		**14%**	**13%**	**17%**	**33%**	**23%**

Source: Technopolis based on survey data. Note: Highest values per category are highlighted

1.3.2.2 Firm & Non-Firm Interviews

Firms were selected for interview[21] via two means: Surveyed firms were asked to indicate whether they would be willing to participate in a follow-up interview, and agencies and intermediaries were asked to recommend firms to approach for interview. Non-firm stakeholders were identified for interview with DJEI and the Advisory Group of the project. Figure 6, below provides a profile of the interview categories.

Figure 6 Interview profile

Firm sector	Indigenous	Foreign-owned multinational	Total
Agric / food & drink	2		2
Business services		1	1
Creative and design	1		1
ICT software and hardware	8	3	11
Medical devices	4	4	8
Pharmaceuticals		1	1
Other tech-lead sectors	3		3
All firms	**18**	**9**	**27**

Stakeholder category	Total
Financial profession	2
Legal profession	2
Policymaker	3
Service provider	8
All stakeholders	**15**

Finally, we have used our knowledge in the area of IP to develop interpretations of the data (in understanding and analysing the responses from firms).

1.4 Analysis and Reporting

The quantitative survey data was cleaned and analysed thematically, with the qualitative data from interviews and open survey questions analysed using a template analysis approach. Data was analysed and reported back to an Advisory Group at key intervals and their inputs and feedback were taken on board and considered throughout the research and analysis phase and in the finalisation of the findings and recommendations.

The Advisory Group was comprised of representatives as follows[22]:

- The Department of Jobs, Enterprise and Innovation – Strategic Policy Division
- The Department of Jobs, Enterprise and Innovation – Intellectual Property Unit

[21] Full interview guides can be found in Appendix C

[22] Full list of Advisory Group members available in Appendix A

- Science Foundation Ireland
- Enterprise Ireland
- Ibec
- IDA Ireland
- Knowledge Transfer Ireland
- The IP Law Committee of the Law Society of Ireland
- The Law Committee of the Association of Patent and Trademark Attorneys

1.4.1 Report structure

The remainder of this report is structured as follows:

Chapter 2 presents a contextual overview of the role and impact of IP in Knowledge Based Economies from a review of relevant literature.

Chapter 3 presents a summary of the key messages from the quantitative IP data review undertaken previously for Forfás/DJEI, setting a foundation for the research of this study. It presents the observations from the data, as well as concluding thoughts on unanswered questions that will be further explored through the additional research.

Chapter 4 presents IPR and IP strategies of firms in Ireland, across a number of sectors and firm groupings. The analysis draws on the survey and interviews of this study.

Chapter 5 highlights the policy, supports and environmental conditions in Ireland and the selected comparators: Denmark, Germany, Finland, Sweden and Singapore, as well as elements of good practice in other selected nations. This chapter offers a description of those practices and offers a range of lessons drawn from them.

Chapter 6 synthesises the previous three chapters with a view to understanding the low activity levels of IP in Ireland.

Chapter 7 offers key findings and policy recommendations emerging from the analysis.

2. The Importance of Intellectual Property in Modern Economies

2.1 Introduction

This chapter presents an overview of relevant literature related to the role and impact of IPR to the economy, as well as emerging trends in IPR usage globally, to act as a contextual piece for the study.

2.2 The Impact of Intellectual Property in Knowledge Economies

The importance of IPR for fostering innovation and for doing business has been increasing in recent years. This is evidenced, for example, by the soaring annual patent applications at the EPO, which has increased by some 50% compared to 10 years ago[23]. The growing significance of IP is also reflected in the more multi-facetted uses of IP for business purposes. Whereas patents, for example, have been used traditionally for the most part as "insurance premium" against the practice of invention copying, their use has increased and covers also income generation through licensing, marketing functions, enabling functions for collaborations (e.g., in open innovation contexts), the ability to attract investors (such as Venture Capital Firms) or patenting for other strategic purposes. However, IPR is not limited to patents. Various other registrable and unregistrable IPR instruments such as trademarks, copyrights, industrial designs or trade secrets add to the toolbox of business and have become, through clever combinations, also building blocks of entire business models and business model innovations. This makes the skill of good IP management a decisive success factor for business in many innovative industries, and the topics of IP and IP management an important focal activity of innovation policy.

2.2.1 Why is IP important?

IP and IPRs play an important role in stimulating innovation and creativity. A recent study entitled "IP rights-intensive industries: contribution to economic performance and employment in the EU", produced by OHIM and the European Patent Office in 2013 made the first attempt to quantify EU-wide the contribution of IP-intensive sectors to the EU economy. In its analysis it examined, between 2008-2010, a range of IP rights including patents, trademarks, designs, copyrights and geographical indications. The study examines more than 320 IP-intensive industries (reportedly half of the EU's industries), identified as such because either IPR use is an intrinsic characteristic of the sector's activity, or it registered a high number of IPRs per employee compared with other industries.

Headline findings include that 'IP-intensive' sectors generate 39% of the EU's economic activity (GDP, €5 trillion annually) as well as 26% of jobs in the EU (57m Europeans). A further 20m indirect jobs are generated in sectors that supply IP-intensive sectors. This means that overall, IP-intensive sectors support 77 million direct and indirect jobs in the EU. The report states that the value added per worker of IPR-intensive industries is higher than elsewhere in the economy. In addition, the report finds that IP-intensive industries account for a very high share of the EU's exports, at 90%. These are important findings, and are mirrored by a similar report one year earlier from the USPTO and US Government.

The EU-wide study highlights that trademark-intensive industries lead employment and GDP rankings, followed by design-intensive industries and then patent-intensive industries.

[23] Radauer and Dudenbostel (2013). PATLICE Survey 2013. Commissioned by the European Commission, Directorate-General for Research and Innovation (DG RTD), consulting 300 firms in 19 European Countries.

Figure 7 Share of total EU employment and total EU GDP of specific IPR-intensive industries

IPR-intensive industry	Share of total EU employment	Share of total EU GDP
Trademark	21%	34%
Design	12%	13%
Patent	10%	14%
Copyright	3%	4%
Geographical Indications	0.2%	0.1%
All IPR	26%	39%

Source: extracted from tables within the study: 'Intellectual Property Rights intensive industries: contribution to economic performance and employment in the European Union', 2013

The report thus highlights that a broad range of IPR uses are impactful in the economy, with the additional note that these sectors often use several types of IPRs at once. The report finds that several of Ireland's growth sectors are among the top 20 IPR-intensive industries in the EU: 'financial and insurance activities', 'computers' and 'pharmaceuticals'.

2.2.2 Intangible and tangible assets

Intangible assets (referring here to intellectual property and including patents, trademarks and copyrights) are becoming more and more important. An article by American Firm Ocean Tomo in 2007[24] highlighted the fundamental changes observable over the last 30 years and recognised the importance of IP in the equity markets (specifically here Standard and Poor's 500 stock market index). The authors show that from 1975 to 2005, the percentage of market value from intangible assets increased almost 63 percentage points. In 1975, intangible value as a percentage of market value was 17%. By 2005, the percentage of market value from intangible assets was 80%, meaning that over this period, the portion of company value residing in intangible and tangible assets reversed.

2.2.3 The expanding role of IP

As Pisano suggested in a 2006 article, IP "continues to play a central role in the health and growth of firms"[25] but there are observable shifts in how this applies to firms. As well as increasing volumes of patent filing globally over the last 20 years (as referenced earlier in this review), the motives for such IPR use appear to be expanding. Blind et al outline several reasons for this, focusing primarily on patent usage[26], including:

- Broader applicability, including new technology fields, and
- Changes to patent strategies, which have became more complex and comprehensive, leading to an expansion of patent applications.

Regarding the patent strategies of firms, Blind et al (2006)[27] discuss the results of empirical work conducted with German firms, suggesting that motives for patenting have widened. The authors go on to suggest that the strategic motives to patent confirmed via their firm survey now include, in addition to the traditional protection purpose, the following main strategic motives:

- Valuation and marketing: improving the reputation of the company
- Bargaining: improving the company's position in negotiations with other companies
- Incentivisation: creating incentives for the firm's R&D employees
- Trade: improvement of a (large) firm's exchange potential

24 Ocean Tomo (2007). The Intellectual Property Marketplace: Emerging Transaction and Investment Vehicles.
25 Pisano (2006). Profiting from innovation and the intellectual property revolution.
26 Blind et al (2006). Motives to Patent.
27 Ibid

Grimpe and Hussinger (2013)[28] add that IP plays an important role for firms capturing the value of what they create, while Hanel (2006)[29] suggests that from a broad review of empirical literature, the value of knowledge-intensive firms is defined by the value of their IP and that "IP is used as a financial asset". Revisiting Blind et al (2006), we conclude by reiterating that the growth and increasing importance of IP leads to subsequent growth in the importance of IPR management.

2.3 Emerging global trends in IP and IPR

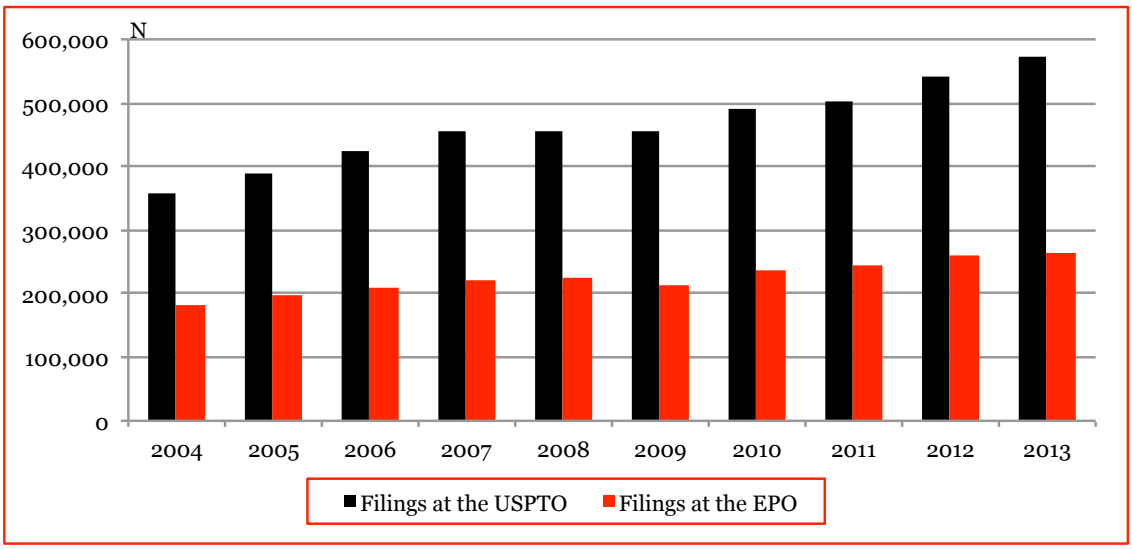
All available evidence now points to the fact that the significance of IPR has increased. Figure 8 illustrates the changes in patent applications submitted to the EPO and the U.S. Patent and Trademark Office (USPTO) on a yearly basis from 2004 to 2013. The data shows that the patenting intensity in the various technological fields has been increasing consistently:

- With respect to the EPO, the yearly patent filings have increased reasonably steadily from 181,134 in 2004 to 265,690 in 2013. This corresponds to an increase of around 47% during the period analysed;
- The USPTO experienced an even higher growth of 60%, from 356,943 patent applications in 2004 to 571,612 applications in 2013.

Similarly, we see almost continuous increases in the number of filings for Registered Community Designs (RCDs) and Registered Community Trademarks (CTMs). There were around 60,000 CTM filings in 2004 and around 114,000 in 2013.[30] For RCDs, the figures were slightly more than 50,000 filings in 2004 and around 97,000 filings in 2013. The economic downturn only temporarily slowed down the upward trend for both the filings at the EPO and at OHIM.

Another indication of the continuously increasing importance of IPR can be seen in the greater significance of patent- and technology-licensing activities, as evidenced by the Commission's PATLICE survey of 2013.[31]

Figure 8 Change in the number of patent applications submitted to the EPO and the USPTO on a yearly basis, 2004–2013



Source: EPO and USPTO Statistics, as of 7 January 2014

28 Grimpe and Husinger (2013). Resource Complementarity and Value Capture in Firm Acquisitions: the Role of Intellectual Property Rights.

29 Hanel (2006). Intellectual property rights business management practices: A survey of the literature

30 OHIM Strategic Plan 2011–2015; OHIM Annual Report 2013.

31 Radauer & Dudenbostel (2013). PATLICE Survey 2013.

Based on the above situation, there are three main developments that contribute to the growing relevance of the topic of IPR to firms:

- *The complexity of the IPR system is increasing*: A key observation is that new IPR results and/or instruments are mostly introduced on top of existing outcomes and tools. IPR instrument replacement or abolition occurs very rarely. For example, the unitary patent will co-exist with the current European Patent Convention (EPC) system. This will then give users of the patent system four levels of strategic choices: the unitary patent; the bundle patent under the current EPC; purely national patents; and, in some countries, the system of utility models or 'patents light';
- *The scope of protection is increasing*: 'Upward harmonisation' in copyright as well as European harmonisation attempts and reforms in other IP areas tend to increase the scope of protection in terms of things that can be protected by IPR or the so-called 'subject matter', of the strength of the IP rights and of their geographic coverage. In this context, the unitary patent could make a profound impact, particularly on SMEs in smaller and/or Eastern European countries[32]. Similarly the scope of patent subject matter has expanded to emerging technical fields such as software in the US and in some areas non-technical fields such as business methods[33], though there have been concerns raised that patenting in these fields actively impinges upon diffusion of innovation.
- *Continuous changes to the legal system make it necessary for IP users to stay up-to-date with developments:* Even if no new Directive or IP instrument is introduced, there are frequent changes that IP users need to take into account in their business and IP strategies.

Along with increasing patenting numbers, the OECD reflects the view that some observers have registered concern about declining patent quality. In this context, lower quality patents are stated to be at least in part responsible for increasing litigation actions from so-called 'patent trolls' in some jurisdictions in recent years[34], an emerging and, as yet, unquantified challenge.

[32] Under the current EPC and the bundle patent, users usually take out patent protection only in a selected number of countries (6-8) due to cost considerations. These countries are typically the largest markets in Europe. Correspondingly, patent protection is rarely sought for Eastern European countries and/or smaller markets. This means that there was a possibility for SMEs that were only active locally, to use patented technologies without having the need to pay any licensing fees. With the UP extending its validity across the EU, these SMEs will more frequently face the need for a valid patent in their home countries or risk being sued for patent infringement.

[33] OECD STI Outlook 2014

[34] OECD STI Outlook 2014

3. IP activity and innovation in Ireland

3.1 Introduction

In this chapter, IP activity in Ireland is considered from a statistical view of applications and registrations. The broader context of innovation activity in Irish-based firms is then briefly examined.

In 2014, a quantitative data study was undertaken by CambridgeIP[35] on behalf of Forfás/DJEI to analyse existing IP data available for Ireland. The work focused on analysis of all IP types for which IP rights can be acquired. The resulting report set out a systematic review of IP data and information available for Ireland and positioned the IP activity in Ireland relative to a number of comparator countries: Denmark, Germany, Finland, Sweden and Singapore. This data driven exercise resulted in the presentation of a large amount of data without narrative (i.e. there was no attempt within the report to develop interpretations of the data).

3.2 IP activity of Irish-based firms

Figure 9 presents a summary of the key points that emerged from the quantitative data study. This summary acts as an overview of the statistical perspective of Ireland's IP performance. Key points for each of the IPR types explored are also expanded further in this chapter, however, the reader is directed to the CambridgeIP report for the fuller picture of the analysis carried out. Later in this report we will seek to build on the quantitative data through interpretations based on the additional research and analysis carried out for this study.

Figure 9 A summary of IP activity, Ireland and comparators

IP type	Category	Ireland	EU Comparators	Singapore
Patents	***Trends***	36,100 filed since 1999 (Ireland applicant country); 11,200 granted 32,000 filed since 1999 (Irish inventor) Both applicant and inventor filings increased year-on-year to 2008, and then gradual decline Grant rate for country applicants 1999-2012: 31%	Broadly similar trends of constant patent volume growth 1999-2008, and then plateauing or decline from 2008 Filed 1999—2013: Demark – 89,400 Finland – 150,600 Germany – 2.0 million Sweden – 242,200 Grant rate for country applicants 1999-2012: Germany – 41% Finland – 40% Sweden – 38% Denmark – 36%	Continued growth in patent volumes up to 2010 Filed 1999—2013: Singapore – 38,900 Grant rate for country applicants 1999-2012: 37%
	Organisations	Between 1999-2013: companies 66%, HEIs 6%, individuals 26%, government/non-profit 0.4%, other 2%	Ireland has a greater proportion of filing from HEIs than any European comparator, and the lowest proportion of companies filing of European comparators. Companies proportion: Denmark – 73% Finland – 76% Germany – 75% Sweden – 78%	Similar proportion of HEI filing as Ireland Companies proportion: 58%
	Sectors (IPC)	Dominated by human necessities and health. Recent growth in physics and computing	Ireland has a greater proportion of human necessities technologies than any European comparator. Ireland's growth in physics and computing is only matched by Finland	Dominance in electricity technology

[35] An Analysis of Intellectual Property in Ireland Based on Existing Data, CambridgeIP (2014): An independent report for Forfás/Department of Jobs, Enterprise and Innovation.

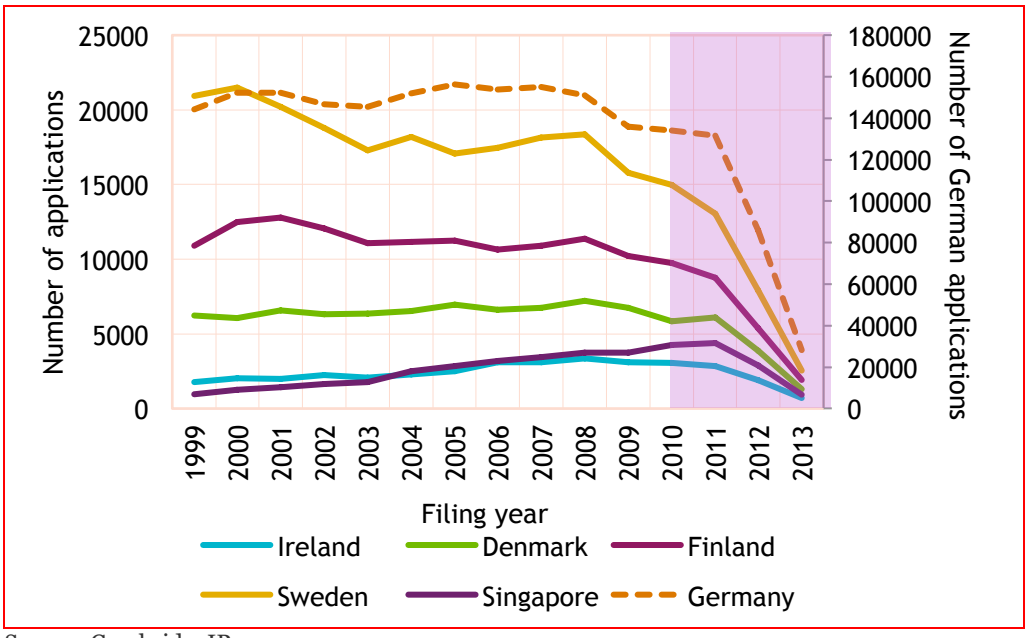
IP type	Category	Ireland	EU Comparators	Singapore
	Sectors (NACE)	Activity in pharmaceuticals in sharp decline since 2006. Growth in filing of office machinery and computing since 2006, driven by Irish firms with Irish inventors.		
	Filing location	Ireland, the US and the EPO are the three main filing locations for Irish applicant with Irish inventor. The US has been overall dominant since 2004.	PCT and EPO have reported considerable growth in their patenting systems in recent years.	
	Collaboration	4 of the top 10 collaborating entities of Irish applicant/foreign co-applicant were HEI or gov. 7 out of the top 10 of Irish applicant and co-applicant for HEI or gov.		
Trade-marks	***Trends***	Irish applicants filed 27,000 trademark applications (0.7% global filings) in 2011 Annual rate of increase of 7% in filing. Filed 1999—2012: 260,500	Comparators demonstrate similar filing trends over time, with a rapid rise since 2003. Normalised to GDP/GNP Ireland ranked ahead of Finland. Filed 1999—2012: Denmark – 444,500 Finland – 304,800 Germany – 6.6 million Sweden 712,800	Normalised to GDP/GNP and population, Ireland ranked ahead of Singapore. Filed 1999—2012: 150,500
	Sectors (NICE)	Most commonly ascribed classification is "Advertising, business management, business administration"		
Designs		Irish applicants accounted for 0.2% (2,200) of global filing in 2011. On average filing 90% of applications in foreign jurisdictions. Filed 1999-2012: 16,700	Ireland ranks 5th in terms of volume when normalised. Comparator countries show stagnation since 2008, which is not reflected in the Irish trend. Filed 1999-2012: Denmark - 98,200 Finland - 58,800 Germany - 972,800 Sweden - 140,300 Singapore – 14,800	Singapore consistently slightly lower volumes in filing. Filed 1999-2012: 14,793
Plant Variety Rights		217 registered since 1999	Similar volumes among comparators	No data
Geographical Indications		6 protections currently held	Similar volumes among comparators	No data

Source: CambridgeIP

3.2.1 Patents

Overall, the broad trends in patent filing are similar among the six comparators, with global patenting activity slowing following the economic recession. Even though Ireland experienced relatively less decline in filings from 2008 than the other comparators, it also started from a lower base (Figure 10). In reviewing these data, it is important to consider that due to patent lag effects, the latest reliable data is 2010. Each graph includes a shaded box to outline this.

Figure 10 Patent applications by applicant country, 1999-2013



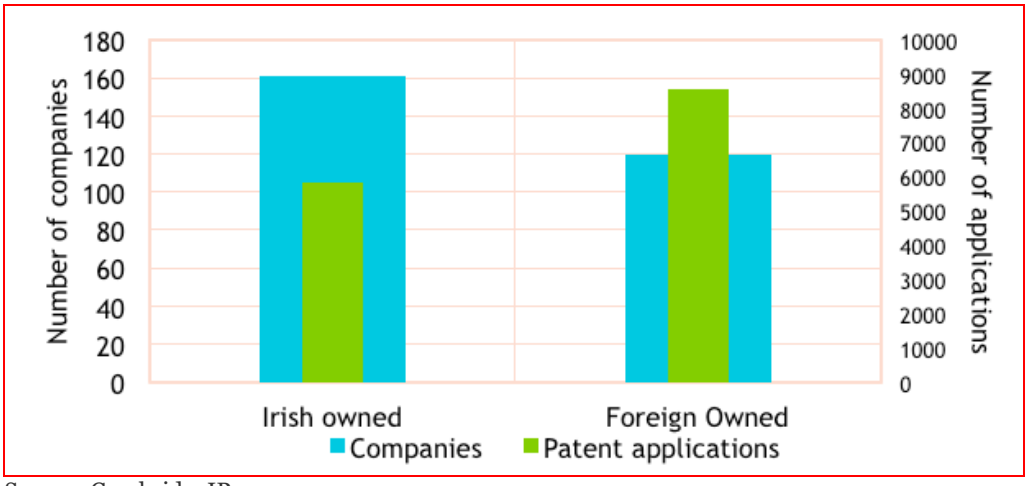
Source: CambridgeIP

In terms of patents by country of applicant[36], Ireland is 6th of 6 in terms of volume with 36,100 published applications between 1999-2013 (Germany 2m; Sweden 242,200; Finland 150,600; Demark 89,000; Singapore 39,000). When normalised for GDP, Ireland moves to 5th, above Singapore. Normalised for population, it remains 6th. Of greater concern is that Ireland has the second lowest proportion of companies (66%) contributing to overall patent filing by country applicant, just above Singapore (58%).

Company patenting activity is concentrated in a small fraction of the total business population: just 358 companies had applied for 10 or more patents over the time frame considered and this accounted for 77% of applications by companies where Ireland is the applicant country for the period 1999-2013. Ownership was assigned to 281 of the 358 applicant companies, and these 281 firms accounted for 65% of all applications by Ireland (as an applicant country) between 1999-2013. Based on these 281 firms, 57% were Irish owned, but foreign-owned companies account for 60% of the applications. Figure 11 highlights this point, charting the ownership of patenting activity for firms who filed 10 or more Irish applications over the period.

[36] An applicant is defined as an individual or firm that files an application for a patent, short-term patent, trademark or industrial design. Applicant country refers to the domiciled location of the applicant. It is possible to have more than one applicant in an application.

Figure 11 Ownership of patenting activity, Irish applications by companies 1999-2013 for firms with 10 or more Irish applications

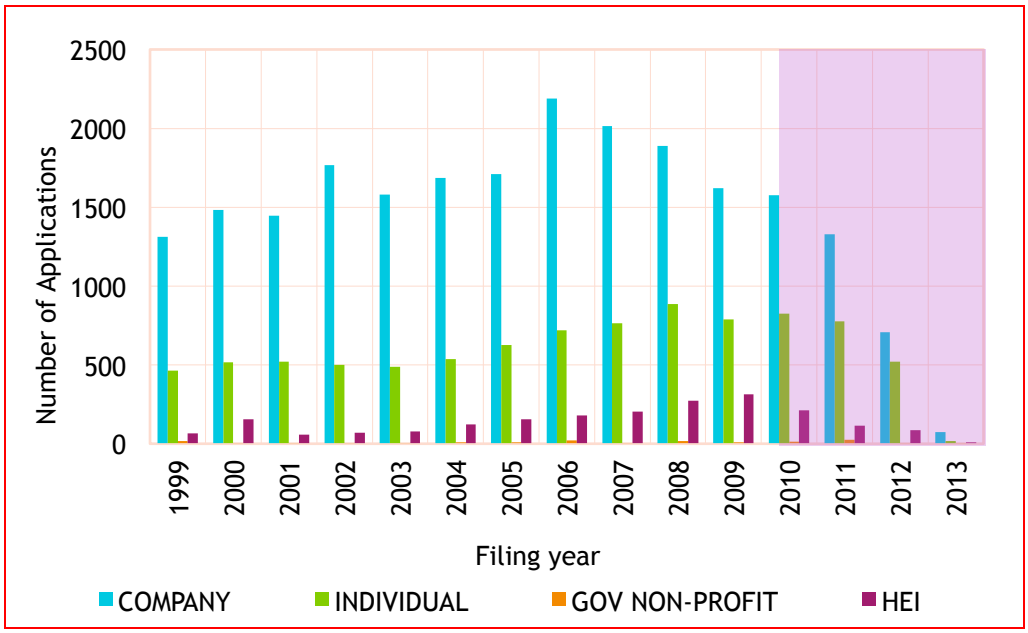


Source: CambridgeIP

Overall patent application numbers in Ireland have been declining rapidly from 2006 to 2010 (the latest reliable data due to lag times), which is a notable reversal in the historical trend that predates the economic crisis (Figure 12).

Figure 12 also indicates that it is the firm-based applicants which have been declining since 2006, with patents from the Higher Education Institutions (HEIs) increasing over the same period: thus leading to an increased proportion of patents overtime that are associated with the HEIs. In comparison to the comparator countries, Ireland demonstrated the highest proportion of HEI patents with regard to the full stock of country patents.

Figure 12 Patent application trends by Ireland as a country of applicant, by organisation type



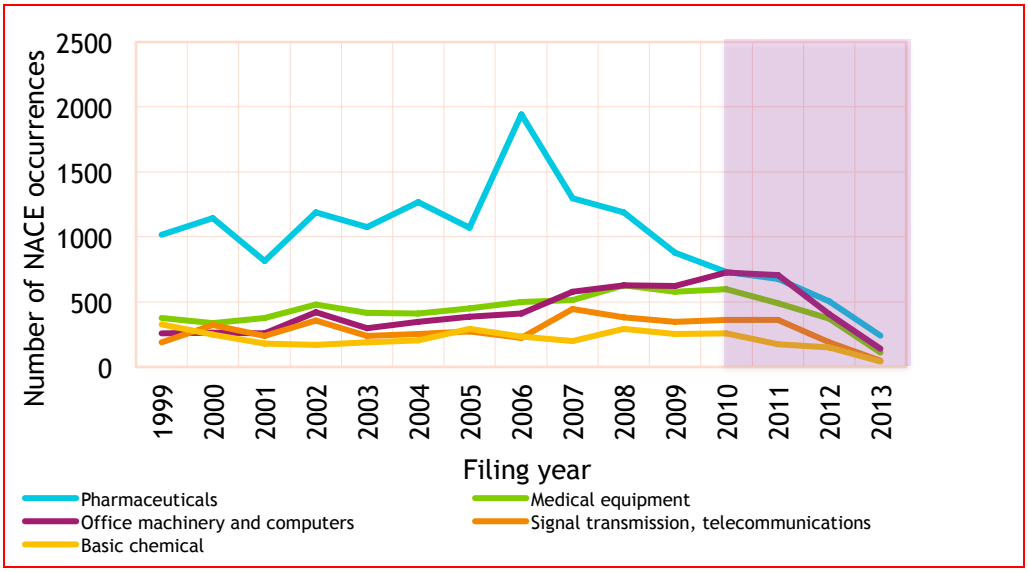
Source: CambridgeIP

The decline in filing appears to be largely driven by changing activity in the pharmaceuticals sector (Figure 13)[37]. Meanwhile, filing in office machinery and computers has demonstrated net

[37] It is worth noting that the pharmaceuticals sector has experienced a number of issues that may contribute to this over and above the global economic recession, including the 'Patent Cliff' (expiring protections on a number of patented drugs within a short space of time), and restructuring of the sector.

growth in patent filing with only Finland showing more growth than Ireland in this area, meaning that computing has bucked the recession along with medical devices, which continued to grow, albeit at a slow rate. These sectors can be seen to have largely maintained the level of IP activity in Ireland.

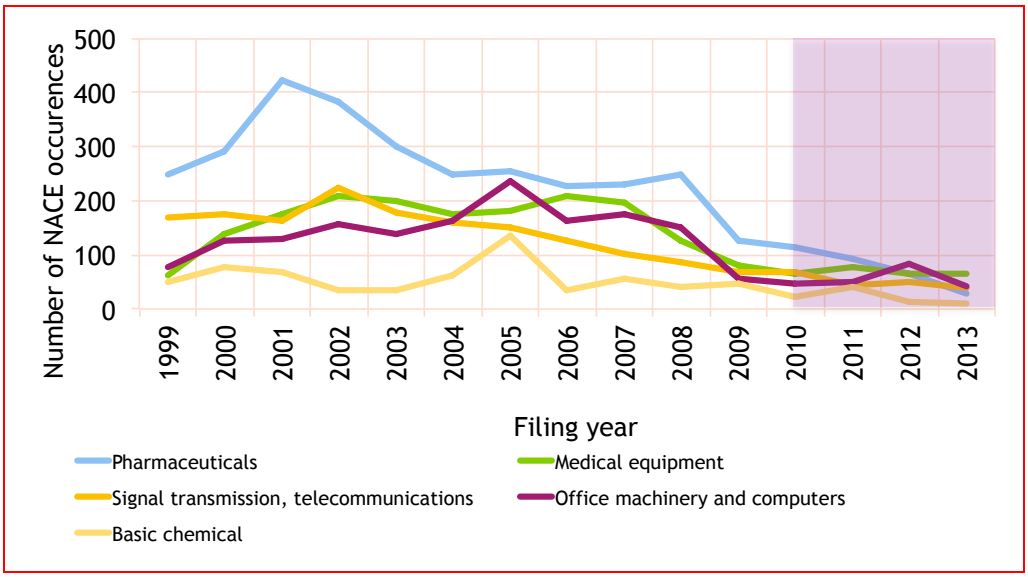
Figure 13 Top five NACE sector patent filing trends: Irish applicants[38]



Source: CambridgeIP

The quantitative data analysis indicates that a drop in Irish inventors with foreign applicants[39] has driven the decline of patent filing in pharmaceuticals (Figure 14). The overall filing trend of foreign applicants with Irish inventors (Figure 15) highlights this further. The trend observed for Irish applicants with Irish inventors[40] (Figure 16) is more positive.

Figure 14 Top five NACE sector patent filing trends: Foreign applicants with Irish inventors



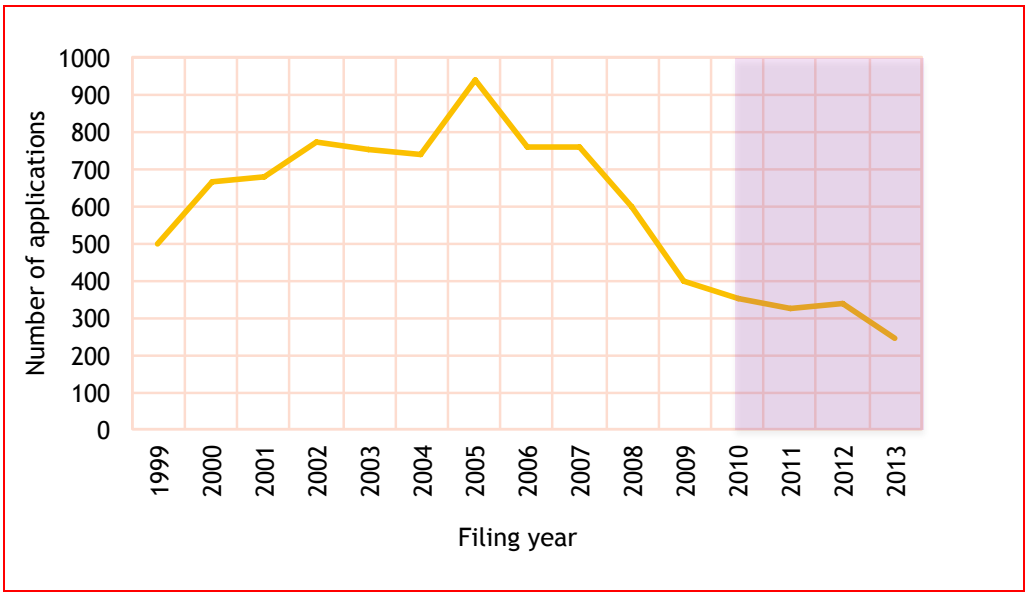
Source: CambridgeIP

[38] This includes any firm domiciled in Ireland, including both indigenous and foreign-owned companies with an Irish address

[39] This combination of applicant country and inventors is a strong indicator that the activity is associated with foreign-owned multinationals with a base in Ireland

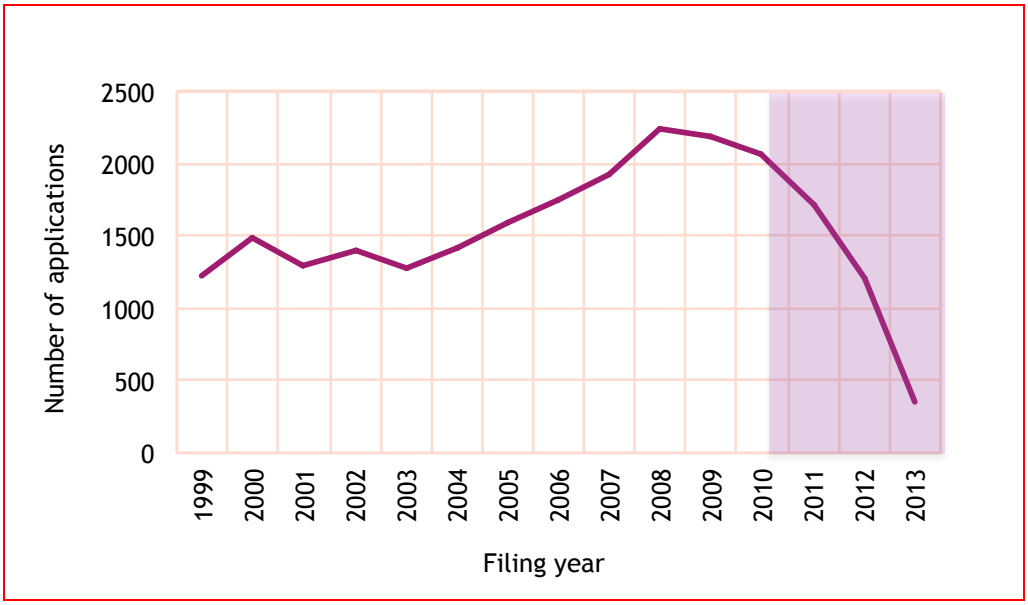
[40] This combination is a strong indictor of indigenous firms

Figure 15 Patent filing trend over time: Foreign applicants with Irish inventors



Source: CambridgeIP

Figure 16 Patent filing trend over time: Irish applicants with Irish inventors

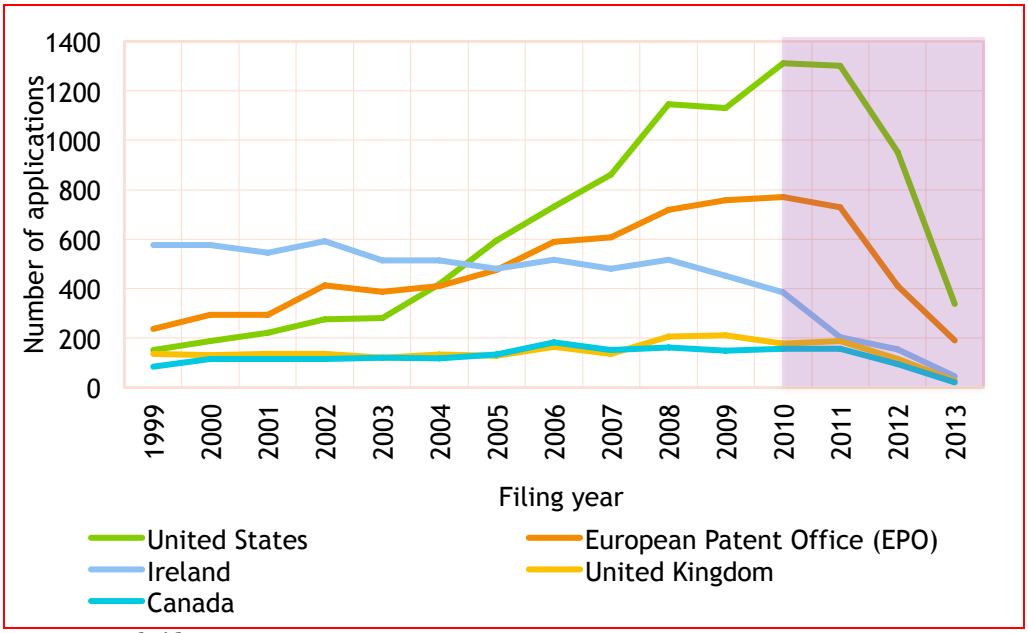


Source: CambridgeIP

Ireland is declining as a filing location, with many firms moving toward the US Patent Office (USPTO) and the European Patent Office (EPO) (Figure 17). As a filing location, Ireland was dominant among Irish inventors and Irish applicants[41] to 2005 (38%), though this decreased to 18% 2006-2013. The US is now firms' dominant focus (40% 2006-2013), with the EPO reaching 23% between 2006 and 2013 (Figure 18).

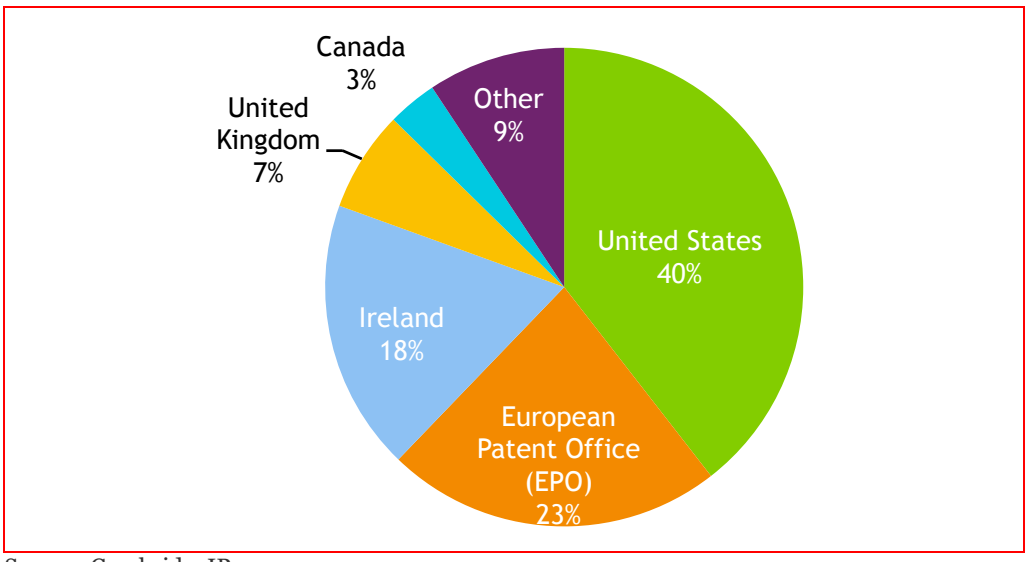
[41] This combination is a strong indicator of Irish-owned firms

Figure 17 Patent application trends by the combination of Irish inventors with Irish applicants in the top five filing offices for the period 2006-2013



Source: CambridgeIP

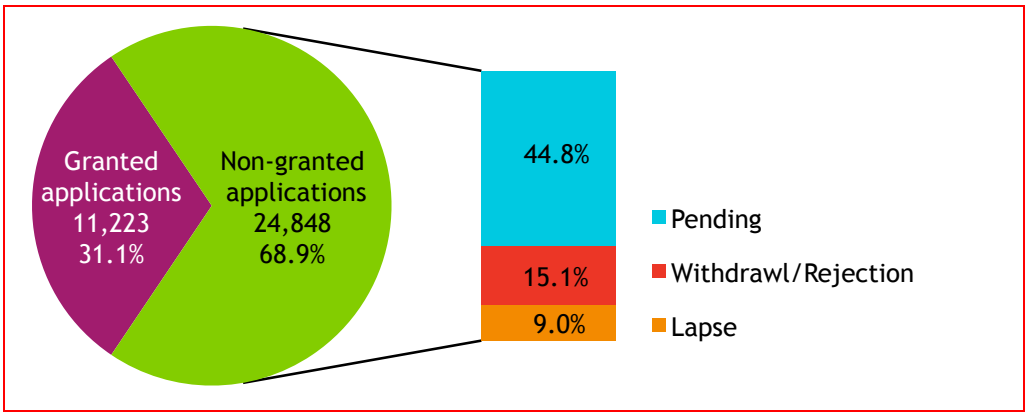
Figure 18 Top filing locations: Ireland as an applicant country (2006-2013)



Source: CambridgeIP

As well as the declining numbers of patent applications by Ireland as an applicant country, Ireland's conversion rate is lower still than that of the selected comparators, with only 31% of applications filed being granted (Figure 19) compounding the effect of low application rates. This may be related to a lack of quality or novelty in the applications, or to withdrawal during the process due to cost or time factors. These figures are matched closely by those for Irish inventors. The country with the highest grant rate for country applicant is Germany (41%), followed by Finland (40%), Sweden (38%), Singapore (37%), and Denmark (36%).

Figure 19 Non-granted applications: Ireland as an applicant country (1999-2013)

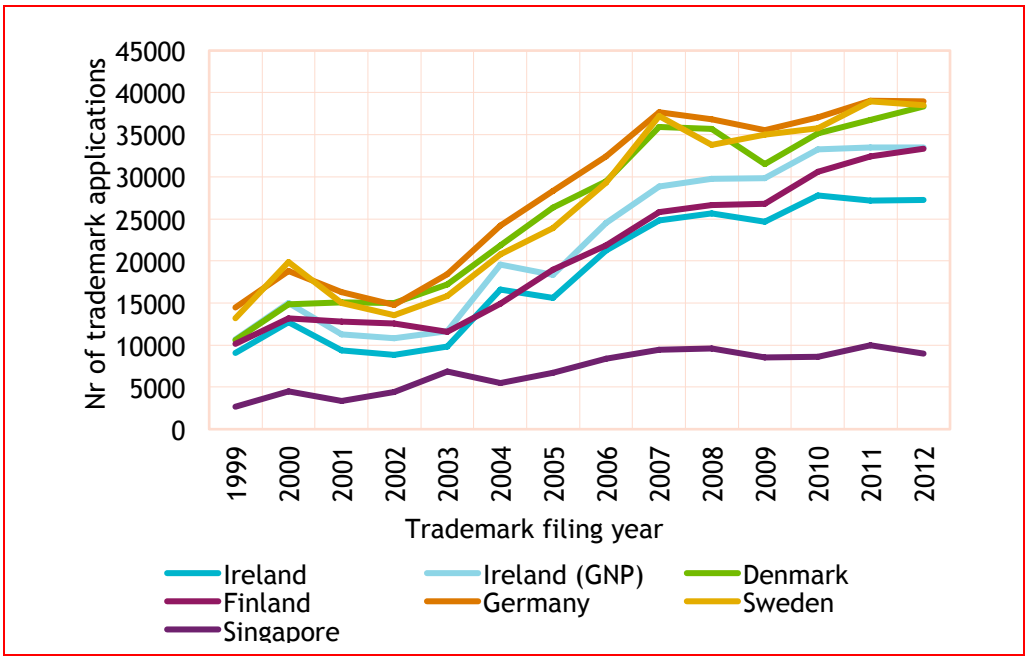


Source: CambridgeIP

3.2.2 Trademarks

As well as the other comparators, Ireland displays a rapid rise in trademark filing since 2003. This may be related to increasing awareness of the broad applicability of trademarks, and their use as part of wider IP strategies in protecting brands and slogans, as well as their relative cost effectiveness. Ireland remains, however, at between 4th and 5th out of the six countries in terms of filing trademarks (depending on the normalisation factor used), and has recently been overtaken by Finland (Figure 20).

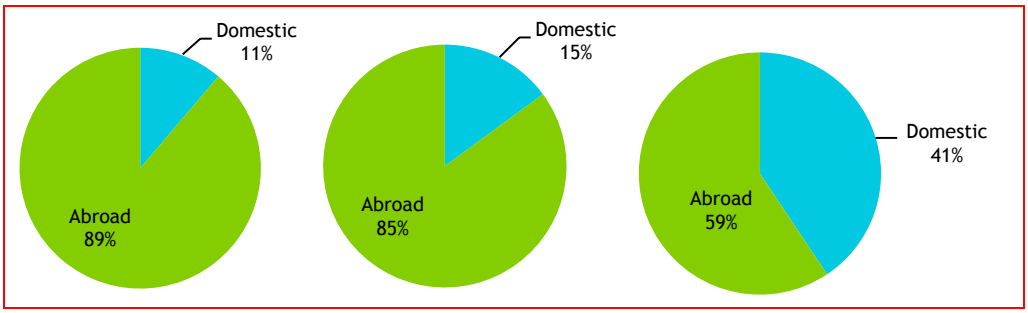
Figure 20 Annual trademark tends by applicant country, normalised by GDP/GNP (PPP constant 2011 Int$)



Source: CambridgeIP

In terms of trademarks, Germany leads on all terms. When normalised for GDP, Ireland ranks 4th of the six, behind Germany, Sweden, Denmark and on a par with Finland. When normalised for population, Ireland moves to 5th. Irish applicants file 12% domestically, with the remainder abroad. This is a stark ratio, though similar ratios are found in the other comparator countries, albeit slightly lower on the proportion of domestic filing. Danish domestic filing is 15%, the next lowest. Sweden files 20% domestically. The main point of difference is Singapore, which shows 41% domestic filing. Ireland does show in the data more foreign filings proportionally than selected comparators.

Figure 21 Trademark filing ratios, domestic/abroad for (L-R) Ireland, Denmark and Singapore

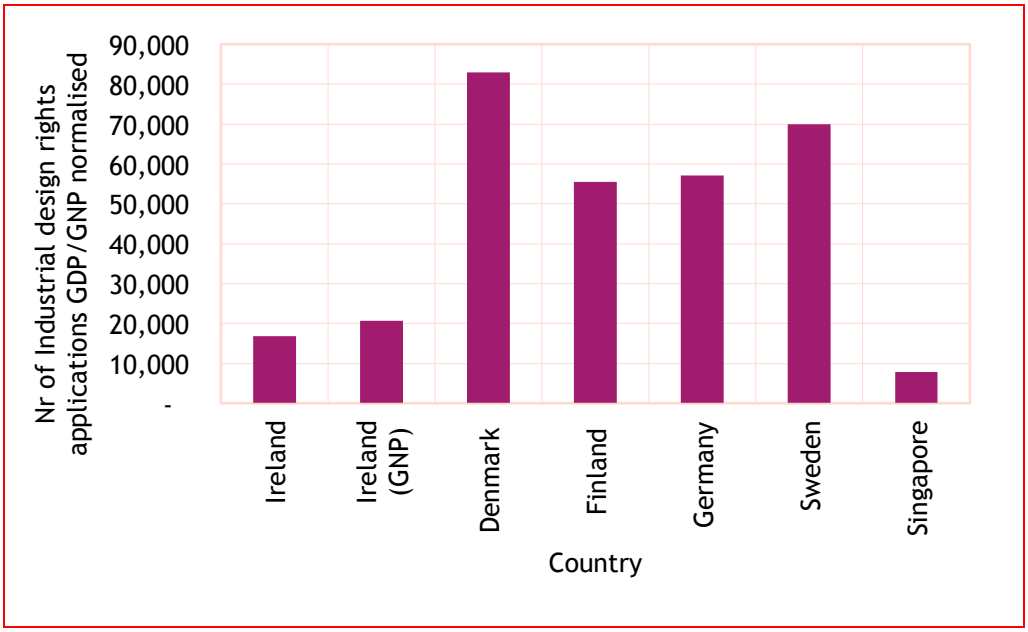


Source: CambridgeIP

3.2.3 Industrial designs, Plant Variety Rights, Geographical Indications

In terms of industrial designs, Ireland demonstrated a slow and steady growth from 2002 onwards, while comparators began to stagnate in 2006. Even so, Ireland ranks 5th in terms of the volume of Industrial Design applications, ahead of Singapore (Figure 22). Plant Variety Rights and Geographical Indications display similarly low activity across all comparators, with Ireland's activity comparable to Finland for both types, but below Germany, Denmark and Sweden.

Figure 22 Industrial Design rights: Number of applications filed 1999-2012 normalised by GDP/GNP (PPP constant 2011 Int$)



Source: CambridgeIP

Due to a lack of data, copyrights and trade secrets are not explored in quantitative terms (though as will be discussed in the following chapter of this report, a survey of firms in Ireland indicates the importance of these type of IPRs).

Across most variables for each of the IPR types explored in the quantitative data study, Ireland ranks no higher than 4th of the six comparator nations, even when normalised for GDP. The closest comparator throughout, performance-wise, is Singapore.

3.3 Innovation activity of Irish firms

Looking at the comparative view of innovation activity across the European Union, we see that Ireland performs well in terms of the share of innovation active enterprises (i.e. the percentage

of firms in a country who declare themselves to be innovation active). The latest data from the Community Innovation Survey[42] (CIS2012) show that the highest proportions of enterprises with innovation activity were recorded in Germany (67% of enterprises), Luxembourg (66%) and Ireland (59%). This places Ireland above the rest of this study's European comparators: Denmark (51%), Finland (53%) and Sweden (50%) in this measure. The EU28 average 2010-2012 is 49%. This places Ireland's innovation activity in a strong comparative position when regarding all innovation activity.

The data show that a higher proportion of large firms (250+ FTE) in Ireland reported innovation expenditure (68%) than small (10-49 FTE, 31%) or medium (50-249 FTE, 52%) firms. In addition, a higher proportion of industrial firms reported innovation activity (66%) than services firms (55%).

Foreign-owned firms are in general more innovation active than their Irish-owned counterparts, and spend proportionally more on innovation. Analysis of ownership conducted by the Central Statistics Office (2014) shows that 46% of foreign-owned firms in Ireland reported innovation related expenditure in comparison to 34% of Irish-owned firms

3.3.1 Exploitation of IP

Using economic return from innovation as a proxy for measuring IP exploitation, the latest CIS data show that Ireland's firms report 23% of enterprise turnover is as a result of new to market or new to firm product innovation[43]. These data also show that foreign-owned firms perform better in this (27% of turnover from product innovation, compared to 17% in Irish-owned firms).

International data related to the share of turnover from innovation is not yet available for the latest survey. Thus, for the purposes of comparative analysis, data from CIS2010 was utilised.

Analysis by the Central Statistics Office (2010) highlighted that in Ireland, in all firms, 9% of enterprise turnover was as a result of 'new to market' or 'new to firm' product innovations. Consistent with the current picture, foreign-owned firms in Ireland reported a higher proportion of turnover generated as a result of such product innovations (10% compared to Irish-owned firms at 6%).

Taking the value of turnover from product innovation for firms in Ireland as between 9% and 23%[44], it would appear that Ireland performs at least at a comparative level with the other countries considered in this study in terms of IP exploitation. Figure 23 highlights these points.

Figure 23 Turnover from product innovation activity as a percentage of total turnover (2008-2010)

Country	Total (all firms)
Ireland	9%
EU27	13%
Denmark	15%
Finland	15%
Germany	15%
Sweden	8%

Source: Community Innovation Survey, 2010 (Eurostat)

[42] The Eighth Community Innovation Survey, 2010-2012, published in 2014. The Community Innovation Survey (CIS) is a survey of innovation activities of enterprises in EU Member States. The survey collects information about product and process innovation as well as organisational and marketing innovation and other key variables.

[43] Product innovation includes new to firm or new to market product innovation

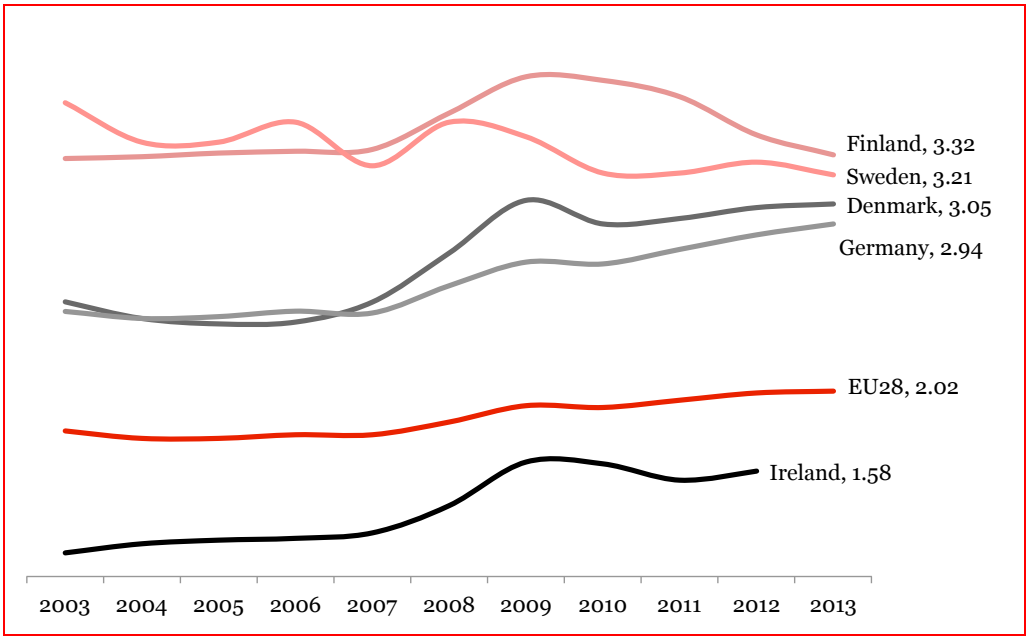
[44] It is noted that there was a methodological change in the CIS between 2010 and 2012, which limits the ability to compare Irish CIS data between the two time frames directly. However, it is reasonable to take the % turnover from product innovation as being within the range of the figures highlighted in the two surveys.

3.3.2 Domestic expenditure on R&D

Consideration of R&D expenditure by businesses in Ireland and the European comparators is worthwhile, though this does not mean that IP should be viewed as a proxy output for R&D. Rather, this is a general contrast, for the purpose of context, to view the broader innovation activity around firms.

Through a cursory examination of data on Business and Enterprise R&D expenditure (BERD), Ireland compares lowest of the European comparators and below the EU28 average. However, more positively, Ireland shows relative growth. As of 2012 (the last data available for Ireland), Ireland's BERD expenditure as a percentage of GDP was 0.43 percentage points lower than the EU28 average, from 0.67 percentage points lower in 2003. Similarly, Ireland represents the second highest net change in BERD as a percentage of GDP to 2012 (0.45 percentage points, behind only Denmark at 0.52) and the highest growth rate overall (40% growth). Finland, Sweden, Denmark and Germany remain much higher, though Denmark and Germany are the only countries with similar growth to Ireland over the period to 2012, as both Sweden (-0.33 percentage points) and Finland (0.13 percentage points) have shown recent decrease or stagnation.

Figure 24 Business and Enterprise R&D expenditure (domestic), as a percentage of GDP 2003-2013 (Ireland 2012)



Source: Eurostat

It is interesting to note that it is during the period of patenting decline (2006 onwards) that growth in BERD in Ireland begins, indicating continued and increasing expenditure on R&D. This may be driven by several larger firms, perhaps multinationals, though it is a notable point of contrast. Without conflating the two, it is interesting to note the differences in performance between firms' R&D expenditure and the performance of firms' IP filings.

In addition, the latest CIS data show that the average per-Enterprise spend on innovation has risen to over €1m since 2010, when it was slightly over €850,000.

3.3.3 Uptake of IP from firms receiving R&D grants

Data from Enterprise Ireland on the R&D grant investments for later stage companies show that 31% of 355 projects funded requested an agreed budget towards IP costs. This figure is based on grants administered over two years to November 2014. In this scenario, IP expenditure is an explicit allowed cost category and the amount is agreed with the EI project evaluators up front.

3.3.4 Ireland's economic structure

A review of sectoral data based on the performance of agency-client[45] firms shows that there are a number of key sectors within Ireland across the variables of value added and employment. Examining the sectors' relevant shares in those two categories, and identifying those most-impactful sectors to the Irish economy will ensure that a fuller understanding of the structure of the Irish economy can be incorporated into this analysis.

It is recognised that the creative industry[46] is IP intensive and also a strong contributor to the economy. While firms from the creative industry were not excluded from this study, there has been a focus towards firms with a technological underpinning rather than those with foundations in music, film, literature and the arts.

The data in Figure 25 shows that based on analysis of agency-client firms, the sectors that display the largest contributions to value added and employment in Ireland by foreign-owned multinationals are chemicals (including pharmaceuticals), which contributes 34% of value added by foreign-owned multinationals and employs 14% of the workforce in foreign-owned multinationals. These, along with medical device manufacturing (7% of total value added and 16% of total employment) and computer, electronic and optical products (12% of value added and 10% of total employment) are traditionally patent-centred sectors. Finally, computer programming – traditionally a non-patenting sector – accounts for 16% of value added and 15% of total employment.

On the side of agency-client indigenous firms, the food and drink sector (19% of value added and 26% of employment by indigenous firms), business services (20% of value added and 12% of total employment by indigenous firms), plus computer consultancy (10% of value added and 8% of total employment by indigenous firms) are the most highly-contributing sectors to value added and employment. The latter of these are not traditionally patenting sectors. This information is also summarised below in Figure 25.

Figure 25 Economic structure in Ireland – main contributing sectors by agency-client firms to the Irish economy by shares of total value added and total employment[47]

Foreign-owned multinational firms	**Value added (% of total by foreign-owned agency-client firms)**	**Employment (% of total by foreign-owned agency-client firms)**
Medical device manufacturing	7%	16%
Chemicals	34%	14%
Computer programming	16%	15%
Computer, electronic and optical products	12%	10%

Indigenous firms	**Value added (% of total by agency-client indigenous firms)**	**Employment (% of total by agency-client indigenous firms)**
Food, drink and tobacco	19%	26%
Business services	20%	12%
Computer consultancy	10%	8%

Source: DJEI data from an analysis of Annual Survey of Business Impact, Forfás, 2012

These tables highlight that the leading sectors, and those that contribute significantly to both economic growth and employment, are largely in low patenting sectors, particularly on the side of indigenous firms.

[45] Client companies of Enterprise Ireland, IDA Ireland and Údarás na Gaeltachta employing ten or more employees in Ireland and comprises all the Manufacturing and Information, Communication and Other Services sectors.

[46] The UK Department of Culture, Media and Sport has defined the creative industry as the following: Advertising and marketing; Architecture; Crafts; Design - product, graphic and fashion; Film, TV, video, radio and photography; IT, software and computer services; Museums, galleries and libraries; Music, performing and visual arts; Publishing.

[47] These sectors related to activities in the Manufacturing and Services Categories of the NACE classification system and do not include activities associated for example with retail trade which are dealt with in other NACE categories. Full data is available in Appendix E.

3.4 Key messages

The key messages from this section are as follows:

- Ireland ranks low across all forms of formal, registered IPR, even when normalised for population and GDP
- Data show falling patent filing in Ireland, a trend shared with all comparator countries but Singapore, which experienced relative growth
- A number of key features of interest in the patent data for Ireland are as follows:
  - The pharmaceuticals sector largely underpins the observed decrease in filing, though the reasons for this decrease are not yet clear; understanding more about recent decisions on business strategies will shed more light on this issue.
  - Patent filing is heavily concentrated in around 0.2% of firms in Ireland (358 firms account for 77% of applications 1999-2013, with Ireland having approximately 189,000 firms in its economy[48]). This is more concentrated in foreign-owned firms, who make up a smaller proportion of firms, but file proportionally more patents.
  - Overall, Ireland displays lower proportional company patent filing but higher proportional HEI filing.
  - Ireland's filing activity starts from a lower base than comparators and demonstrates consistently lower filing levels. Innovation leader countries remain higher than Ireland in terms of filing, even when volumes are normalised for population and GDP, displaying a distinct gap.
  - The data show a move away from patent filing in the Irish Patent Office, with the US and EU becoming the most- and second-most-dominant locations over the period respectively.
- Ireland shows rising trademark filing, a trend shared by all comparators, though Ireland again performs less well than most.
- Ireland shows rising industrial designs filing, a trend shared by all comparators, though Ireland again performs less well than most.
- Plant Variety Rights and Geographical Indications appear lowly ranked in terms of importance, which is common across all comparators in terms of volumes. More information is needed on how and why firms utilise these forms of IPR, as well as how and why firms utilise the non-quantifiable IPR mechanisms such as copyright and informal mechanisms like trade secrets.
- In the latest comparable data, Ireland ranks well among comparators when assessing the proportion of innovation active firms, is over the EU28 average, innovation expenditure per enterprise has risen, and its percentage of turnover from product innovation appears to fall with the values reported for comparators. Large firms report a higher proportion of innovation activity than SMEs and small firms, which prompts a further examination of how firms of different sizes utilise IPRs.
- Business Expenditure on R&D is lower than in the innovation leaders included in this survey, but Ireland has been improving in this category more than others from the comparators. Limited data on firms receiving R&D grants in Ireland show that a good proportion are subsequently pursuing IP.
- An analysis of agency-client firms indicates that important economic sectors – particularly for indigenous firms – are concentrated in largely low or non-patenting sectors (food and drink, business services and software). This may explain historical and continuing lower patent filing volumes, though not lower activity in trademarks and other forms. Understanding more about how IPRs are used by sectors will allow a more informed view of

[48] Business in Ireland 2011, Central Statistics Office, 2013

whether this is a potential reason for lower filing and registration activity, or whether there are other reasons behind this. The foreign-owned multinationals are largely dominant in chemicals (including pharmaceuticals), medical devices, computing (ICT hardware) and computer programming, three of which are patent-centred sectors.

4. IP strategies of Irish firms

4.1 Introduction

In order to find out more about how firms in Ireland utilise IP, we conducted a survey and an interview programme (full details are listed in the methodology, section 1.3). This was designed to add to the picture of IP activity developed in the quantitative data study undertaken previously[49], to understand how and why particular forms of IPR are used and by whom. This additional research was conducted to gain a better understanding about the reasons for certain decisions related to IPR usage, and to understand what enabling and limiting factors had been experienced. The survey sought to find more detail on usage of IPR across all types and mechanisms: usage and combinations thereof, motivations for use, generation of IP and innovation activities, location of registration and filing, engagement and usage of external support in Ireland, and barriers to more usage. In the interviews, we asked questions about management and resourcing of IP, any changes to firms' IP strategies and uses, their experiences of operating in Ireland and accessing support, and their detailed views on rationales and enabling and limiting factors.

This chapter begins with an overview of usage and rationales across all responding businesses. It is important to address explicitly the ownership of firms, as there are implications for how IP activity is approached. There are many foreign-owned multinationals in the firm base alongside the mix of indigenous multinationals and SMEs. The following discussion takes into account the points of difference between foreign- and Irish-owned firms (section 4.2), before looking sectorally (section 4.3) and then by firm size and operating age (section 4.4).

The survey was answered at various levels of detail. A small number of firms provided only firm details, others answered only R&D questions and not IP protection questions. We similarly find that when analysing data by ownership, sector, firm size and firm age, the respondent population varies, as some firms did not provide all of these details. As such, at some levels of analysis, the numbers of respondents becomes rather small. For this reason, the number of respondents is highlighted in tables and charts, and all analysis is written in the context of drawing on the data that was collected. Further, it is worth noting that given the current lack of distinct public IP supports in Ireland, all discussions of support accessed in the Irish system relate to both the broader innovation supports, and in some cases to historical supports (such as the IP Assistance Scheme) that were previously in operation.

4.2 All firms and ownership considerations: Irish-owned and foreign-owned firms

This section reports the overall view of the survey respondents, as well as conducting analysis according to firm ownership status (indigenous independent, Irish-owned multinational, foreign-owned multinational). The number of firms (n) can vary across questions as not all firms answered all questions.

In reporting the responses according to ownership the percentages represent the proportion of firms (within the ownership group) that have responded in a particular way to a given question (e.g. X per cent of all foreign-owned multinational firms that answered the question stated Y). The number of firms within each ownership grouping can vary across questions, as not all firms answered all questions. This number is shown for each table or chart used, and full tables can be found in Appendix E.

4.2.1 Use of IPR types

The majority of firms consulted view formal and registered IPR as being important to their business[50] and will continue to use it as part of their innovation strategy. In addition, informal and unregistered forms also play an important role, with combinations of registered,

[49] An analysis of Intellectual Property activity in Ireland based on existing data. CambridgeIP (2014): An independent report for Forfás/Department of Jobs, Enterprise and Innovation.

[50] The 7 firms that identified themselves as R&D active but that they do not protect their IP provided very little further information in the survey and as such there was insufficient data to provide insights from firms that are not IP active.

unregistered, formal and informal means often contributing towards IP strategies. Figure 26 summarises the stated importance of various IPR protection mechanisms to firms surveyed.

Figure 26 Importance of IP protection mechanisms (n = 112, multiple choices)

	High importance	Moderate importance	Low importance	Not used	Number of respondents
Patent	51%	14%	13%	22%	111
Short term patent / Utility model	13%	18%	21%	48%	104
Industrial design	20%	31%	16%	32%	105
Trademark	32%	39%	14%	15%	107
Copyright	27%	33%	17%	23%	108
Plant Variety Rights	4%	9%	16%	72%	102
Geographical Indication	8%	17%	20%	55%	99
Trade Secret	44%	24%	8%	23%	107
Complexity of design	29%	41%	10%	21%	105
Lead time advantage	31%	41%	11%	16%	105

Source: Technopolis based on survey data. Note: Highest values per category are highlighted.

4.2.1.1 Patents

Patents remain important, with 51% of all survey respondents stating that patenting is of 'high importance' to their business. When interviewed, both indigenous and foreign-owned firms stated that they are now much more selective in what they choose to patent, utilising patents strategically to secure monopoly time and freedom to operate around their core IP.

Patenting is inappropriate or impractical to some firms; 22% of survey respondents stated that they do not utilise patents at all, meaning that the split of opinion on patents is either 'central to operation' or 'unimportant'.

Analysis of the survey data shows that patents are regarded relatively equally as important by Irish-owned and foreign-owned firms.

4.2.1.2 Short-Term Patents

A large proportion of firms – almost half – stated that they do not use short-term patents. Survey data shows that foreign-owned multinationals stated slightly more importance (38% of foreign-owned multinationals who responded to this question noted high or moderate importance) than Irish-owned firms (31% of independent firms and only 10% of Irish-owned multinationals responding to this question) who stated importance for short-term patents.

4.2.1.3 Industrial designs

The survey revealed that Industrial designs are significantly under used, with one third of firms stating that they do not utilise this form at all and only one fifth stating that it is of high importance. Interviews revealed that firms generally do not understand the utilisation of designs – only one firm mentioned sparing use of Industrial designs – and one non-firm respondent stated that it often requires prompting from a legal professional to consider this form of IPR, with firms often unaware that there is an applicable use for them. Irish-owned firms (55% of independents, 50% of multinationals who responded to this question) stated more importance in industrial designs than foreign-owned multinationals (42% of foreign-owned multinationals who responded to this question).

4.2.1.4 Trademarks

The quantitative data study highlighted that trademarks have displayed a significant uptake in recent years. Interviews revealed that firms are finding an appreciation of the broader range of applicability of trademarks, from brand names to slogans and beyond. Foreign-owned multinational firms generally stated that trademarks are dealt with by corporate commercial functions, away from the Irish plant. The survey shows that trademarks are regarded as highly important by one third of respondents, and of moderate importance by 39%. Only 15% stated that they do not use trademarks. Despite these positive findings, interviews revealed that much more could be done to help indigenous businesses understand the true value of trademarks,

with various examples such as Apple and Samsung used as illustrations of large technology firms who have built their value largely from their brand. Anecdotal evidence presented through interviews suggests that many Irish firms do not progress with trademarking, even when advised to do so, though this is most likely to relate to firms not operating in overseas markets. Multinational firms stated higher importance than independent firms: 81% of foreign-owned multinationals and 82% of Irish-owned multinationals who responded to this question indicated high or medium importance in comparison to 66% for independent firms that responded to the question.

4.2.1.5 Copyright

Copyrights are also regarded as highly important, with a total of 60% of firms stating that they are of high or moderate importance to their business. As with trademarks, there is a broad spread of applicability, though unlike trademarks, copyrights do not have the same applicability. Those firms interviewed who use copyrights as their main protection mechanism stated that their internal processes are necessarily set up to record the creation of materials and products. Both foreign-owned and Irish-owned firms stated roughly the same importance for copyrights.

4.2.1.6 Plant Variety Rights and Geographical Indications

Responses to our survey suggested that plant variety rights and geographical indication, as indicated in the quantitative data study, receive little use, with 72% and 55% of firms indicating respectively that these forms are not used at all. Of the firms who responded to this question, indigenous firms (both multinational – 20%, and independent – 14%) stated more importance than foreign-owned firms (8%).

4.2.1.7 Unregistered and informal IPR

Unregistered and informal IPR also play important roles for firms. A total of 68% of those surveyed firms stated that trade secrets are highly or moderately important to their business, with 70% and 72% respectively stating that complexity of design and lead time advantage are of combined high and moderate importance. Firms confirmed in interview that a mixture of registered and unregistered forms of IPR is common in business strategies: there is no registered IP activity without unregistered IP, and some firms rely entirely on unregistered and informal approaches, either across different elements, or at different stages of product development. Both foreign-owned firms and Irish-owned firms (multinational and independent) stated similarly high levels of importance for trade secrets, complexity of design and lead-time advantage.

4.2.2 Motivations for use of formal IPR

Figure 27 Motivations for formal IP regarded as 'very beneficial', in descending order (n = 108, multiple choices)

Motivation	As % of all respondents	Number of responses
Preventing unauthorised use of protected IP in general	42%	45
Protecting against copying of products or services we actually produce or offer	41%	43
For attracting investors	37%	38
For strategic purposes (e.g. to scare the competition off)	31%	31
For creating bargaining power in deals / negotiations with competitors	27%	28
For marketing / signalling purposes and / or to support our brands	26%	26
To maintain "Freedom-to-Operate"	23%	23
To facilitate collaboration on innovation projects with other partners	18%	18
For creating direct revenue through out-licensing	17%	17

Source: Technopolis based on survey data

Figure 28 Motivations for formal IP regarded as 'very beneficial', in descending order, by ownership (n varies between 101 and 106, multiple choices)

		Prevent unauthorised use	Protect against copying	For marketing / signalling	For attracting investors	For creating bargaining power in deals	For creating direct revenue through out-licensing	To maintain "Freedom-to-Operate"	To facilitate collaboration on innovation projects	For strategic purposes (e.g. to scare the competition off)	Total
Independent		46%	46%	28%	51%	32%	22%	30%	21%	37%	67-71
Part of a group	**Foreign owned**	42%	38%	23%	13%	17%	4%	9%	9%	18%	22-24
	Irish owned	18%	9%	18%	0%	20%	9%	9%	18%	22%	10-11

Source: Technopolis based on survey data

The survey shows that the motivation to protect is largely to stop unauthorised use, to protect against copying and for attracting investment, there is little difference in the former two between foreign-owned and Irish-owned firms, though the survey data show that attracting investment is much more important as a motivation to independent indigenous firms (51% of respondents) than to multinational firms (13% of foreign-owned and 0% of the Irish-owned firms answered thus).

Creating revenue was the lowest-rated response, with only 17% of all respondents citing that reason. This was again more important to independent indigenous firms (22% of indigenous independent firms who responded to this question) than multinationals (4% of foreign-owned and 9% of Irish-owned who responded to this question). In a separate question, only one third of surveyed firms stated that they out-licence their IP. A number of interviewed firms stated that they primarily licence out to manufacturers, or as part of specific arrangements with customers. In the same interviews, respondents stated that in circumstances where firms licence out to larger multinational customers, there is a more pronounced emphasis on patents, as opposed to know-how licences or trademark licences for operating a brand or branded products abroad. The use of licencing to create a direct revenue stream appears to have subsided in recent years, with only 17% of surveyed firms stating this was a major driver of IPR for them. In interviews, a small number of firms stated that the changes to preferential tax treatment of revenue derived from IP (i.e. the 2011 closure of the Patent Royalty Exemption Scheme) has had a negative impact on their licensing activity[51], due to now not being able to offset costs.

Creating bargaining power was reportedly of more interest to independent Irish-owned firms (32% of respondents) than to multinationals (17% foreign-owned and 20% Irish-owned).

Maintaining freedom-to-operate was reported through the survey as much more important to independent Irish-owned firms (30% of firms in this grouping who responded to this question) than to multinationals (9% of both foreign-owned and Irish-owned respondents).

Scaring off competition was a more important motivation to independent Irish-owned firms (37% of respondents to this question in that grouping) than to Irish-owned multinationals (22% of respondents). Almost one fifth of foreign-owned multinationals (18% of respondents) stated that this was important.

Finally, facilitating collaboration through IPRs was stated as more important to Irish-owned firms (21% of independent firms and 18% of Irish-owned multinationals, compared to 9% of foreign-owned multinationals).

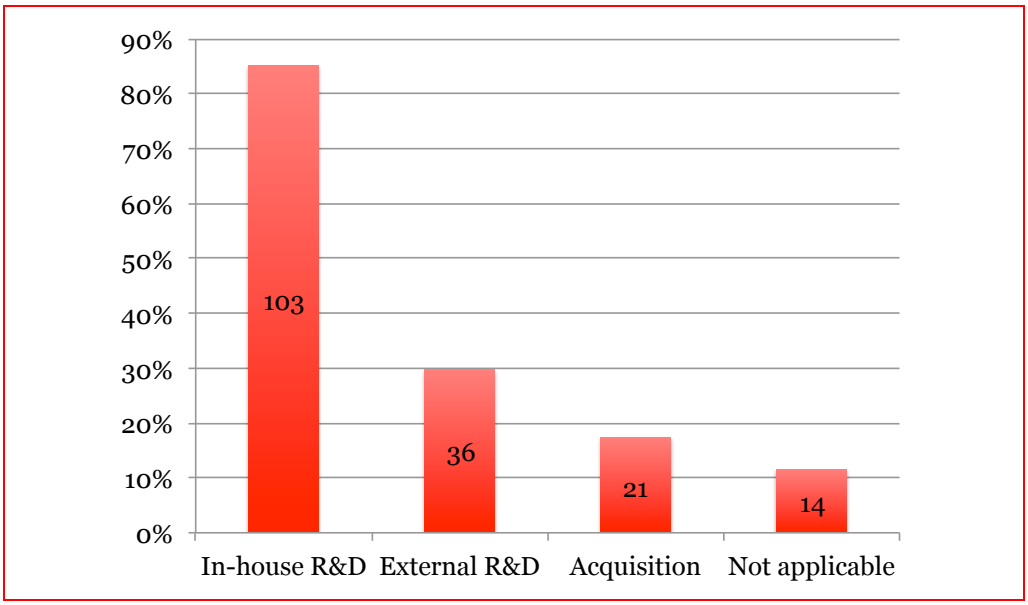
[51] It should be noted that this is within a very small sample

4.2.3 Generation of IP

Almost ninety per cent of survey respondents stated that they conduct R&D activity[52]. Those who did not answer the question (i.e. six firms left it blank) were primarily foreign-owned multinationals (five, with the other not declared) whose representative perhaps could not answer this question. Of those who explicitly stated they were not R&D active, this was more mixed (three independent indigenous firms, two Irish-owned multinationals, two foreign-owned multinationals).

A significant proportion of the respondents indicated that in-house R&D is the main source of their IP (86%). External R&D (30%) and acquisition (17%) were stated less frequently as significant IP generation sources (see Figure 29, below). Firms interviewed reinforced this view, stating that they often try to access external IP to fill gaps in their activity, if unable to fill the need internally. In interviews, a number of indigenous knowledge-intensive firms stated that they utilise in-licensed IP from HEIs in addition to their own in-house processes, or to expand business areas away from core IP, though many had struggled, or had not yet attempted to work with the HEI sector due to difficulties or perceived difficulties. Interviewed foreign-owned multinationals stated that they often proceed with acquisition in order to gain market share.

Figure 29 Generation of IP (n = 121, multiple choices)



Source: Technopolis from survey

Splitting this out by ownership shows that foreign-owned multinationals are more oriented toward acquisition than indigenous firms, but the split of external R&D appears to show that indigenous firms are more active in this area. Caution is required around these figures, however, as they are very small (Figure 30).

[52] It is worth noting again here that due to the way firms answered the survey, analysis of questions by ownership yields a different total number of respondents than the overall survey, as some firms did not provide these details.

Figure 30 Generation of IP by multinational firms – split by foreign-owned and Irish-owned (n = 118)

		In-house R&D	External R&D	Acquisition	Not applicable	Total
Independent		94%	33%	10%	5%	78
Part of a group	**Foreign-owned**	75%	18%	36%	21%	28
	Irish-owned	67%	42%	17%	25%	12

Source: Technopolis from survey.

Interviews revealed that foreign-owned multinationals are more active in sponsoring academic research and co-development because of their greater resourcing, though there were unsurprising complaints about the process and mismatches in expectations and valuations between industry and academia and accusations on both sides that the other party will try to 'grab' the resulting IP. These firms also discussed difficulties stemming from lack of trust, misalignment of expectation and differing timescales. These issues cause an apparent blockage to transfer out from HEIs and exploitation by industry, but it has been suggested that this may be overcome through mediation and mutual expectation management[53]. Interviewed firms stated that standard agreements and other tools, such as IP marketplaces may help all parties and lead to more exploitation[54].

Our interviews reinforced the fact that the foreign-owned multinational firms have distinct, well-resourced IP strategies focused on growing an IP portfolio, often identifying gaps to "invent into" or using problem-led strategies to seek out external IP. Firms interviewed reiterated that the two main drivers for multinationals in building a portfolio are:

i) To build a defensive portfolio

ii) To gain market share

The foreign-owned multinationals interviewed stated that their IP management processes are mature, and that they have specific and dedicated IP management resources such as invention disclosure forms, with internal appraisal and advisory boards often in place to manage the development of IP projects. These processes cover oversight of internal R&D, co-development with partners and due diligence for acquisitions. It is clear, and expected, that such firms have much greater resourcing and specialist expertise in dealing with IP, including their own legal departments, as well as well-developed and deeply embedded processes.

Of the foreign-owned firms interviewed, respondents stated that these processes and structures are always located within the corporate headquarters, even though multinationals do have a functional presence in Ireland. Irish sites conduct research and manufacturing, with IP (particularly patents) assigned, protected and exploited elsewhere due to corporate decisions and the international division of labour. There is little to suggest that there are many concrete policy measures to change this behaviour. Interviews revealed a small number of foreign-owned multinationals who assign IP in specific areas to an Irish subsidiary, depending on the overall group structure; this means that IP sits in Ireland, regardless of where it was created.

4.2.4 Location of IP protection

Location of protection was reported as being primarily in the market of operation, with the EU and the US featuring strongly. Our survey shows that while many indigenous firms seem to relatively evenly spread their protection across Ireland, the EU and the US, foreign-owned multinationals much less frequently use Ireland as a filing location, with the US as the primary choice. Foreign-owned multinationals interviewed stated that they only protect in Ireland if i)

[53] Recent changes in Ireland such as the Knowledge Transfer Ireland initiative, Research Prioritisation Exercise, and the National IP protocol may impact this, and as such, we do not duplicate this effort in the recommendations

[54] A review and publication of IP protocols is planned for 2015 as well as publication of further practical guides and model agreements.

that is the main market[55], ii) there was a desire to block manufacturing, or iii) there was the presence of a significant competitor in-country. For other forms, this is often because that protection is valid in a specific country. In addition, some firms when interviewed stated that filing in Ireland is used as a priority claim, where the process is easiest, to then give more time to consider further strategic decisions.

Figure 31 Geographical concentration of IP protection (n=104, multiple choices)

		Ireland	EU	US and Canada	Latin America	Asia	Africa	Total
Independent		71%	66%	57%	3%	13%	0%	70
Part of a group	**Foreign-owned**	33%	42%	58%	0%	29%	0%	24
	Irish-owned	90%	30%	10%	0%	0%	0%	10

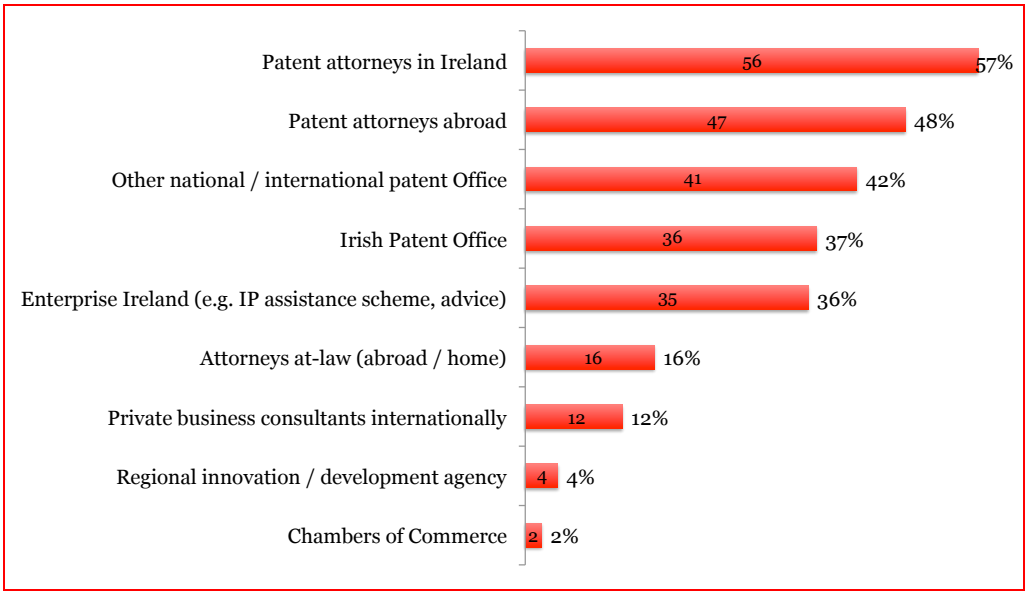
Source: Technopolis based on survey data. Note: Highest values per category are highlighted

4.2.5 Use of external support[56]

The survey reveals a high-level picture of which parts of the support system are most accessed, summarised in Figure 32. Unsurprisingly, given the importance ascribed to patents, patent attorneys (in Ireland and abroad) are top, closely followed by international patent offices.

There is limited explicit public support for IP currently in Ireland. As such, usage of public support for IP is through broader business and innovation support, and historic supports such as the IP Assistance Scheme.

Figure 32 Use of external support (n = 98, multiple choices)



Source: Technopolis from survey

As Figure 33 shows, of those utilising patent attorneys in Ireland, these were mostly Irish-owned firms (70% of independent firms and 60% of Irish-owned multinationals who responded to this question, compared to only 11% of foreign-owned multinationals who responded to this question). Patent attorneys abroad were reported as more mixed, with 46% of independent Irish

[55] Ireland's market size is small, as such, when coming to the recommendations, it is sensible to suggest intervention based on internationally trading firms. This also fits well with overarching policy objectives for Ireland in terms of economic growth and job creation.

[56] A note on terminology: "Chambers of Commerce", as used in the original survey was selected for comparability with other countries. We understand through consultation that the Irish system operates differently and that while many countries make membership of such bodies mandatory, this does not exist in Ireland. We recommend for future research to utilise Ibec and the sector bodies here.

firms who responded to this question, and 63% of foreign-owned multinationals who responded to this question, compared to 30% of Irish-owned multinationals who responded to this question.

It is similarly unsurprising to see other national and international patent offices near to the top of the list, as the majority of firms discussed protecting patents in their priority market. The survey reveals a mixture of independent Irish-owned firms (39% of responding Irish-owned independent firms) and foreign-owned multinationals (58% of respondents to this question) most utilising these services. The Irish Patent Office unsurprisingly was used mostly by Irish-owned firms (42% of independent Irish firms and 40% of Irish-owned multinationals that responded to this question, compared to only 16% of foreign-owned multinationals that responded to this question).

Enterprise Ireland was used mostly by Irish-owned firms (43% of independent Irish firm respondents and 30% of Irish-owned multinationals that responded, compared to 11% of foreign-owned multinationals that responded).

Private business consultants were used predominantly by Irish-owned multinationals (30% of firms in this group) compared to 5% of responding foreign-owned multinationals and 12% of responding independent Irish firms.

Further analysis of the survey data shows that the two final services (regional agencies and Chambers of Commerce[57]) were utilised entirely by independent indigenous firms (but by only 4% and 3% of responding firms respectively), and that multinational firms (37% of responding foreign-owned multinationals and 20% of responding Irish-owned multinationals) are more likely to utilise attorneys at law than independent indigenous firms (10% of responding firms in this grouping).

Figure 33 Use of external support, by ownership (n = 98, multiple choices)

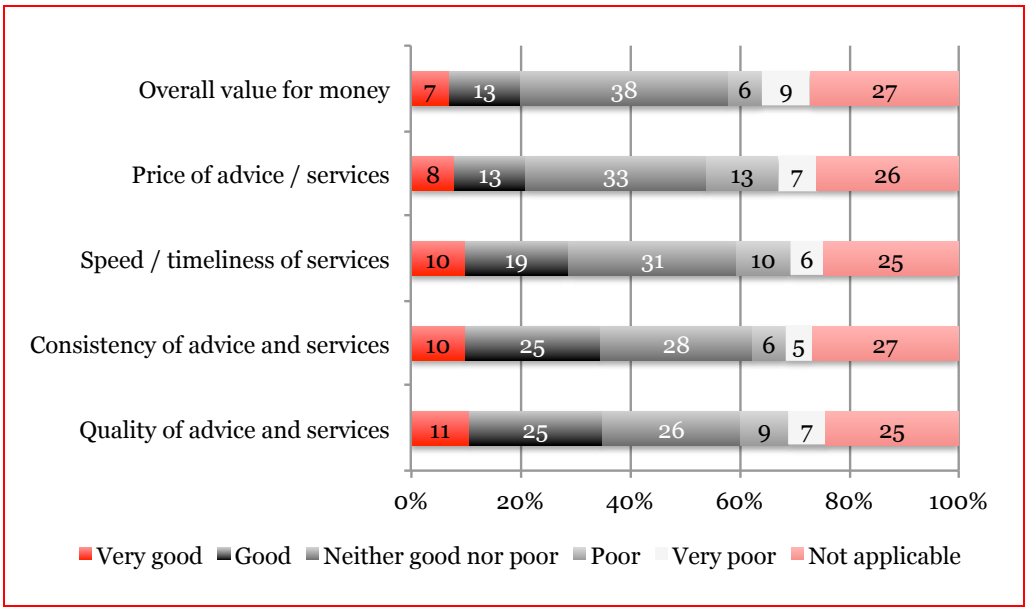
		Irish Patent Office	Other national / international patent Office	Enterprise Ireland (e.g. IP assistance scheme, advice)	Patent attorneys in Ireland	Patent attorneys abroad	Attorneys at-law (abroad / home)	Private business consultants internationally	Chambers of Commerce	Regional innovation / development agency	Total
Independent		42%	39%	43%	70%	46%	10%	12%	3%	4%	69
Part of a group	**Foreign-owned**	16%	58%	11%	11%	63%	37%	5%	0%	0%	19
	Irish-owned	40%	30%	30%	60%	30%	20%	30%	0%	0%	10

Source: Technopolis from survey

Despite the absence of explicit direct IP support schemes in Ireland, the broader Irish innovation support system is generally well regarded in terms of the quality, consistency and timeliness of advice, and the majority of respondents in both the interviews and survey stated a need for additional (rather than improved) government support in all areas. The following chart (Figure 34) summarises these views.

[57] A note on terminology: "Chambers of Commerce", as used in the original survey was selected for comparability with other countries. We understand through consultation that the Irish system operates differently and that while many countries make membership of such bodies mandatory, this does not exist in Ireland. We recommend for future research to utilise Ibec and the sector bodies here.

Figure 34 Satisfaction with external (state) support (n varies between 101 and 104)

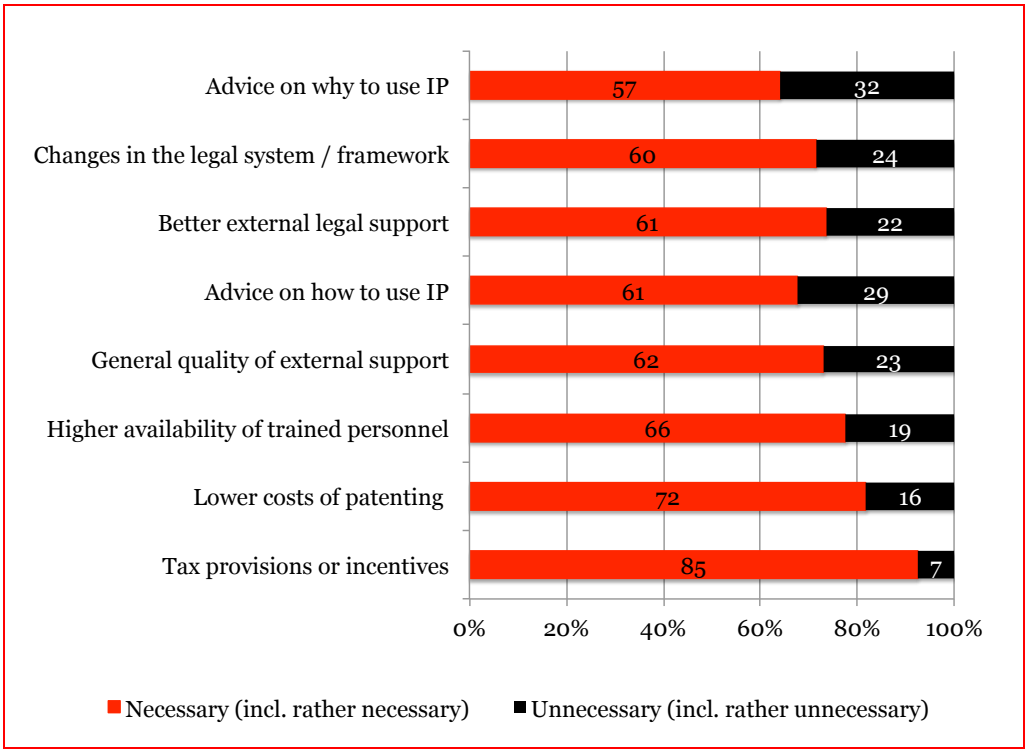


Source: Technopolis based on survey data

As the above chart shows, there is general positivity, even as survey respondents mostly opted for a middle route in-between satisfaction levels. When interviewed, most firms – indigenous and foreign-owned – stated that though they were generally satisfied with the support they had received, they had found it difficult to find out about the support that is available and from whom. The navigation of the support system, though small, was repeatedly mentioned as an issue in interviews, with firms of all kinds stating that they had difficulty locating the right individuals and the right areas; several firms mentioned that branding for available support was not clear enough.

A majority of respondents can see a need for additional government support in all areas. The chart below summarises the overall survey response as to which areas of State support for IP are felt to require attention. Tax provisions and lowering the cost of patenting were the main responses given through the survey for support improvements, followed by higher availability of trained personnel, but of this latter point, indigenous companies, including Irish-owned multinationals, are clearly more in favour than foreign-owned multinationals (100% of Irish-owned multinationals who responded to this question compared to 72% of foreign-owned multinationals that responded). Eighty-seven per cent of indigenous firms who responded stated that this was important.

Figure 35 In which areas do you see the most need for state help in improving beneficial use of IP for firms in Ireland? (n=between 83 and 92, multiple choices)



Source: Technopolis based on survey data

Indeed, each of these suggested changes appear in the survey to be much more important to Irish-owned firms (independent and multinational) than to foreign-owned multinational firms.

4.2.6 Barriers to support and scope for state support

The barriers listed to increased IP usage were rather varied among the survey respondents, however the most frequently quoted barriers were considered to be the high costs of IP protection from different angles, as per Figure 36, below. It is worth noting that in interview, firms variously stated that this was related to the cost of professional external services, such as legal experts, and that this relates to preparing and filing applications, as well as later (potential) defence costs, which again related to hiring legal services. Statutory fees[58] were not mentioned as being problematic. The majority of firms interviewed had hands-on experience of preparing and filing at least one patent application (as well as other forms of IPR), meaning that this view comes from experience. Unfortunately it is not possible to achieve the same view of the survey respondents, who may speak from experience and may simply state a perception. It is similarly worth noting that a smaller number of interviewed firms had experienced enforcement issues, wherein they had been approached by a prosecuting firm. In interview, a number of firms suggested that there is an on-going internal dialogue about the value of patents in particular, with decisions being made to manage down firm costs, though this is not a negative comment on the value of patents or other formal IPRs.

It is recognised that a detailed quantitative examination of costs was outside the scope of this study and thus costs are differentiated in this report only qualitatively, based on particular statements heard in interview. As such, this research could not systematically and in a quantitative manner differentiate the extent to which the cost barrier is based on perception or experience. The research should not be used to make inferences on the degree to which the cost

[58] Statutory fees relate to the fees payable to the Intellectual Property Office for submission of a filing

barrier relates to costs in Ireland or abroad, nor which specific cost components[59] the cost issues pertain too. Furthermore, this study did not look to compare legal costs internationally and as such there is no inference in this study that Ireland is a more expensive location than elsewhere for firms to engage in IP activities.

Figure 36 Main barriers for a more beneficial use of IP (n=96)[60]

Barrier	% of total respondents (n=96)	Number of respondents
Costs too high	47.4%	45
Process too expensive	46.3%	44
Not confident of ability to enforce any such IP rights	45.3%	43
Affordability of external professional services (IP agents / lawyers)	42.1%	40
Too complicated / time-consuming	29.5%	28
No internal capacity to manage IP	20.0%	19
Disclosure of our principal IP is too great a risk	18.9%	18
IP not relevant to our business	17.9%	17
Unclear benefits of IP usage	15.8%	15
No or little independent advice available	12.6%	12

Source: Technopolis based on survey data

It becomes apparent through further analysis of the survey data that Irish firms feel less confident about their ability to enforce their IP rights than their foreign-owned counterparts, with 60% of Irish-owned multinationals and 49% of independent Irish firms that responded to this question compared to only 18% of foreign-owned multinationals.

Figure 37 Main barriers for a more beneficial use of IP, by ownership (n=96)

		IP not relevant to our business	Unclear benefits of IP usage	Too complicated / time-consuming	Process too expensive	Costs too high	No internal capacity to manage IP	Affordability of external professional services	No or little independent advice available	Not confident of ability to enforce	Disclosure of our principal IP is too great a risk	Total
Independent		14%	17%	30%	53%	59%	21%	46%	17%	49%	20%	70
Part of a group	**Foreign-owned**	31%	6%	31%	25%	6%	13%	19%	0%	19%	6%	16
	Irish	20%	20%	20%	30%	30%	20%	40%	0%	60%	20%	10

Source: Technopolis based on survey data

As shown in Figure 37, above, all barriers appear to be felt more keenly by Irish-owned firms, as opposed to foreign-owned multinationals. While proportionally costs were regarded as the highest barrier, only 6% of foreign-owned multinationals that responded reported this, as opposed to 30% of Irish-owned multinationals and 59% of independent Irish firms that responded to this question. The same pattern holds across 'process too expensive' (53% Irish

[59] Cost components for IP protection include (but are not limited to) costs in preparing an application and costs in enforcing and maintaining IP after grant, for example performing regular research via databases to identify potentially harmful IP, taking opposition actions, and so forth.

[60] Survey respondents were given the option of: costs too high, process too expensive and affordability of external support. In answering, firms could have considered costs too high on the basis that either the process was too expensive or external professionals were too expensive. This was to gain an overall view that could be followed up in interview.

independent firms, 30% Irish-owned multinationals, 25% foreign-owned multinationals) and 'affordability of external professional services' (46% Irish independent firms, 40% Irish-owned multinationals, 19% foreign-owned multinationals who responded to this question). 'Too complicated or time consuming' was reported a little more closely (30% Irish independent firms, 20% Irish-owned multinationals, 31% foreign-owned multinationals who responded to this question). Interviewed firms, including foreign-owned multinationals, did note the time investment in locating and navigating appropriate supports.

'Lack of internal capacity' and 'disclosure is too risky' were also reported primarily by Irish-owned firms. 'Unclear benefits' were reported mostly by Irish-owned firms, though 'IP not relevant' was reported relatively evenly (14% Irish independent firms, 20% Irish-owned multinationals, 29% foreign-owned multinationals responding to this part of the survey).

The lack of independent advice was reported only by independent Irish-owned firms (17%).

4.3 Sectoral considerations of IPR

In this section we examine the same set of questions, split by sector. As stated in the methodology, due to how firms answered, splitting the data this way results in varying total respondents.

In reporting the responses according to sector, the percentages represent the proportion of firms (within the sectoral groups) that have responded in a particular way to a given question (e.g. X per cent of all software firms that answered the question stated Y). The number of firms within each sectoral grouping can vary across questions, as not all firms answered all questions. This number is shown for each table or chart used, and full tables can be found in Appendix E.

It should be noted that the manufacturing sector included below was self-selected by survey respondents and contains a broader range of sectors within the grouping. As such, this presents a mixed picture and the results should be carefully interpreted. A further note is that splitting sectorally results in lower overall numbers due to the structure of survey responses. Firms who self-identified their sector as "other", and which could not be meaningfully aggregated, have been omitted from sectoral breakdowns. This data is viewable in the supporting data section of Appendix E.

4.3.1 Use of IPR, by sector

It is common to see firms combining IPR mechanisms. Many firms consulted rely on a variety of combinations, with sectoral concerns often dictating particular uses and combinations. The survey data provides an indicative view of IPR combinations across sectors. Taken in turn, these are shown in Figure 38 in order of frequency[61].

[61] In analysis, self-identified firms ("other" sector) that could not be meaningfully aggregated have been omitted from sectoral breakdowns.

Figure 38 Sectoral IPR combinations rated as high or moderate importance, descending frequency (n varies between 100 and 112, multiple choices)

Sector	Indicative combinations of IPR mechanisms	Total respondents in sector
Food and Drink	Trademark (100%), copyright (83%), patents (83%)	6
Business services	Copyright (78%), trademark (71%), lead time advantage (50%)	7-9
Financial services	Copyright (100%), trademark (75%), lead time advantage (75%), patents (75%)	4
ICT hardware	Complexity of design (100%), trade secret (100%), patent (92%), industrial design (75%)	11-12
ICT software	Complexity of design (83%), lead time advantage (79%), trade secret (67%), copyright (63%), trademark (58%)	23-24
Manufacturing	Patents (63%), trademark (63%)	7-8
Medical devices	Trade secret (88%), Complexity of design (82%), lead time advantage (82%), industrial design (81%), patent (76%)	15-17
Pharmaceuticals	Patent (100%), trademark (86%), trade secret (86%), complexity of design (67%), lead time advantage (67%)	5-7

Source: Technopolis based on survey data. Note: Omitted "other" self-identified sectors not usefully able to aggregate

4.3.1.1 Patents

The data shows that firms in traditional patenting sectors – pharmaceuticals and ICT hardware – continue to use patents as a central part of their IP strategies, with respondents in both sectors identifying patenting as their most important IPR mechanism. Patenting remains important to medical devices firms as well, though appears more embedded among informal measures, plus copyright and industrial design. Certain sectors, such as software, make sparing use of patenting, and interviews confirmed that only large firms with activity in the US utilise software patents, particular to that market. In interview, one respondent stated that it is very difficult to patent software in Europe. The US patent system allows for this, but firms interviewed expressed that such a process is often long, involved and expensive. The majority of indigenous software firms interviewed had never filed patents, and had little interest in doing so. In interview, some technology-led firms who utilise patenting in technological products have stated that in electronics, there is often a move toward more standard solutions, as patenting becomes difficult at the level of circuit boards, for example. Interviews highlighted that patenting in the food and drink sector is mostly around processes, though this is a very small number of firms.

4.3.1.2 Short Term Patents

This form was not selected as a top priority by any sector, though the sector with the highest proportion of users of short-term patents – not shown in the above table – is the financial services sector, the food and drink sector and pharmaceuticals (each 50% of respondents), indicated the next highest uses of short-term patents, though overall this remains a lesser-used form.

4.3.1.3 Industrial designs

Industrial designs were not rated as a top priority within the survey, though the sectors making most use of this form are medical devices with 81% of respondents stating high or moderate importance of this form. ICT hardware (75%), was the next highest, with indications also that there is some use in the food and drink sector (67%), though again this remains lesser used. Interviews confirmed that firms often require prompting from legal professionals to consider this form, as knowledge of its applicability appears to be under-developed.

4.3.1.4 Trademarks

Trademarks see significant utilisation across a broad range of sectors, with the largest proportional usage being in the food and drink sector (100%), pharmaceuticals (86%), medical devices (76%), and the financial services (75%) sector. Business services firms (71%) and

software firms (58%) also display high proportional use of trademarks, with ICT hardware coming slightly lower (55%). Trademarks, because of their nature, are applicable to most sectors and most businesses, regardless of orientation; interviews confirmed that this is particularly true where firms operate in national or international markets. Interviews confirmed rising awareness across all sectors, with many respondents stating increased usage and appreciation for trademarks. There was a minority view expressed through interviews that trademarks fall outside the realm of IP and into the realm of marketing, though this is often from the perspective of highly technology or science-led firms that perhaps pay less direct attention to this side of their IP strategy.

4.3.1.5 Copyright

The sectors making the most use of copyrights are the financial services (100%), food and drink (83%), business services (78%), software (63%), medical devices (63%), and ICT hardware (58%). Many software firms consulted through interviews use a range of open source elements (for example, mySQL) meaning that the development of marketable products is put together end-to-end, with concomitant internal processes that require the firm to be aware and record which parts are created by them, which parts are proprietary, which parts are novel, and so forth. This comes in the form of documents with releases, and a central code repository that logs the developers' time and inputs. This same process of documenting creation is used in the creative and design sector, as discussed in interviews.

4.3.1.6 Plant Variety Rights and Geographical Indications

There are low levels of responses for these two forms, with no sector giving them priority status. Through the survey, respondents in some sectors that would not otherwise be associated with Plant Variety Rights and Geographical Indications indicated some levels of importance, implying potential confusion among respondents as to what these particular forms of IPR are applicable.

4.3.1.7 Use of unregistered and informal forms of IPR

The table above in Figure 38 shows that unregistered and informal forms of IPR play an important role for all sectors. The use of unregistered forms such as copyright are reported as priorities within financial services, business services and food and drink, as well as within the software sector among a broader range of informal approaches. Through interviews, many firms stated the central importance of informal mechanisms, with these making up the core of IP protection strategies in software and medical devices in particular. A key example is the use of trade secrets, complexity of design and lead-time advantages in combination with copyright and trademarks in the software sector, with one respondent stating that their IP is based on how long it would take to replicate, with one feature perhaps taking 12-18 months to put in place[62], and the protection being based on how long and the knowledge it takes to solve the problems. Firms in the majority of sectors included in the survey stated the importance of informal mechanisms, including the more patent-focused sectors. Trade secrets, complexity of design and lead-time advantage all received high response rates.

Interviews confirmed that some firms may use specific, contractual or agreement-based protections when working on behalf of a specific customer and not distributing products widely or for general release. This is most common in business services and software. These projects are based around a bespoke contracted arrangement upon which the customer is given the product, for example software and code, with a specific clause that the producing company owns the copyright, or a licence that gives access to the product, as well as the rights to use and continue development, without redistribution.

[62] Further consultation points out that the length of time to grant a patent application depends on the nature of the route taken and the office where the patent is being examined. If an application were filed only in Ireland, it would take 12-18 months. However, to obtain a granted patent in multiple jurisdictions (for example, via the PCT route) would take anywhere from 3 to 6 years from the date of filing

4.3.2 Motivation for use of formal IPR

In our survey, we asked firms to record their main motivations for utilising registered IPR. In the vast majority of sectors – all but software and ICT hardware – firms stated that the main reason is to protect against unauthorised use of protected IP. Firms from the ICT hardware sector stated that the main reason for utilising registered IP is to attract investors (64% of firms in the ICT sector that responded to this question), followed by strategic purposes (i.e. scaring away competition, 42%) and then marketing and signalling (36%), creating bargaining power in negotiations (also 36%) and preventing unauthorised use (33%) as well as maintaining freedom to operate. Those in the software sector stated that the main motivation was to protect against copying of products or services and to attract investors (both 30%). Preventing unauthorised use[63] was next, at 22%. One firm interviewed recounted the use of the patenting process as a prior claims procedure, with no intention of finalising the process. Overall, the main motivations per sector are summarised in the following table (Figure 39).

Figure 39 Motivations to use formal IPR regarded as 'very beneficial', by sectoral (n varies between 100 and 106)

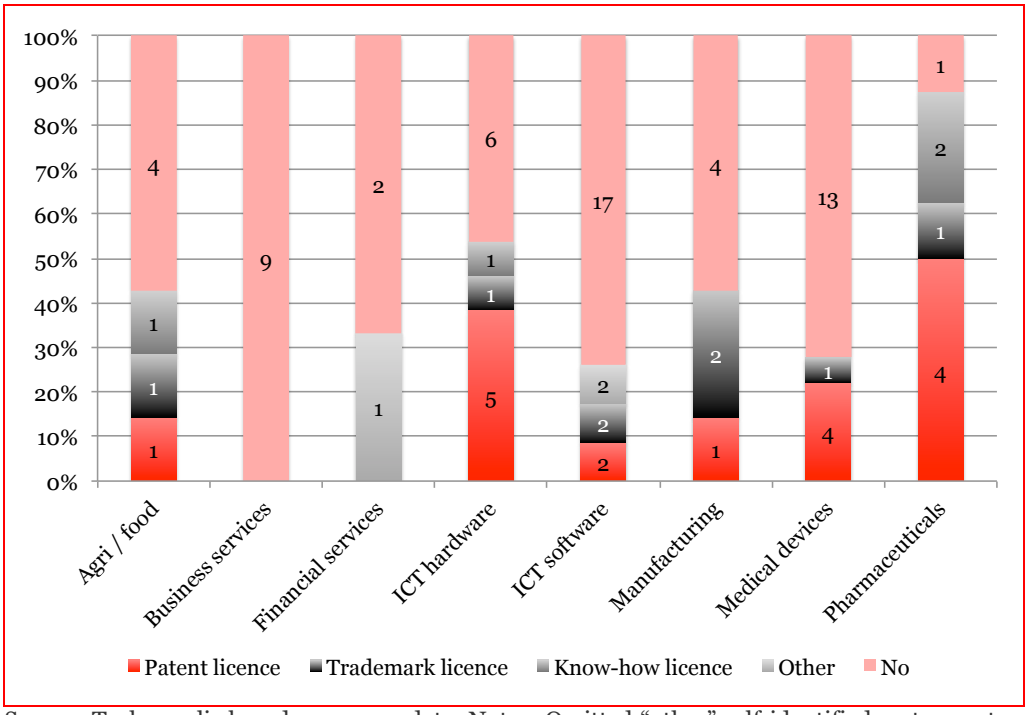
	Food and drink	Business services	Financial services	ICT hardware	ICT software	Manufacturing	Medical devices	Pharma-ceuticals
Preventing unauthorised use of protected IP in general	33%	25%	100%	33%	22%	33%	59%	100%
Protecting against copying of products or services we actually produce or offer	33%	25%	75%	33%	30%	29%	59%	71%
For marketing / signalling purposes and / or to support our brands	33%	13%	33%	36%	13%	17%	44%	17%
For attracting investors	17%	25%	50%	64%	30%	0%	47%	71%
For creating bargaining power in deals / negotiations with competitors	0%	14%	25%	36%	13%	29%	35%	43%
For creating direct revenue through out-licensing	17%	0%	33%	8%	14%	29%	6%	14%
To maintain "Freedom-to-Operate"	17%	0%	0%	27%	18%	17%	24%	57%
To facilitate collaboration on innovation projects with other partners	0%	14%	50%	25%	9%	17%	12%	14%
For strategic purposes (e.g. to scare the competition off)	33%	14%	50%	42%	10%	17%	41%	57%

Source: Technopolis based on survey data. Notes: Highest values per category are highlighted. Note: Omitted "other" self-identified sectors not usefully able to aggregate.

Creating revenue through licensing remains low on the list of motivations across all sectors. Though most firms do not currently hold out-licences, the survey does allow an analysis of which sectors do currently hold licences, and of which kind. Figure 40, below, shows that the traditional patenting sectors of pharmaceuticals, ICT hardware and medical devices hold most patent licences. Interviewed firms stated that this is often related to manufacturing relationships, with a smaller proportion noting that there was some use for revenue purposes. Pharmaceuticals firms were the most active in holding know-how licences, followed by those in the food and drink sector. Firms in manufacturing and food and drink, followed by those in the pharmaceuticals and software sectors were most active in holding trademark licences.

[63] Preventing copying refers to: stopping third parties from duplicating or copying IP. Preventing unauthorised use refers to: a monopoly right for IP creators over who can use the IP, and whether to exploit the IP themselves or through licensing.

Figure 40 Out-licensing of IP by sector (n = 105, multiple choices). The numbers included in the bar chart indicate the number of out-licenses and not the number of responding firms.



Source: Technopolis based on survey data. Notes: Omitted "other" self-identified sectors not usefully able to aggregate. This chart represents the number of licenses indicated by respondents; some firms have more than one kind of licenses (for example, 6 food and drink sector firms indicated a total of 7 licenses).

4.3.3 Generation of IP

As shown in Figure 41, financial services is the sector that proportionately uses in-house R&D most (100% of firms from this sector that responded indicated use of in-house R&D), though these numbers are very small. ICT hardware also reports 100% of firms utilising in-house R&D. Software (96% in-house R&D) is the next highest, with smaller proportions of external R&D (12%) and acquisition (19%). This is closely followed by business services (89% in-house R&D). Medical devices firms combine in-house R&D (79%) with external R&D (37%) to a high degree. The most active sectors in external R&D are food and drink (63%), pharmaceuticals (57%), ICT hardware (50%) and medical devices as referenced.

The pharmaceuticals sector is among the biggest proponent proportionally of acquisition (29%) as well as ICT hardware (25%) and financial services (25%).

Understandably, manufacturing[64] is the sector with the highest proportional response that IP generation is not applicable (56%), but this was a self-identified sector from respondents, and itself contains a broader range of sectoral orientations.

[64] Survey respondents were given the option to select a pre-defined sector, or to self-identify their sector by entering into a free text field. Manufacturing appears in this analysis as it was a frequently self-identified sector and as such, those answers were aggregated together into a sector heading.

Figure 41 Generation of IP by sector (n=118)

	In-house R&D	External R&D	Acquisition	Not applicable	Total
Agri / food and drink	88%	63%	13%	13%	8
Business services	89%	22%	11%	11%	9
Financial services	100%	0%	25%	0%	4
ICT hardware	100%	50%	25%	0%	12
ICT software	96%	12%	19%	4%	26
Manufacturing	44%	11%	22%	56%	9
Medical devices	79%	37%	11%	16%	19
Pharmaceuticals	86%	57%	29%	0%	7

Source: Technopolis based on survey data. Note: Omitted "other" self-identified sectors not usefully able to aggregate

4.3.4 Location of protection

The survey shows that based on firm responses from each sector two of the most patent-centred sectors (pharmaceuticals and medical devices) are the least active in terms of protecting IP in Ireland. Conversely, financial services, business services and the food and drink sector are the most active in Ireland, though each is also active in other markets. The food and drink sector shows a more even spread between the main locations asked about in the survey. Figure 42, below, confirms to a large extent the act of protecting in main strategic markets, as software and medical devices are highly active in the US, while pharmaceuticals is highly active in both the EU and US. ICT hardware firms appear to be highly active across the EU, US and Ireland. Interviews confirm that this is due to protecting in key markets of operation, following an export-based strategy.

Figure 42 Location of protection by sector (n=104)

	Ireland	EU	US and Canada	Latin America	Asia	Africa	Total Responses
Agri / food and drink	100%	50%	50%	17%	17%	0	6
Business services	100%	38%	13%	0%	0%	0	8
Financial services	100%	50%	25%	0%	0%	0	4
ICT hardware	67%	92%	83%	0%	42%	0	12
ICT software	57%	43%	57%	4%	22%	0	23
Manufacturing	50%	67%	33%	0%	17%	0	6
Medical devices	44%	44%	75%	0%	6%	0	16
Pharmaceuticals	77%	64%	41%	0%	14%	0	7

Source: Technopolis based on survey data. Note: Omitted "other" self-identified sectors not usefully able to aggregate

4.3.5 Use of external support

Figure 43 External support accessed by sector, descending frequency (n = 98)

Sector	External support accessed	Number of firms per sector in the survey population
Food and Drink	Enterprise Ireland (83%), patent attorneys in Ireland (83%), Irish Patent Office (67%)	6
Business services	Patent attorneys in Ireland (44%), Enterprise Ireland (33%), Attorneys at law (22%)	9
Financial services	Other national / international patent offices (75%), Irish Patent Office (50%), Enterprise Ireland (50%)	4
ICT hardware	Patent attorneys in Ireland (75%), patent attorneys abroad (75%), Irish Patent Office (33%), Enterprise Ireland (33%)	12
ICT software	Other national / international patent offices (55%), Patent attorneys in Ireland (50%), patent attorneys abroad (45%)	20

Sector	External support accessed	Number of firms per sector in the survey population
Manufacturing[65]	Patent attorneys abroad (67%), other national / international patent offices (67%) patent attorneys in Ireland (33%), Irish Patent Office (33%)	6
Medical devices	Patent attorneys abroad (73%), patent attorneys in Ireland (60%), other national / international patent offices (47%)	15
Pharmaceuticals	Other national / international patent offices (67%), patent attorneys abroad (50%), patent attorneys in Ireland (33%), Irish Patent Office (33%)	6

Source: Technopolis based on survey data. Note: Omitted "other" self-identified sectors not usefully able to aggregate

Based on the firm responses in each sector, it is clear that proportionally, firms in the food and drink sector have most utilised Enterprise Ireland (advice and financial support) and patent attorneys in Ireland. Interviews were unable to expand on the use of patent attorneys in this sector, though one respondent did state use of the online searches and information from the Irish Patent Office. Business services firms indicated that proportionally patent attorneys in Ireland and Enterprise Ireland support have been key external support services for them, followed by attorneys at law.

Financial services firms responded stating that other national and the Irish patent office, as well as Enterprise Ireland and overseas patent attorneys have been key supports. Interviews revealed for one respondent that the use of the international presence of Enterprise Ireland has been impactful in accessing new markets.

ICT hardware respondents, medical devices and pharmaceuticals firms each unsurprisingly utilise patent office services (home and abroad), patent attorneys (home and abroad) and in some cases Enterprise Ireland support and advice. Each of these sectors indicated a large proportion of supports on internationally-centred services.

The ICT software sector indicates overseas patent offices, and patent attorneys both in Ireland and abroad are the main supports. Use of Enterprise Ireland (30%), and the Irish Patents Office (also 30%) are lower in proportion, though interviewed firms did note the importance of Enterprise Ireland advisors.

4.3.6 Barriers and scope for state support

Cost was highlighted as a key barrier across sectors to more use of formal IPR, though there are some indicative answers from our survey and interviews that suggest particular points are more prominent than others according to sector.

Again, it is recognised that a detailed quantitative examination of costs was outside the scope of this study and thus costs are differentiated in this report only qualitatively, based on particular statements heard in interview. As such, this research could not systematically and in a quantitative manner differentiate the extent to which the cost barrier is based on perception or experience. The research should not be used to make inferences on the degree to which the cost barrier relates to costs in Ireland or abroad, nor which specific cost components[66] the cost issues pertain too. Furthermore, this study did not look to compare legal costs internationally and as such there is no inference in this study that Ireland is a more expensive location than elsewhere for firms to engage in IP activities.

[65] It should be noted that the manufacturing sector included below was self-selected by survey respondents and contains a broader range of sectors within there grouping. As such, this presents a mixed picture and the results should be carefully interpreted.

[66] Cost components for IP protection include (but are not limited to) costs in preparing an application and costs in enforcing and maintaining IP after grant, for example performing regular research via databases to identify potentially harmful IP, taking opposition actions, and so forth.

The main sectoral barriers, according to survey data, are summarised below in Figure 44.

Figure 44 Sectoral IPR barriers, descending frequency (n = 96)

Sector	Barriers marked as highly important	Number of respondent firms per sector
Food and Drink	Unclear benefits (50%), too complicated (50%), costs too high (50%)	6
Business services	IP not relevant to our business (44%), costs too high (44%), unclear benefits (33%), affordability of external services (33%), process too expensive (33%)	9
Financial services	Process too expensive (100%), costs too high (50%), too complicated (50%)	4
ICT hardware	Costs too high (83%), process too expensive (67%), affordability of external expertise (58%)	12
ICT software	Too complicated (38%), process too expensive (38%), costs too high (33%)	21
Manufacturing[67]	IP not relevant to our business (33%), no internal capacity to manage IP (33%)	6
Medical devices	Costs too high (54%), process too expensive (54%). affordability of external expertise (54%)	13
Pharmaceuticals	Affordability of external expertise (60%), process too expensive (40%)	5

Source: Technopolis based on survey data. Note: Omitted "other" self-identified sectors not usefully able to aggregate

The data indicates that the respondents of the most patent-centred sectors of pharmaceuticals, medical devices and ICT hardware believe/perceive that the main barriers to their use of IPR are mostly financial, related particularly to the costs of external expertise and the costs of the actual process of protecting IP (though again interviews indicated that this does not relate to statutory fees, and more to external private professional services for preparing, filing and defence). Interviews expanded this, revealing that the costs of defence are particularly problematic, with several respondents in the medical devices sector stating that there is a high degree of litigiousness. Pharmaceuticals respondents stated that there is a high cost to patent protection due to the requirement of broad geographical protection for the sector, meaning that multiple applications are required.

Firms from the food and drink sector that responded stated that the main barriers to utilising more formal IP is a lack of clarity around the benefits of doing so, and the complexity of the process. One interviewee stated that IP protection in the food and drink sector is difficult to discuss, due to the inability, for example, to utilise patents for recipes. The benefits of trademarks seemed to be well known, but this based on a very small group of responding firms from the sector.

Business services firms that responded to this question highlighted their main barrier as a lack of relevance of formal IPR. This is an interesting outcome, as the same respondents also stated that copyrights and trademarks are important. Firms interviewed stated that they often utilise contractual arrangements when creating IP during client work (particular tools, for example) that transfer ownership, or effectively licence clients to utilise the resulting IP. Costs, a lack of clarity of benefits and affordability of external expertise were also identified as important barriers, though interviews were unable to expand on these.

Financial services firms highlighted primarily the cost and complexity of the process as being barriers to using formal IPR.

Firms in the software industry responding indicated that complexity and costs are the main barriers to formal IPR use. Interviews expanded on this, with respondents discussing the

[67] It should be noted that the manufacturing sector included was self-selected by survey respondents and contains a broader range of sectors within the grouping. As such, this presents a mixed picture and the results should be carefully interpreted.

software industry as moving quickly and being difficult to patent within. Respondents stated that as such, unregistered protection often takes precedence. However, several respondents in this sector noted that the use of software patents by bigger firms can be 'mischievous', with differences between the US and EU systems causing issues and that filing to combat this is complicated and expensive. There is some scope within the software sector to enable those operating in the US market, though interviews revealed that a lack of expertise in international IPR is an issue.

Finally, one creative sector firm interviewed (i.e. design services) stated that there is, anecdotally at least, a significant undervaluing of IPR in the sector, with many clients often being dismissive of trademarks when suggested, due to perceived cost issues. This indicates a lack of knowledge on behalf of those businesses, and also goes beyond this sector into other, more traditional sectors that have historically not used IPR.

4.4 Firm size and age considerations of IPR forms

In this section we examine the same set of questions, split by firm size (full-time equivalent – 'FTE' – employment size bandings) and firm age (i.e. the number of years a firm has been active). As stated in the methodology, due to how firms answered, splitting the data this way results in varying n values.

In reporting the responses according to size and firm age, the percentages represent the proportion of firms (within the size and age groups) that have responded in a particular way to a given question (e.g. X per cent of all micro firms that answered the question stated Y). The number of firms within each size and age grouping can vary across questions, as not all firms answered all questions. This number is shown for each table or chart used, and full tables can be found in Appendix E.

It is particularly worth noting here that multinationals are captured across the size bands. We asked survey respondents to answer on behalf of their Irish operation in the event that they were a multinational. This means that there are a variety of sizes dependent on the function/office/plant of the Irish presence of multinational firms.

4.4.1 Use of IPR, by firm size band and firm age band

Analysing the survey data by firm size shows a similar picture of broad applicability. It should be noted that splitting by firm size and age could result in lower overall numbers due to the structure of survey responses.

Figure 45 Firm size IPR combinations rated as high or moderate importance, descending frequency (n varies between 102 and 111, multiple choices)

FTE	Indicative combinations of IPR mechanisms	Total respondents in grouping
0-9	Complexity of design (85%), patents (82%), trade secret (81%), lead-time advantage (77%)	26-28
10-19	Trademark (93%), patent (73%), copyright (71%), complexity of design (71%), trade secret (67%)	13-15
20-49	Copyright (68%), lead time advantage (67%), patent (65%), trademark (61%)	18-20
50-249	Lead time advantage (72%), complexity of design (66%), trademark (63%), copyright (%), copyright (56%), trade secret (56%)	30-33
250+	Patent (87%), trademark (87%), trade secret (87%), lead time advantage (87%), Industrial designs (73%), complexity of design (73%)	14-15

Source: Technopolis based on survey data.

Analysing the survey data by firm operating age shows a less distinct picture, with broad applicability of all forms witnessed across a range of firm ages.

4.4.1.1 Patents

Patents were again important across all groupings, appearing in at least the top five forms ranked by importance. The exception to this is in the SME group (50-249 FTE), who ranked patents 7th of the 10 mechanisms asked about, highlighting less use or value to this grouping. Micro firms reported high importance of patents, indicating a number of patent-driven firms in this grouping, and interviews in this group confirmed that there were a number of start-ups and spinouts that started from IP. Smaller firms, particularly those at the lower end of the size range, stated that they cannot pursue patenting more due to costs, particularly of defending. The reasons given for not utilising patents at all, revealed through interviews, were that they are often inappropriate due to orientational factors, disclosure or timeliness issues, particularly where firms seek to reach the market quickly. Another issue reported was the need to indemnify customers against potential infringement.

Examining the data by firm age highlights a very mixed picture, but shows that the youngest firms (5 years or less) use patents selectively among combinations of informal mechanisms.

4.4.1.2 Short Term Patents

Short-term patents were again ranked as low importance across all groups, though highest proportional usage was reported in the 250+ FTE firm grouping, at 53% of respondents.

4.4.1.3 Industrial designs

Industrial designs also remain lowly ranked, with no grouping reporting priority usage. The highest proportional usage was again in the 250+ FTE sector (73% of respondents).

4.4.1.4 Trademarks

Trademarks are again used very broadly, with all firms that employ more than 10 FTE employees identifying trademarks among their priority mechanisms.

4.4.1.5 Copyright

Copyright continues to display broad applicability, remaining high in placement within IP protection strategies for firms employing between 10 and 249 FTE employees.

4.4.1.6 Plant Variety Rights and Geographical Indications

Both of these forms were again ranked as low importance across all groups, with low levels of responses and no group giving priority status to either form.

4.4.1.7 Use of informal forms of IPR

All firm size groups reported informal forms of IPR as important parts of their strategies. Micro firms (0-9 FTE) are more highly predisposed toward complexity of design, trade secrets and lead-time advantage than all other firm groups. SMEs responding mostly used lead-time advantage and complexity of design. The largest firms (250+ FTE) also showed high levels of importance ascribed to trade secrets and lead-time advantage, but were the only group to rank patents highest.

Trade secrets play an important role, with internal processes particularly often kept secret. From the SME perspective, one respondent in interview noted that secrecy is used because it is impractical to file all IP due to not being able to defend a portfolio. Another perspective favouring secrecy was the view that patenting publishes information; from interviews, this is most keenly felt in the SME grouping. There are tensions in relying on secrecy, however. Trade secrets need to be managed carefully, making sure that the right confidentiality, non-solicitation and other agreements are in place with partners and others who have access. Some small firms interviewed expressed concern at relying on secrecy, due to the risk that employees may be able to take IP to a competitor, with no recourse, though there are few documented cases of this happening and, in the software sector at least, anecdotal evidence that this has not yet occurred. This does, though, point to a need to educate and inform businesses on the management of such forms.

4.4.2 Motivation for use of formal IPR

Examining the firm size motivations to use formal IPR, the survey data reveals that all firms state that protection against unauthorised use is highly important, as well as protection against copying. These two motivations remain the same to the overall picture previously described. However, the smallest firms (0-9 FTE) stated that the main motivating factor was to attract investors, which is also mirrored by firms employing 10-19 FTE employees. The largest firms (250+ FTE) stated that marketing/signalling was a main motivation, which is not held in common with other size groups. Another point of departure was seen in firms employing 20-49 FTE employees, who stated that strategic purposes (i.e. scaring off competitors) was a main motivation. Figure 46, below, summarises these responses.

Figure 46 Motivations to utilise formal IPR, by firm size (n varies between 100 and 106)

	0-9	10-19	20-49	50-249	250+
Prevent unauthorised use of protected IP in general	59%	43%	28%	27%	64%
Protect against copying of products or services we actually produce or offer	50%	43%	35%	21%	71%
For marketing / signalling purposes and / or to support our brands	35%	21%	19%	19%	42%
For attracting investors	67%	43%	19%	19%	36%
For creating bargaining power in deals / negotiations with competitors	54%	21%	6%	13%	36%
For creating direct revenue through out-licensing	26%	14%	13%	10%	21%
To maintain "Freedom-to-Operate"	22%	29%	27%	13%	36%
To facilitate collaboration on innovation projects with other partners (competitors, academia)	30%	14%	13%	10%	21%
For strategic purposes (e.g. to scare the competition off)	37%	29%	29%	14%	57%
Total responses per grouping	26-28	14	15-18	12-14	29-33

Source: Technopolis based on survey data. Note: highest values highlighted.

Resource is another barrier. Interviews confirmed that smaller firms are by nature poorly resourced, often with one person who has responsibility for IP, such as the chief scientific officer, or founder, but this person is also expected to develop products and fulfil management duties. This point came across strongly in interviews, but is no different to the global picture of small firms. As such, very small firms are often "learning through doing", and often not planning far ahead, as stated by several respondents. IP and IPR is often 'in the back of the mind', but is not something that can or should necessarily be acted on immediately.

Based on age groupings, of firms identifying reasons as "highly important", motivation to utilise formal IPR remain broadly consistent with the overall picture shown previously. All firm groups identified preventing unauthorised use and copying, and attracting investors as the main motivations for using formal IP. More mature firms – those older than 21 years – reported a higher proportion of marketing/signalling than other firm groupings, and assigned less importance to attracting investment. Caution should be maintained in these figures, as the numbers of responses are small, particularly at the higher end of the age spectrum.

Figure 47 Motivations to utilise formal IPR, by firm age (n varies between 91 and 96)

	5 or less	6 to 10	11 to 20	21 to 50	51 plus
Prevent unauthorised use of protected IP in general	58%	52%	24%	38%	33%
Protect against copying of products or services we actually produce or offer	58%	48%	21%	38%	33%
For marketing / signalling purposes and / or to support our brands	27%	27%	16%	40%	33%
For attracting investors	67%	43%	30%	13%	0%
For creating bargaining power in deals / negotiations with competitors	25%	33%	18%	21%	0%

	5 or less	6 to 10	11 to 20	21 to 50	51 plus
For creating direct revenue through out-licensing	9%	20%	9%	20%	0%
To maintain "Freedom-to-Operate"	17%	38%	9%	20%	0%
To facilitate collaboration on innovation projects with other partners (competitors, academia)	25%	23%	6%	14%	0%
For strategic purposes (e.g. to scare the competition off)	36%	39%	16%	27%	33%
Total responses per grouping	11-12	29-31	32-34	15-16	3

Source: Technopolis based on survey data. Note: highest values highlighted.

Out-licencing remains low in the list of motivations, though the above table highlights that the most importance assigned to this motivation is from firms in the 6- to 10-year and 21- to 50-year age groupings.

4.4.3 Generation of IP

Figure 48, below, summarises the approach to IP generation based on firm size. Micro firms reported that in-house R&D is a source of IP generation in 93% of firms, with acquisition of IP reported by only 10% of micro-firms. Unsurprisingly, a high proportion of the largest firms report in-house R&D as a primary source of IP generation, but also more actively engage in acquisition of IP - 44% of large firms. External R&D remains relatively constant between firm groups, between 27% and 38% of responding firms in each group, with no particular pattern among firm size groupings. Through interview, some smaller firms stated that they experience difficulty working with external partners on R&D due to a lack of resourcing to manage the research, and a perceived lack of influence when dealing with large institutions such as universities. Smaller firms reported finding this interaction particularly difficult, as they do not have the experience, resource or time to draft agreements and manage the research. Larger firms suggested that while collaborating with external partners is generally easier for them, there is still an issue of misaligned expectations and valuations, particularly related to working with HEIs. As such, there was a sense conveyed through interviews that some IP gets "stuck" within such systems and improved agreements may help access.

The analysis revealed no clear pattern emerging from firm-age groupings of IP generation, other than an overall decreasing proportion of firms utilising in-house R&D as the age groups ascend.

Figure 48 Generation of IP by firm size (n=119)

	In-house R&D	External R&D	Acquisition	Not applicable	Total
0-9	93%	34%	10%	3%	29
10-49	89%	27%	14%	11%	37
50-249	76%	27%	16%	19%	37
250+	94%	38%	44%	6%	16

Source: Technopolis based on survey data.

4.4.4 Location of IP protection

When examining the location of IP protection by firm size, proportionally micro firms (0-9 FTE) are the group that file in Ireland the most. The largest firms (250+ FTE), as expected, file proportionally the least in Ireland, displaying instead a bias toward filing in the US. The overall trend appears to be a declining proportion of firms filing in Ireland as firm size increases. The EU remains a popular filing location across all firm-size groups.

Figure 49 Location of IP protection by firm size (n=104)

	Ireland	EU	US and Canada	Latin America	Asia	Africa	Total
0-9	75%	71%	54%	0%	7%	0%	28
10-49	69%	59%	53%	3%	28%	0%	32
50-249	70%	47%	33%	3%	10%	0%	30
250+	36%	50%	93%	0%	14%	0%	14

Source: Technopolis based on survey data.

Analysis of the data from a firm-age perspective does not reveal any strong pattern.

4.4.5 Use of external support

Analysis of external support accessed by firm size does not reveal any strong patterns, though it does show that the largest firms (250+ FTE) are more likely to access patent attorneys abroad than in Ireland, and are more likely to engage attorneys at law than other firm groupings. Only micro and small firms reported utilising regional innovation/development agencies and Chambers of Commerce were limited to micro firms (though the numbers of respondents for both of these services are very low)[68].

Figure 50 Access to external support by firm size (n=98)

	0-9	10-49	50-249	250+
Irish Patent Office	44%	31%	30%	50%
Other national / international patent Office	56%	28%	37%	58%
Enterprise Ireland (e.g. IP assistance scheme, advice)	56%	38%	23%	17%
Patent attorneys in Ireland	70%	59%	53%	33%
Patent attorneys abroad	52%	52%	27%	83%
Attorneys at-law (abroad / home)	11%	14%	10%	50%
Private business consultants internationally	7%	10%	13%	25%
Chambers of Commerce	7%	0%	0%	0%
Regional innovation / development agency	7%	3%	0%	0%
Total	27	29	30	12

Source: Technopolis based on survey data.

From firm-age analysis, there is no strong pattern emerging.

4.4.6 Barriers and scope for state support

Though there is a need to remain sensitive to sectoral affiliations in designing support of IP – as we see above in section 4.3, sectors utilise IPR differently – there is greater scope for consideration of firm size and age, which impacts on resourcing, cash flow and various other important factors.

Our survey asked firms to identify the main barriers to gaining more commercial benefit from their IP activity in Ireland. The chart below demonstrates that the answers were rather varied, however, the most frequently quoted barriers circle around the high costs of IP protection from different angles. Through the programme of interviews, we gained more in-depth insight into these barriers, set out following the table.

However, as before, it is recognised that a detailed quantitative examination of costs was outside the scope of this study and thus costs are differentiated in this report only qualitatively, based on particular statements heard in interview. As such, this research could not systematically and in a quantitative manner differentiate the extent to which the cost barrier is based on perception or experience. The research should not be used to make inferences on the degree to which the

[68] A note on terminology: "Chambers of Commerce", as used in the original survey was selected for comparability with other countries. We understand through consultation that the Irish system operates differently and that while many countries make membership of such bodies mandatory, this does not exist in Ireland. We recommend for future research to utilise Ibec and the sector bodies here.

cost barrier relates to costs in Ireland or abroad, nor which specific cost components[69] the cost issues pertain too. Furthermore, this study did not look to compare legal costs internationally and as such there is no inference in this study that Ireland is a more expensive location than elsewhere for firms to engage in IP activities.

Figure 51 Main barriers for a more beneficial use of IP by company size (n = 96, multiple choices)

Barrier	0-9	10-49	50-249	250+
Costs too high	69%	50%	33%	20%
Process too expensive	77%	33%	40%	20%
Not confident of ability to enforce any such IP rights	46%	43%	50%	30%
Affordability of external professional services	77%	33%	27%	10%
Too complicated / time-consuming	35%	23%	30%	30%
No internal capacity to manage IP	4%	33%	27%	0%
Disclosure of our principal IP is too great a risk	8%	20%	23%	20%
IP not relevant to our business	19%	13%	17%	30%
Unclear benefits of IP usage	4%	17%	27%	10%
No or little independent advice available	12%	23%	3%	10%
Number of firms per grouping in the survey population	26	30	30	10

Source: Technopolis based on survey data. Note: Highest values highlighted.

Micro firms (0-9 FTE), small firms (10-49 FTE) and SMEs responding to the question all report issues with cost and the expense of the process are also major barriers, with firms in interviews identifying the cost of legal fees and patent agents. The survey data highlights that micro and small firms also stated that the affordability of external professional services was a barrier. The cost of registered IP – particularly patenting – was a popular topic among all respondents. Patenting is often considered expensive, though it is not elucidated in the study if this relates to patenting activities in Ireland or in other territories. Statutory fees in Ireland for patents were again not mentioned as an issue, and other forms of registered IP, such as trademarks (indicated as up to €2,000) and designs (indicated as up to €700) are considered more cost-effective options. This point was also reflected in interview responses, with several firms reporting that even in active, IP-savvy firms there is an on-going internal dialogue about the costs and benefits of utilising patenting: this is a major point to be addressed. Smaller firms stated in interview that they are more reliant on external legal support, as they do not have internal expertise or departments. Within the interviews, the main criticisms of Irish legal support is that there are too few high quality services, with comments received about a lack of expertise in international IP, and on certain legal precedents, such as complex copyright issues. The cost of external legal and financial support is particularly challenging for micro firms, though also reported was the difficulty in identifying individuals and firms, and building trust relationships. Foreign-owned multinationals stated that they often have on-going partnership agreements with legal firms. Help for smaller firms in this area would save substantial time and money, and would provide firms assurances on better-value services.

Small firms (10-49 FTE) stated also that a lack of internal capacity to manage IP was a main barrier. Through interview, it was revealed that many small and younger businesses often have difficulty in pursuing IPR, due to either cash flow or lack of capacity, and this lack of capacity extends through other areas of the business. These firms also discussed some difficulties in accessing support, due to the time-consuming nature of initially finding the appropriate support, building relationships and going through the process. In interview, firms stated that when applying for investment or funding support, the criteria should be less prescriptive and more sensitive to the circumstances of start-ups, who often have more fluid staffing and

[69] Cost components for IP protection include (but are not limited to) costs in preparing an application and costs in enforcing and maintaining IP after grant, for example performing regular research via databases to identify potentially harmful IP, taking opposition actions, and so forth.

remuneration structures. There was a feeling among some respondents that the US is more aware of these ways to assess companies than Europe.

Small firms (10-49 FTE), SMEs (50-249 FTE) and even larger firms reported a lack of confidence in being able to enforce any IP rights as a serious barrier. In interviews, SMEs stated that the lack of ability to build defensive portfolios leaves them feeling exposed to potential litigious behaviour. The high costs of defending litigation are also considered to be an inhibiting factor, particularly as there is no support available for this. This is felt most keenly by those SMEs whose annual turnover is approaching the threshold where they will "come on the radar" of large international competitors, with deeper pockets, who may cynically bring an action that a small firm cannot defend. Interviewed firms discussed downstream issues for companies when operating outside of Ireland often being hit with litigation. Firms who have experienced litigation state that often their only course of action was to pay and settle, or be taken to court. There was concern in interviews around so-called 'patent trolls' – entities who buy IP and take malicious litigation action against firms. This remains anecdotal, as it has not yet been quantified, but substantial nervousness surrounds this topic and acts in some cases as a deterrent to filing or publishing for some SMEs interviewed. One respondent stated a feeling of being exposed due to patent trolls, noting that big European companies have begun going into consortia to defend against such threats. Additionally, firms are nervous about the possibility of getting to the market phase, only for another firm to maliciously file an injunction for infringement, before making an offer for the company out of knowledge that it cannot defend the claim. Other impacts include loss of business, with particularly large corporate customers stated likely to detach if a supplier is hit by such action.

Regarding unregistered mechanisms such as copyright, respondents stated that disputes in this area are often resolved quite quickly, but that these issues have the potential to spawn prolonged negotiations and expensive resolution measures.

The data shows that cost overall is much less important as a barrier, for example, to foreign-owned multinational firms (with deeper pockets) than it is to indigenous SMEs. In the survey, larger firms (250+ FTE) indicated that the complexity and time-consuming nature of the process was an issue, as well as disclosure of IP. In interview, the largest firms also stated that costs are a mitigating factor, despite being more cash-rich than smaller firms. This relates to financial management and managing down costs, as larger firms interviewed reported consistently becoming more selective in their patent filing behaviour for this reason. A surprisingly large proportion of larger firms stated that IP is not relevant to their business, though this could relate to a particular sectoral coincidence.

Analysing the survey answers to this question by firm age, it becomes apparent that there are slight differences. Cost can be seen as a main issue for the youngest firms, those operating 5 years or less, with those firms also stating that the cost of external expertise is problematic. Figure 52, below, summarises these points.

Figure 52 Main barriers for a more beneficial use of IP by firm age (n = 87)

Barrier	5 or less	6 to 10	11 to 20	21 to 50	51 plus
Costs too high	82%	52%	50%	17%	66%
Process too expensive	55%	55%	53%	25%	33%
Not confident of ability to enforce any such IP rights	55%	48%	44%	42%	33%
Affordability of external professional services	55%	55%	28%	17%	33%
Too complicated / time-consuming	45%	28%	25%	25%	66%
No internal capacity to manage IP	9%	21%	25%	17%	33%
Disclosure of our principal IP is too great a risk	9%	24%	19%	8%	66%
IP not relevant to our business	9%	10%	25%	25%	33%
Unclear benefits of IP usage	18%	7%	19%	25%	66%
No or little independent advice available	9%	14%	16%	17%	0%
Number of firms per grouping in survey population	11	29	32	12	3

Source: Technopolis based on survey data. Note: highest values highlighted.

Cost is a dominant barrier identified across all firm-age groups, and the lack of confidence in enforcement is also highly present, though it is again worth noting that this does not relate to statutory fees.

Firms operating for between 20 to 50 years stated that unclear benefit of IPR use is a main barrier, as well as a lack of relevance to their business. In interview, some respondents felt that IP and IPR is too 'black boxed', meaning that it is often difficult for firms to understand quite what happens where, and what is required in following steps. This applies across many levels of engagement and 'savviness', with experienced respondents also stating that they would welcome more education, either in the form of 'refreshers', or in structured ways to increase their knowledge in certain areas of IP management, including informal and unregistered forms and greater understanding of confidentiality management.

Respondents broadly agreed that there is a need to increase and to foster more strategic thinking around IP development in the broad firm base, to help firms better understand the potential value of their IP and to make informed decisions on usage and management. Often this advice is available in the system, but is either presented or accessed in a fragmented way. Unsurprisingly, respondents from companies with more than 250 FTE employees find advice on how to use IP less necessary than the average.

It was considered that education related to IP is currently limited to legalistic perspectives, taught specifically as law modules.

4.4.6.1 Cultural and awareness Issues

Presented here is a short discussion of the cultural barrier identified through interviews. This is treated as a standalone discussion as it does not fit into the areas discussed above – it cuts across firm size and age, as well as ownership – but is an important point of consideration. The topic of IP culture was widely discussed in interviews, from both firms (on behalf of others) and by other stakeholders engaged in the IP system in Ireland.

It was stated in interviews that perhaps the main difference between Ireland and its comparators for this study is the culture around IP and IPR, with many firms not placing much value in pursuing it, either because they are in industries that traditionally have not, or they do not understand the potential value to their business. Some respondents noted that even upon recommending IP protection, firms may decline or state a lack of interest. There are several underpinning reasons for this, some of which have been discussed in previous sections – cost, a desire to simply 'get to market', or a misunderstanding that IP refers only to patents. Some stakeholder respondents stated that firms often find it difficult to understand if they have IP in their business, or the true value of it.

We heard in interviews that anecdotally, young Irish companies do not value IP highly, but this may be across the whole start-up scene, globally, as opposed to a distinct geographical issue. Experience elsewhere highlights that it is not necessarily a lack of value, but rather the resourcing issue discussed earlier, and a lack of forward planning. Firms should be educated in this aspect, respondents believe, as part of the basics of establishing a business. Respondents stated that many businesses still only value physical things, and that a shift is needed to understand intellectual assets. One respondent stated that there is a danger in undervaluing software, systems and processes, believing that entrepreneurs may receive less value in the eventual acquisitions process – a negative outcome for Ireland.

Other factors offered in consultation include the recent and rapid change from an agricultural economy to one with significant technological industry. Many foreign-owned multinationals entering Ireland brought manufacturing functions and subsidiaries, creating jobs but without much impact on IP. The developing knowledge base in the country, the increasing research quality and capacity, creates indigenous companies. These spin-offs and more traditional start-ups and SMEs, create value, new ideas, products and knowledge themselves, that then introduce issues of IPR. The system is still relatively young and in a developmental stage, and with this rapid change, the system itself requires a number of iterations and developments to be able to offer appropriate supports. This can be contrasted against the German context, which, being based more on engineering and manufacturing, and with a much more overt focus on IP and IPR, these thoughts permeate even smaller businesses from a much earlier stage. Several respondents stated that Germany has a culture of respect of IP, with a natural position toward being IP owners.

There was a feeling across the firms and the broader IP stakeholder group that the majority of Irish firms do not yet fully value formal IP – not that they are not innovative, but that there is a lack of awareness around IP and that recognition, valuation and protection are still not 'front of brain', even in the entrepreneur community.

4.5 Key messages

- Formal IP remains important amongst firms that are IP active, with firms stating that this is and will continue to be a main part of their strategies going forward:
  - Overall, patents remain important, with over half of surveyed firms stating that they are of high importance, though interviews revealed that recently businesses have become much more selective in their patenting activity in order to manage costs better.
  - Of the formal IPR mechanisms, the most used appear to be patents and trademarks, followed by copyright.
  - Short term patents are not widely used, and some interviewees believe that these have been misused in the past due to lower levels of due diligence.
  - Industrial designs are sparingly used, with interviews revealing a lack of understanding of their applicability.
  - Trademarks are highly used, with only 15% of respondents in the survey stating that they do not use them – the lowest of all forms. Interviews revealed the increasing awareness of applicability and use for trademarks, but it was also revealed that more could be done to help firms use trademarks.
  - Copyright – a largely unregistered form and for which quantitative data could not be obtained via the methodology utilised in the CambridgeIP study, was also reported as widely used.
  - It was confirmed that Plant Variety Rights and Geographical Indications received little use. We see from the data in the quantitative data study that there are only six firms in Ireland making use of Geographical Indications.
- Informal IP has also been demonstrated to be important through the survey and interviews, including trade secrets, lead-time advantage and complexity of design. This shows that informal mechanisms – previously not quantified – are revealed to be of significant importance and employ in the firm base. Firms confirmed in interview that a mixture of registered and unregistered forms of IPR is common in business strategies; there is no registered IP activity without unregistered IP.
- Sectorally, use of IPR clearly differs, with the survey results confirming the inference from the data in the quantitative data study that traditionally non-patenting firms such as software and services more often rely on informal forms such as secrecy, complexity, lead time advantage and unregistered forms such as copyright, with internal processes used to document creation. Patenting activity is concentrated in traditional patenting sectors such as medical devices, pharmaceuticals and ICT hardware. The food and drink sector reported some use of patents, but in interviews this was revealed to be mostly around processes. Trademarks are reported as important across all sectors, with interviews revealing a minority view that trademarks are sometimes regarded as a marketing tool as opposed to IP. This indicated a need for some education on usage. Similarly, the survey shows that informal IPRs play an important role across all sectors and are a key part of firms' IP strategies.
- Firm size also plays a role in differing IPR usage. There appear to be a number of patent-driven micro firms, as patents appear very important in the mix of mechanisms indicated via survey. Patents appear to be less used by the small- and medium-size-firm groups (10-249 FTE), with more importance assigned to informal and unregistered mechanisms; in interview some SMEs stated that there was tension around use of secrecy. Copyright and trademarks are again broadly used, though not in the micro-firm respondents group.

- Overall, IP-active firms were largely motivated to protect their IP via formal IPR mechanisms to prevent unauthorised copying and use of products or services, as well as to attract investors. Licensing IP to create revenue appears to be low on the list of motivations.
  - Motivation remains largely the same when split sectorally, though what is revealed is that the ICT hardware and software sectors are more motivated by attracting investment, and the food and drink and ICT hardware sectors motivated by scaring off competitors. The pharmaceuticals sector is the most active sector in out-licensing, including patent, trademark and know-how licences.
  - By firm size, motivations remain largely consistent, though the main points of difference include attracting investment as more important to micro and small firms (0-9, 10-19 FTE) and creating bargaining power being most important proportionally to micro firms. Similarly, larger firms stated that marketing/signalling was a main motivation.
  - Firm age revealed that despite another mostly consistent view, attracting investment was not particularly important to more mature firms, operating 21 years plus.
- IP generation is overall dominated by in-house R&D. External R&D and acquisition were stated as used to fill gaps in firms' IP strategies if an in-house solution or competence was not present, or in the case of multinationals, to broaden market share. Survey data show that foreign-owned multinationals are much more predisposed to acquisition than their Irish-owned counterparts, and are more active in sponsoring academic research and co-development due to greater resourcing.
  - The manufacturing sector is the sector that reported most highly that no R&D activity takes place, though those these numbers are very small and this was a self-identified sector[70] in the survey that itself is naturally mixed. While financial services, ICT hardware, software and business services were most active proportionally in in-house R&D, firms in food and drink, ICT hardware and pharmaceuticals were the most active in external R&D. Pharmaceuticals and ICT hardware reported proportionally the highest acquisition as a source of IP, along with financial services.
  - Analysis of the firm size for IP generation activities revealed, as expected, that the larger the firm, the wider the range of IP generation activity that the firm engages in. While firms of all sizes indicated the use of external R&D, interviews highlighted that smaller firms struggle with accessing external IP with HEIs due to the lack of resourcing.
- As expected, firms locate their IP protection in the main market of operation. Irish-owned firms are more likely to file in Ireland than foreign-owned counterparts, who stated in interview that they often only protect in Ireland for strategic reasons such as blocking.
  - The patent-centred sectors are those least likely to file in Ireland, and each report a high degree of activity in the EU and US. Interviews confirmed that the key markets of operation and export focus drive this behaviour.
  - Size-wise, the largest firms are the least likely to file in Ireland.
- Patent attorneys and patent offices appear as the most used external support overall, followed closely by Enterprise Ireland. Multinationals stated that they often only access external expertise when extra bandwidth is required, or specific expertise that is not available in-house and this is reflected in the survey data.
  - Sectorally, the use of international patent offices and patent attorneys abroad are highly favoured by patent-centred sectors, confirming the focus on export markets.
  - The largest firms are more likely to utilise patent attorneys abroad rather than in Ireland, as well as other national patent offices rather than the Irish Patents Office. This firm group is also more likely to use attorneys-at-law than any other firm size group.

[70] The sectors for selection in the survey cover the main manufacturing activities in Ireland. Firms self-selecting manufacturing are thus outside of these key sectors

The Irish Patents Office appears to be used relatively evenly, while Enterprise Ireland appears to be used mostly by micro and small firms.

- Overall, the broader Irish innovation support system (as there is an absence of explicit direct IP support schemes) is well regarded in terms of quality, consistency and timeliness of advice. Upon further investigation, a broad range of firms stated that navigation of the support system is difficult, in terms of finding out what help is available from whom; clearer branding of support could help this, as well as focusing on creating easy access and pathways for firms through the support system. However, the most popular request for additional state support came in tax provisions and lowering costs. The discussion of costs included the price of external private support, which many firms reportedly find/perceive to be too high, particularly those for whom such expense is a higher proportion of turnover (i.e. micro, small-medium and young firms). This relates to both preparation and enforcement of IP.
- Cost overall is reported as the main barrier to more use of formal IPR, followed by the ability to enforce rights. It is, however, recognised from the outset that a detailed quantitative examination of costs was outside the scope of this study and thus costs are differentiated in this report only qualitatively, based on particular statements heard in interview. As such, this research could not systematically and in a quantitative manner differentiate the extent to which the cost barrier is based on perception or experience. The research should also not be used to make inferences on the degree to which the cost barrier relates to costs in Ireland or abroad, nor which specific cost components[71] the cost issues pertain too. Furthermore, this study did not look to compare legal costs internationally and as such there is no inference in this study that Ireland is a more expensive location than elsewhere for firms to engage in IP activities.
  - Irish firms reported more nervousness in the area of costs and the ability to enforce rights. The cost issue is differentiated in that consultation showed it to be related to the cost of professional external services, such as legal experts, and that this relates to preparing and filing applications, as well as later (potential) defence costs, which again related to hiring legal services. Statutory fees were not mentioned as being problematic. The majority of firms interviewed had hands-on experience of preparing and filing at least one patent application (as well as other forms of IPR), meaning that this view comes from experience. Unfortunately it is not possible to achieve the same view of the survey respondents, who may speak from experience and may simply state a perception.
  - Splitting barriers by sector showed that the patent-centred sectors largely identified costs and affordability of external expertise as main barriers, where food and drink respondents stated unclear benefits to be a main issue as well as process complexity. Software firms also reported the latter. Business services respondents largely stated that IP was not relevant, but also that costs and unclear benefits were problematic. This indicates that there are a number of sectors for whom targeted education might be useful, but that the patent-centred sectors largely understand the value and process of IPR, and still find costs an inhibitor.
  - When split by firm size, the data reveals that while costs remain the most highly-rated barrier, the affordability of external professional services was most keenly felt by micro and small firms. The largest firms (250+ FTE) do not feel this or overall cost to be an overt blocker, but stated in interviews that general cost management has made them become more selective in filing. Rather, this group stated that enforcement, complexity/time investment and relevance were the main barriers. Small and medium firms stated that capacity to manage IP was a barrier. Enforcement was more mixed, with all but micro firms stating that this was a main barrier. Interviews revealed that this is particularly an issue as firms reach a certain level of turnover, coming into view of

[71] Cost components for IP protection include (but are not limited to) costs in preparing an application and costs in enforcing and maintaining IP after grant, for example performing regular research via databases to identify potentially harmful IP, taking opposition actions, and so forth.

larger competitors. Interviews also revealed a high degree of nervousness around patent trolls, though there is little quantified on this topic.

  - Young firms (0-10 years) find the affordability of external professional services difficult, and all firms up to 50 years of operation find enforcement of IP rights problematic.

- The IP strategies of firms in Ireland appear to be largely the same as globally for those that use IP for their business, with resourcing also consistent. Large firms and multinationals have well-resourced and mature IP functions and strategies, focused on building defensive portfolios and gaining market share, with corporate resources based at headquarters. By contrast, smaller firms are less well resourced, and often rely on external expertise and focus on a much smaller, core amount of IP.
- This research was not able to directly engage with IP non-active firms. However, interviews with IP active firms, other stakeholders, and the findings of an evaluation of a previously operated IP support scheme[72], indicate that there is a lack of awareness of the potential value of IP in many firms in Ireland. Interviews stated that there is often difficulty in identifying and valuing IP in firms, and that many often see it only as a cost. Even savvy firms are reportedly engaging in on-going dialogue around the potential value of IP.

[72] Evaluation of Enterprise Supports for Research Development and Innovation, Forfás 2013

5. Intellectual Property Policy, Supports and International practice

5.1 Introduction

In this section of the report, we profile each country: Ireland, Denmark, Finland, Germany, Singapore and Sweden, to outline the workings of the respective support systems for IP and highlight particular elements of learning for the Irish context. We also include a number of points of interest from other nations. Before profiling these, however, we briefly outline high level developments at the EU and OECD levels.

Each of the European comparators is an 'innovation leader', and Singapore is a fast-developing and ambitious nation that offers some potentially interesting parallels and lessons for Ireland. For these information-rich countries, full profiles are available in Appendix D.

Despite the comparators selected for this study, it should be noted that consultation revealed that Ireland's major competitors for R&D are UK and the Netherlands. This chapter briefly highlights the UK in terms of a number of interesting services and interventions, though this was not in the study brief, and is not in as much detail as the comparators listed above.

5.2 High-level developments to IPR legal frameworks in the EU and policy in the OECD

There are several qualitative developments to consider in the IPR legal framework within the EU:[73]

In 2012, after more than three decades of preparatory activities and failed attempts, the European Parliament reached an agreement on the unitary patent package. This package consists of Council Regulation No. 1257/2012 on the unitary patent (UP), Council Regulation No. 1260/2012 on language/translation issues and the Agreement on a Unified Patent Court (UPC). Implementation of the UP seems to be imminent and can be considered to be a major innovation in the European patent system. The UP would be a single patent that would be valid in a large majority of EU Member States and enforceable using the European structure of the UPC.[74]

A reform of the Community Trademark system is currently under discussion. This involves a proposal for a Regulation amending Council regulation No. 207/2009 on the CTM and a Proposal for a Directive to Approximate the Laws of Member States relating to Trade Marks.

Copyright is the least harmonised IPR instrument in the EU. Only certain aspects of EU copyright law have been harmonised through a series of Directives called the '*Acquis*'. This *Acquis* has been growing in size, as between 2009 and 2014, there have been two new Directives added to the existing *Acquis*, on orphan works and on collective management. The *Acquis* now consists of 12 Directives. As far as harmonisation is concerned, scholars in the copyright field speak of a trend toward 'upward harmonisation'. This means that the scope of protection has become stronger.

In terms of trade secrets, there is a proposal for a European Directive that is currently being debated in the European Parliament.

At the OECD level, there has been an observable trend to align and co-ordinate a range of public policy instruments to support the commercialisation of knowledge, particularly by SMEs.

The 2014 OECD STI Outlook states that commercialisation programmes now tend to be decentralised and targeting support to a range of actors. This is necessary due to the multifaceted and phased state of commercialisation, though can lead to degrees of fragmentation. In order to overcome this tension, it is increasingly encouraged to diversify support while bringing support programmes together (within one place) in order to better take advantage of synergies, to build better scale and to ease the journey through support structures

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[73] Bently & Radauer (2014).

[74] By contrast, the current patent system only is a harmonised form for processing patent applications by the EPO. Upon grant, a current patent application at the EPO will lead to a bundle of national patents that are also only nationally enforceable.

for firms. The same Outlook report notes that in recent years, commercialisation policies have tended to focus on national commercialisation pathways, despite the markets for IP becoming increasingly international.

5.3 Ireland

Ireland currently has no direct explicit public support schemes for IP. However, IP advisory and filing costs are eligible expenditure within some existing supports: under Enterprise Ireland's High Potential Start-Up (HPSU) support, as well as being an allowed expenditure within the R&D grant programmes that may be proposed and agreed. These supports as such reside within higher-level schemes, meaning that coverage is limited.

Indirect supports for IP are available to firms in Ireland via a variety of tax-related measures. The key features of the tax environment pertaining to IP include[75]:

- Tax relief for capital expenditure incurred by companies on the provision or acquisition of intangible assets for the purpose of trade.[76]
- Credit for foreign royalty income.
- Withholding tax on patent royalty payments.
- Stamp Duty – Exemption: Transfers of IP; e.g. trademarks, patents and any goodwill directly attributable to such intangible assets, are exempt from stamp duty in Ireland.

Recent changes to the IP support system include the closure and re-assignment of some funding from the IP Assistance Scheme and the closure in 2011 of the Patent Royalty Exemption Scheme, under which there was a capped corporation tax incentive and an income tax incentive.

There has been a great deal of priority given to research prioritisation, technology, and structural reform, and the development of a Knowledge Development Box is under consideration in Ireland, which will address some corporation tax incentives for Irish-based IP.

The national Patent Office is a modern representation of a patent office[77], though has not been mandated to deliver services in the same way as in other comparators, and as such provides primarily technical services, on a commercial basis, on top of some light-touch awareness raising work. The Patent Office appears enthusiastic about strengthening its role in educational aspects, with a small extant role in some Local Enterprise Office workshops, school enterprise competitions and a series of talks on an ad hoc basis with partners including the EPO.

Knowledge Transfer Ireland (KTI) have an important role supporting the IP system, having been established to help industry access IP generated by Ireland's public sector research performing organisations, as a recommendation of the review "Putting public research to work for Ireland". Responsibilities involve ensuring that IP is managed "in a professional way" by Irish research performing organisations. The Intellectual Property Unit of DJEI is responsible for intellectual property laws and policies.

Ireland has a well-established community of patent and trademark attorneys and other IP-related consultancies, and the Irish legal profession has grown in both capacity and quality in the last two-to-three decades. There remains room for further growth, with businesses expressing a lack of available IP legal expertise in certain areas, such as international IP, US regulations, and some more esoteric areas related to legal precedents.

Notwithstanding limited direct explicit firm support structures for IP, the environmental conditions for IP are good. Ireland has been an active proponent of the unitary patent[78] and a supporter of numerous EU-led initiatives in the field (for example the Madrid Protocol), and is committed to enforcement of IP, with a strong legal base and active courts. Ireland has a

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[75] R&D tax credits are not considered here as we distinguish between support for R&D and specific support for IP

[76] Section 291A of the Taxes Consolidation Act 1997 – as amended by the Finance Act 2012.

[77] Meaning that the patent office activities cover a broad range of services in addition to examination and registration: online services and tools, information and advice, educational activities.

[78] The Irish Government has recommended that a local division of the Unitary Patent Court be located in Ireland

modern legislative framework that includes a Common Law jurisdiction with an independent court system and legal protections for the creators and owners of IP. Ireland is party to the majority of international co-operations treaties and memberships.

However, a recent review on innovation in agency-supported high growth firms in Ireland noted that there had been a "failure to pair technological innovation with a 'delivery system' aiding its exploitation and commercialisation (including IPR)"[79].

5.4 Denmark

Denmark is known to be very active in terms of providing support to businesses in the IP area, however it does not have a national IP strategy. The Danish legislative framework for IP is to a large extent based on international law and the Danish Patent Office (DKPTO) actively participates in international IPR forums and co-operations to help shape IPR legislation internationally, also allowing the interests of Danish businesses to be taken into account.

The DKPTO is part of the Danish Ministry of Business and Growth and is the national IPR competence centre for information regarding IPR and the protection of technology and know-how. The DKPTO is responsible for intellectual property laws and policies in Denmark and implements the system of intellectual property protections across all formal types. The DKPTO has a strong role, and is 100% financed through fees and services. It is responsible for all IP topics except copyrights (but feels comfortable in addressing the topic with tools and in consulting/advice); it issues Patents and Industrial designs and registers Trademarks to assist businesses in expanding their innovation capacity. The DKPTO strives to be a centre for strategic information and to protect the rights of both techniques and business marks to secure an efficient system for the protection of IP rights at reasonable costs. The DKPTO also has an Enterprise Policy Unit, which provides analysis and input on IP policy development to the Danish Government, implements policy initiatives such as the IP Trade-Portal, works to place IPR on the general agenda of growth and innovation and explores how IPR can be used to increase growth and the ability to innovate in enterprises.

In this context, the DKPTO has been very active in commissioning research on the use of IP by Danish innovators and on various IP topics. This research also informs the office when developing and improving existing services. For example, through a series of research initiatives, it was shown that Danish SMEs could be classified into four clusters: "IP Rookies", which are often family owned SMEs operating domestically with rather little use of IP. "IP dealers" differ from the rookies in that they have some level of expertise. "IP Strategic" denotes firms that are already IP aware and active, however with rather little internal capacity to handle IP; rather decentralised organisations with a high share of technically/scientifically educated staff. The final cluster is "IP Strategic Dealer", which are firms that have both know-how and in-house expertise, and are usually internationally- and growth-focused firms. These four classes have been further analysed in terms of their activity characteristics, and, following that, three types ("circles") of IP support services have been developed to target specific company profiles.

Denmark also has an Invention Centre based at the Danish Technological Institute, which assists Danish private investors (i.e. individuals), scientists and SMEs in all phases of their invention activities. Elements of the assistance provided through the Invention Centre is financed by the Danish Ministry of Science, Technology and Innovation and includes the following activities: a hotline for researchers, private inventors and entrepreneurs, offering advice in all phases of the process of commercialising new ideas; a web-based toolbox for Danish researchers, inventors and entrepreneurs consisting of 'dos' and 'don'ts', FAQ's, evaluation and assessment checklists, checklists for licensing, model contracts and secrecy agreements; collective information and awareness activities for groups of researchers, inventors and entrepreneurs including e-mail newsletters on topics like IPR, prototype technology, licensing and thematic conferences in selected areas and courses for researchers, SMEs and inventors.

Denmark also participates in the Global Patent Prosecution Highway (PPH) programme pilot arrangement, which involves offices from 17 other countries. This pilot allows patent applicants

[79] Forfás, Innovation In Agency-Supported High Growth Firms In Ireland

to request accelerated examination at any of the offices involved in the pilot if their claims have be found to be acceptable by any of the other offices involved in the pilot.

The DKPTO has a commitment to create a new tool every year (dependent on demand), though also hosts the 'ministerial network against IPR infringements', which was formed in 2009 by ten government authorities. It works as an umbrella network supplemented by a number of subordinate, issue-specific networks. It aims to improve collaboration between its members, ensure dialogue between government authorities and the business community, promote knowledge and action on IPR infringements and follow up on initiatives to strengthen the efforts against IPR infringements.

5.5 Finland

In 2014, the Finnish Government produced a resolution on a policy programme in intangible value creation[80], a strategic document that updates national policy measures of the national IPR strategy, promotion of business and entrepreneurialism in the creative industries, and an updated national design programme. The main motivation is to strengthen co-operation and policy interaction in implementation. Specifically, the resolution aims to i) enhance the prerequisites for intangible investments, ii) strengthen the expertise related to the utilisation of intellectual capital and intangible value creation, and iii) promote the development of innovation-based business in Finland. Measures for the programme are clustered around:

- Investments in expertise centred around, among other priorities: IPR representatives in HEIs, and continued adult education.
- More effective utilisation of IPR: charting the needs of start-ups in terms of IPR, prerequisites for growth and obtaining funding; a requirement for large firms to surrender unused IPR for further development by SMEs; development of better ways to value IP and developing the expertise in that valuation; reviewing the legislation around rights in inventions from HEIs; promote expertise in licensing and agreements; reviewing copyright policies; increased communications and co-ordination to raise awareness concerning the social and financial impact of IP.
- Development of funding instruments: including mentoring and advisory services, particularly in the creative sector; investments to support product development, repaid through royalties – again aimed particularly at the creative sector; ensuring the development of a service path between various stages.
- Taxation issues: review international tax practice; improve guidance and advisory services on tax.
- Development of regulation: clarifying the impact of the unified patent on Finnish innovation (to which Finland signed up in 2013); actively influence the renewal of the Trademarks Act of the EU; proposing a directive to protect against the misuse of trade secrets.

The Finnish Patent and Registration Office (PRH) is an agency under the administrative branch of the Ministry of Employment and the Economy. The PRH advances enterprise innovation and corporate activities both in Finland and internationally by:

- Creating a legal foundation for businesses associations and foundations.
- Granting protection for company names, trademarks, inventions and other industrial property.
- Maintaining and publishing comprehensive business information intended to benefit society.
- Offering client-orientated online services, information services and specialist services including:

[80] Government Resolution on a policy programme on intangible value creation (April 2014)

  - Finnish Business Information System (BIS), which allows businesses, organisations and foundations to submit information to both the PRH and the Tax Administration using a single form.
  - Trade Register (Virre) entries of businesses and foundations.
  - Details of Associations (AssociationNet).
  - Details of patents and utility models (PatInfo).
- Supervising foundations and monitoring the compliance of businesses and organisations with registration requirements.

Within the PRH there are four sub-divisions; The Enterprises and Corporations Line responsible for the Trade Register and Enterprise Mortgages; The Patents and Innovations Line is in charge of patents, utility models and layout-designs or integrated circuits; The Trademarks and Designs Line is in charge of trademarks and Industrial designs and an Association and Foundations Affairs Unit responsible for affairs relating to the Register of Associations, the Register of Religious Communities and the Register of Foundations.

The PRH also acts as an International Searching Authority (ISA) and International Preliminary Examining Authority (IPEA) for international PCT patent applications.

Copyright is not dealt with by the PRH but instead The Ministry of Education and Culture, who is responsible for matters relating to copyright issues.

Developments considered particularly important for Finland's IP support system include the launch of online services for setting up limited liability companies, a new online trademark application service, an upgrade made to patent and utility model services, details of revisions made to Acts as well as providing information and updates on various fees and statistics. The PRH have set out strategic objectives for the period 2011-2020 which include the following[81]:

- Promoting new and growing business activities including the fostering of favourable operating conditions for associations and foundations.
- To maintain current station as a recognised organisation granting exclusive rights.
- To be a pioneer in providing online services.
- To ensure all of the information we provide is used effectively.
- To be a single, unified PRH.
- To do everything cost-effectively and efficiently.
- To have competent staff with exemplary leadership.

PRH is also active in SMEs support[82], with a focus set on providing services to SMEs through a cooperation network, which includes the funding agency Tekes, patent attorneys, ELY centres, regional business services, universities, etc. Further foci of services and interventions are placed on start-ups and firms internationalising. A particular output of support activities is the "Management Workbook – Intellectual Property Issues in Business Operations"[83]

There are several institutions supporting innovation in Finland and one particularly notable organisation is the aforementioned Tekes, the main institution supporting innovation in Finland. Tekes has an annual budget of around €600m at 2014/2015 and provides funding for companies and research organisations, as well as service providers.

Previously, the Foundation for Finnish Inventions supported and promoted the development and exploitation of Finnish inventions, providing advice and support for private inventors (i.e. individuals) as well as researchers (i.e. within HEIs or research organisations) and SMEs in

[81] PRH 2014, Annual Report 2013

[82] See: https://www.prh.fi/en/information_and_services/ipr_information_for_smes.html

[83] See: https://www.prh.fi/fi/tutustu_ja_asioi/prh_koulutuspalvelut/verkko-oppaat/management_handbook.html

Finland[84]. The activities and funding of the Foundation have now been merged with the regional Centres for Economic Development, Transport and Environment (ELY Centres). As such, the activities of the Foundation (promotion, evaluation of inventions, advice on inventions and IPR, financing of protections and product development) are now managed by the ELY-centres and regionally coordinated from the central region. The governance of these and a number of other activities operated by the regional ELY Centres has been allocated to Tekes since the start of 2015, putting the practical management of these activities within Tekes.

In 2013, The Finnish Market Court (court that hears market law, competition and public procurement cases) gained exclusive jurisdiction with respect to civil litigation and prosecution for all IPR related issues and also handles any precautionary measures. Furthermore the Market Court also achieved exclusive jurisdiction with respect to appeals over decision of the PRH concerning registration issues and appeals over the administrative decisions of the Finnish Communications Regulatory Authority regarding the grant of domain names for the top-level domain '-fi'. The Board of Appeals of the PRH was closed down at the end of 2013.

5.6 Germany

The publicly-funded system to support the take-up of IP by the German firm base rests, at the federal level, on two main pillars: on the one hand, the SIGNO programme of the German Federal Ministry of Economics and Innovation (BMWi). The SIGNO programme is the central pillar with measures particularly in awareness raising, funding schemes for the registration of IP and commercialisation of research results. On the other hand, there is the network of patent libraries that provides advice and search services in IP and patent databases. There is no national patent or IP policy, although there are some remarks with respect to IP in the national 'high-tech' strategy.

Interestingly, the German patent office (DPMA) – which is subordinated to the German Ministry of Justice – has only a small role to play in the actual provision of services to users such as SMEs or researchers. Its legal mandate is *"…to grant and administer Industrial property rights and provide information on industrial property rights effective in Germany."* In practice, this means that the DPMA has not the legal possibility to service and support SMEs directly, although it tries to maintain a role in this context by reaching out to organisations such as the patent libraries, teaching them how to search in DPMA databases or by conveying information on support services concepts and IP consulting tools to which the DPMA has access through international networks of IP and patent offices.

The major player in IPR support for industry and research is the BMWi and its SIGNO programme. The programme has been in existence since 1996 and has been modified only slightly since then. It has three major programme tracks, of which two are particularly relevant here:

- SIGNO Enterprise: The Enterprise scheme addresses industry, and here – through its main tool the SIGNO SME patent action – SMEs. The SME patent action is basically a subsidy of up to € 8,000 for the first patent application of a firm. The aim of the scheme is not so much to lower the cost barrier for SMEs, but to raise awareness on how to correctly use the tool of a patent. Payment of the subsidy is done in five instalments that are linked to certain parts of the patenting process and the mandatory involvement of professional advice in these steps, i.e. through patent attorneys. The money thus acts only as 'carrot' for the provision of consultancy services. There is no other financial incentive for IP offered at federal level, although a 'patent box' regime is currently under consideration. Besides the SME patent action, the SIGNO Enterprise Scheme entails also two standards/guides, one on how to value patents and one on how to conduct searches in patent databases. The guides have been implemented, as one of the few tools in SIGNO, rather recently.
- SIGNO Inventors: This scheme aims at private inventors (i.e. individuals). It comprises mainly a first free-of-charge consultation with an expert to value an invention and advise on possible next steps for commercialisation. The duration of this consultation is at most four

[84] WIPO, Foundation for Finnish Inventions – Promoting Innovation

hours. In addition to this free offer, 'SIGNO inventors' organises also a yearly prize/competition for children who have invented something.

- Actual implementation of the SIGNO scheme, particularly the SIGNO Enterprise scheme, is done in a decentralised manner through regional network partners that have to qualify as SIGNO partners. SIGNO partners can be regional funding/development agencies, chambers of commerce or regional certification organisations such as the TÜV Rheinland (which would also offer services like the NCT in Ireland). This particular set-up entails that the SIGNO offerings are used in regionally different ways as an addition to an existing portfolio of other services, which could or could not be in the IPR domain.
- Patentverein.de, and Arbeitsgruppe Patente at WTSH Schleswig-Holstein provide interesting examples of exchange platforms.

A recent evaluation of the SIGNO scheme provided positive results. The evaluation confirmed that a high number of SMEs have been reached, and that the cost/benefit ratio of the programme is extremely beneficial, particularly because it increased the capacity of the firms to make informed strategic patenting decisions. The report recommends continuing the subsidy programme with only minor adaptations.[85]

5.7 Singapore

Recently East Asia has been emerging as a new hotbed for IP activities overtaking North America and Western Europe in the amounts of applications filed under the Patent Cooperation Treaty (PCT). These developments have pushed Singapore to position itself as a Global IP Hub in Asia and play a facilitative role for regional and international transactions offering a neutral and trusted platform in supporting the development for growth. Additionally, Singapore has a world-class legal and financial infrastructure, high-quality workforce and strategic geographical location that provide a good cradle and base for establishing it as a strong global player[86].

The leading governmental body for IP-related issues is the Ministry of Law. The Intellectual Property Office of Singapore (IPOS) is the main agency responsible for IP laws and policies. IPOS provides intellectual property protection across all formal types, including patent, trademark, industrial design and copyright. As a statutory organisation under the Ministry of Law, IPOS's main role is to advise and administer the IP regime, support various stakeholders, as well as to promote the usage of IP and to develop further expertise.

IPOS strives to reach out to and deliver its services for:

- Businesses – IPOS continues to provide tools and information to enable them to create, own, protect and profit from their ideas and knowledge.
- IP professionals – IPOS seeks to upgrade their technical know-how and expertise, as well as provide opportunities for IP professionals to network and exchange views with IP thought-leaders around the world.
- International stakeholders – IPOS strives to further its cross-border IP cooperation so as to provide a strong and connected IP system for creators.
- IPOS also reaches out to a wide array of audiences including the general public, government, and the youth, to educate them and raise IP awareness.
- The scope of services that IPOS undertakes is quite vast. Companies can submit their applications for patents, trademarks, designs and plant varieties protection. Businesses who choose to file their IP and develop their IP management strategies can benefit from different available schemes, including:
  - IP Management (IPM) for SMEs – grants that support small and medium enterprise for increasing their business competitiveness under the guidance of IP consultants

[85] See http://www.signo-deutschland.de/e5072/e13035/SIGNO_Erfolgskontrolle_Endbericht_FraunhoferISI.pdf

[86] Intellectual Property (IP) Hub Master Plan – Developing Singapore as a Global IP Hub in Asia, 2013

- Productivity and Innovation Credit Scheme[87] – an option that allows cost savings in the form of Cash Payout and / or Tax Deductions for the registration of Patents, Trade marks, Designs and Plant Varieties, or for acquisition of IPR. The tax deduction is granted to up to 400% on amounts of $400,000 of companies' spending each year, whereas cash payouts are converted up to $100,000 of the total spending into a non-taxable cash payout instead of claiming tax deduction.
- IP Financing Scheme
- Global Company Partnership (GCP)

In order to secure its place as an IP Hub, the Singapore government established an IP Hub Masterplan in 2013, to guide Singapore's development over a 10-year plan. It includes 14 initiatives to achieve this with 3 areas of focus. More specifically, those initiatives are grouped as IP transactions and management, quality IP findings and IP dispute resolution.

There are a number of elements of good practice in Singapore:

Embracing IP is a new campaign run by IPOS that tries to get IP-related work closer to the end users through three key thrusts:

- Enabling local business through IP – this helps IPOS to reach their consumers through numerous initiatives and programmes such as IP Financing Scheme. IPOS has lunched a new one-stop service centre (IP 101) that has been dedicated to help businesses access a full suite of IP.
- Growing Singapore-based business with IP – this path helps businesses that seek to venture overseas to learn more about IPOS' suite of patent agreements that have been established both regionally and internationally. A good example is ASEAN Patent Examination Cooperation (ASPEC) that is a regional patent work-sharing programme.
- Respecting and Caring with IP – as a driver of social growth and community improvement, IP needs to gain its place in the community. IPOS is determined to bring closer initiatives such as World IP Day and promote examples like partnership with the Singapore Association for the Visual Handicapped (SAVH). Singapore places emphasis on creating spillovers from multinational firms as a means of upgrading domestic capabilities, designing various policy incentives and programmes such as the Local Industry Upgrading Programme[88].

Singapore has a complex system, but one that offers support to financial assistance for drafting and filing patents, exchange of IP through a marketplace, an operational centre of excellence and thought leadership on the protection, exploitation and management of IP, and valuation services for firms' IP. However, patent filing is a condition of some research funding, which may artificially inflate filing volumes. There has been an emerging focus on supporting start-ups in accessing innovations and technology from IP.

Singapore has the most advanced national innovation system in Southeast Asia, and is working toward cementing its role as the region's innovation hub. Singapore has world-class infrastructure and a strong focus on education that is geared toward the knowledge economy[89].

5.8 Sweden

Sweden has no tax-based incentives for IP[90]. As a country it has placed significant emphasis on creating conditions for innovation-led growth, and is well known for the high degrees of efficiency, trust and transparency in its institutions and support structures[27]. There is on-going dialogue related to the regulation or contractual agreement of how to distribute IP between

[87] Inland Revenue Authority of Singapore, KPMG Tax Institute

[88] OECD Reviews of Innovation Policy Innovation in Southeast Asia

[89] World Economic Forum Global Competitiveness Report 2014

[90] OECD Review of Tax Incentives for Research and Development (2013)

collaborators, and major funding bodies often have IPR agreements in their collaboration programmes.

Overall governmental responsibility for IP issues lies with the Ministry of Enterprise, Energy and Communication. There is no national IP strategy, though IP does feature in the national Innovation Strategy, stated as "Continuing to strive for appropriate and effective protection for intellectual property rights on a national scale as well as a functioning, uniform patent protection and a uniform patent court in the EU"[91].

The Swedish Patent and Registration Office (PRV) covers the protection of patents, trademarks, and designs. It has 340 employees, and its activities are financed entirely through commercial charges, which have recently resulted in some financial difficulties.

PRV offers a range of relatively basic information products and brochures online for each type of IP, including a broad range of awareness-raising material, aimed at informing on the very basics of IP and information on counterfeit and piracy. PRV offers free access to a network of innovation advisers.

There are a number of searchable databases online, including the Swedish Patent Database, the Swedish Trademark Database and the Swedish Design Database, and links to consultancy services – the 'PRV InterPat:secure' service – aimed at firms who wish to patent.

PRV hosts a 'Knowledge Centre' with an international training programme run in cooperation with WIPO and the Swedish International Development Cooperation Agency (Sida) that focus on copyright, patent, trademark and design protection, including knowledge transfer and experience exchange between the participating countries. PRV also provides access to international experts and hosts study visits from abroad and runs international projects. PRV coordinates development activities with the European Patent Organisation (EPO) and the World Intellectual Property Organization (WIPO).

5.9 Elements of interest from other nations

Given the findings emerging from the data and consultations, there are a number of other specific programmes, initiatives or mechanisms that are worthy of consideration for the Irish context.

5.9.1 Austria

Austria's support in the field of IPR is quite extensive and includes different types of grant schemes as well as advice provided to firms. Of particular interest is the scheme "discover.IP", a scheme that builds loosely on the French IP pre-diagnosis service described below, a free due diligence-like assessment of the firms in a country. The IP Pre-diagnosis approach has proved very popular in a number of European countries to foster the IP fitness of the firm base. Furthermore, Austria is in the process of establishing its own national IP strategy, with the aim to increase qualified usage of IP by the firm base. We can therefore contrast the approaches in Austria to those of Ireland, as Austria is also a small economy within Europe, which shares some of the same challenges as Ireland.

5.9.2 France

Of particular interest to the Irish context is the French "IP Prédiagnosis" scheme, the overall objectives are to:

- Increase the overall awareness and understanding of IPR among SMEs
- Assess the status and potential of IP within a specific company
- Offer information and advice to support the establishment of an IPR strategy for that company

[91] The Swedish Innovation Strategy, the Swedish Ministry of Enterprise, Energy and Communications

During the process of up to two days, a state IPR expert identifies with the firm's management the needs, wants and expectations of its IPR. This is aimed at raising the awareness of the firm of their IP and of what services and aid they could use to protect it and maximise its potential. This covers registered and unregistered protection methods, from patents to trade secrets. There is no specific sector targeted, though "traditional" industries and services usually less aware of IPR issues are often prioritised. There is no size restriction on firms (in terms of FTE employment), though beneficiaries tend to be on the smaller side, up to 20 employees. Important to note is that "IP Prédiagnosis" is part of a national policy for the promotion of IPR and of innovation in SMEs. The service operates nationwide through regional INPI Centres and is not limited in its duration.

5.9.3 Switzerland

The Swiss system maintains on-going dialogue with businesses, and makes careful considerations before introducing new tools.

The majority of IPR support in Switzerland is embedded within other areas of business support, which is seen as hugely positive and resulting in higher performance. Previous critiques of the Swiss approach were that any available IPR support was limited only to certain topics and industries (predominantly high-tech). Swiss actors were encouraged to look beyond this, with demand for even clear-cut patenting services coming from medium or low-tech industries.

The CTI Start-Up programme offers a structured four-step process, starting with a basic check around basic properties and scope, and then followed by market and technology evaluations and feasibility checks, a coaching programme that takes firms through business planning and development, and training, before then helping firms into a support programme of networking, contracts and financing, market access and sales. Parts of these exist in Ireland and could be leveraged. The coaching could be taken through via patent attorneys or IP management firms, but only those with strong business know-how. The CTI Start-Up programme ends in an accreditation opportunity for the businesses.

5.9.4 The UK

The UK has witnessed a period of considerable transformation since the publication of the Gowers review in 2006. The UK IP Office has undertaken many initiatives to increase the use of IP by businesses, including online tools such as IP Health Check that seeks to quickly establish whether a business has created IP and to help build understanding of how to progress with it, across all forms, and awareness raising seminars. The IP Tutor from the UK IP Office is an online learning tool aimed at universities to help students understand how IP impacts them. There is also a fiscal policy, including the implementation of the UK Patent Box, and other reforms such as in the enforcement area with the introduction of the Intellectual Property Enterprise court.

5.10 Key messages

Figure 53 Observations from international practice

Country case	Observations
Ireland	• No explicit direct IP support schemes for firms • Direct support available for IP activities through the High Potential Start-up and R&D grants programmes • Indirect support for IP in place through tax instruments and a new Knowledge Development Box is under consideration. Well-regarded broader support system for innovation, but reportedly difficult to navigate • A range of complementary actors in the business and innovation support space that have important roles within the IP agenda going forward • Modern patent office, who: – Covers all forms of IP (including copyright) – Offers information and technical services as part of the statutory role – Conducts educational activities in partnership with other actors
Denmark	• Mandated strong role of patent office (DKPTO) – National competence centre, promoting knowledge and action – Provides intelligence to Government through policy unit and bridges growth, innovation and IPR – Hosts ministerial network to improve collaboration and improve dialogue in IPR infringement between business and government • DKPTO fully commercial • Complementary information services funded by the Ministry of Science include: advice hotline, web toolbox, FAQs, do's and don'ts, evaluation and assessment checklists, model contracts and agreement templates, thematic conferences • Involved in pilot to accelerate patent examination
Finland	• Patent office (PRH) offers online services, including: – Setting up limited liability companies – Trademark applications – Streamlined submission to PRH and tax authorities • Clear vision from PRH to 2020 to: – Pioneer further online services – Boost staff competency • Finance available from complementary service agencies for protection of IP (patents and other IPR) and product development • Clear vision for service delivery and supports for IP to 2020 • Strong focus on co-ordination and communication in support delivery • Strong focus on outreach and awareness raising, as well as easing access and the pathway of service delivery • Restructured delivery to regional centres, centrally co-ordinated – similar to LEOs/Enterprise Ireland
Germany	• Well-designed programmes that bring together small amounts of funding for filing and registration, guidance and capacity building, access to legal services • Programmes clearly aimed at various groupings and subsets of IP users (Higher Education, SMEs, Inventors) • IP addressed in national high-tech strategy, bringing together IP and broader sectoral considerations • Patent office (DPMA) does not service firms directly, but can call on broader support network such as the patent libraries, provide training/education • Exchange platforms in place for sophisticated users of IP • Direct support for IP activities, and currently considering a patent box-type initiative

Country case	Observations
Singapore	• Strong vision to become regional IP hub, supported by published Government master plan • Patent office (IPOS) seeking to grow capacity and expertise, as well as cross-border connectedness in IP system • Strong role of IPOS: – Easing access to services and information: new one-stop service centre, IP101 – Broad awareness-raising, including growing respect for IP – IP management grants for SMEs to access expertise – Connecting innovation, growth and IP through specific Initiative "Embracing IP" • Explicit support for internationalising indigenous SMEs • Patent filing is a condition of some major R&D funding - perhaps explains significant growth in volumes • Focus on creating spillovers from foreign-owned multinationals to domestic firms • Tax support for IP
Sweden	• Emphasis on enabling conditions • IP connected to innovation through inclusion in the national innovation strategy • Strong patent office (PRV) role: – Offers broad range of information and training, including information on piracy and counterfeit, IP basics and consultancy services for firms – IP Knowledge Centre and co-ordination of development activities with international training programme in collaboration with WIPO and the Swedish International Development Agency • No direct financial supports for IP
Other nations	• Well designed programmes for specific purposes, such as addressing capacity building, accreditation, aid in IP valuation and a special attention given to IP for universities

- Ireland currently has no explicit direct IP support schemes for firms, though direct support for IP is available under the High Potential Start-Up programme and R&D grants, and there is data to suggest that around a third of firms receiving R&D grants are then pursuing resulting IP. These supports reside in higher-level schemes and as such coverage is limited. The broader support system, including Enterprise Ireland advice and IDA support is well thought of, with many firms interviewed stating that they have experienced benefits. Ireland has good environmental conditions for IP, particularly the legislative framework, though what support is available is limited and not very visible.
- The advent of the Knowledge Development Box in Ireland will be a positive addition to the suite of tax-related measures for IP that are currently available to firms.
- It is difficult to highlight any particular example of international practice as 'high performing', though there are a number of important and interesting examples and precedents that can be viewed, including initiatives or mechanisms that are designed and implemented well. It is difficult, to truly suggest system alterations that will stimulate IP activity.
- Co-ordinating and guiding measures such as overarching visions in the Singaporean and Finnish cases are often instrumental in bringing together numerous actors and ensuring more cohesive and complementary working. Most effective is the bringing together of innovation and IP – having a strong national statement that draws together agencies and institutions – but integrated into broader innovation and growth strategies.
- Services often perform better when offered as part of an integrated package, rather than isolated initiatives. Integrated services tackle a broader range of interconnected issues and thus better take into account the complexity of the subject of IPR. These examples each showcase the broader interconnectivity of services. In addition, packaged services benefit from synergies among the different services and providers, easing access and the journey through the support system. As a result of being offered principally through patent offices, a large share of IPR support services seem to operate in "stealth mode" and are hardly visible

to firms. This can be overcome with better integration and signposting, and there is a case to say that not separating IP from other areas of business support has beneficial consequences, as per the Swiss example.

- Services that perform better are usually carefully designed and targeted (i.e. by assessing user needs or by carrying out ex-ante evaluations) and are subject to regular evaluation exercises. However, many of the services discussed here do not have evaluations conducted and have in many ways insufficient quality assurance mechanisms in place. This has important implications both in terms of customer orientation (e.g., with respect to knowing the target groups and their characteristics) and in terms of accountability.
- In some cases, there are no overarching IP strategies – this may be as a result of particular orientations, such as views on limiting state intervention, or complex spatial arrangements such as in the German federal case.
- Denmark and Singapore both offer tax incentives for IP, in terms of purchase of IP in the former and registration of IP in the latter, while Germany offers other direct funding support for IP and is also considering a 'Patent Box'-type initiative. There are no other special favourable tax treatments among the study comparators, though we acknowledge that schemes such as the proposed Knowledge Development Box for Ireland is a relatively new innovation globally and that many countries are developing some form of offering, including a number of Ireland's competitors outside of the comparator group (the Netherlands and the UK already have Patent Box schemes). A number of the comparator countries highlight a disconnect between tax incentives and high performance in IP and innovation more generally, offering support to the suggestion that this performance stems from industrial and economic structure. A recent review by the OECD argued that tax incentives cannot compensate for the lack of broader enabling conditions[92].
- Patent Offices in the countries reviewed are given strong roles across a range of IPR and with a focus on awareness raising, education and intelligence back to policy actors.
- In summary, the key factors for more effective support include:
- Taking a holistic approach to IPR
  - No single focus on patents
  - Understanding significance of IP management skills
  - Pooling of scarce expertise
- Integration of IP topics and organisations into the innovation system
  - Bridge the 'two universes' of IP and innovation
  - Understanding that IP is part of innovation and business strategies ('business comes first')
  - Industry-specific approaches (no 'one-size-fits-all')
  - Specific outreach strategies to IP users
  - Enablement of IP institutions and systems
- Awareness raising, teaching and information provision
  - Specific target groups and content
  - Non-legal IP teaching
- Special role of IP education in HEIs

[92] OECD Review of Tax Incentives for Research and Development (2013)

6. Exploring reasons for low IP activity in Ireland's firm base

6.1 Introduction

The quantitative data study showed that firms in Ireland file and register less than international comparators across the major forms of formal IPR. In light of our further research, discussed in chapter 4, we offer here some explanatory reasons underpinning the observed trends.

6.2 Interpretation and discussion of IP activity by firms in Ireland

The macro-level data show an overall level of lower performance in formal and registered IP than the majority of comparators selected for this study. There are a number of points to draw out of this, in order to try and better understand the reasons behind such performance. We do so here, taking each form of formal and registered IPR for which data was gathered in turn.

Overall, the data show that Ireland begins from a lower base in filing and registration of IPRs. This initial lower base likely relates to the industrial structure of the economy. Ireland experienced an economic shift from an agricultural economy to one focused on services and high-tech industries since the mid-1980s. Significant investments and focus in the Science, Technology and Innovation (STI) agenda were introduced in the early 2000s. This places the start of the data time series used in the quantitative data study on IP toward the beginning of the period of the ramp up of investment and focus on STI in Ireland.

6.2.1 Patents

This low base in patent filings can initially be considered to some extent a reflection of the lower focus on RD&I in Ireland before the 2000s. There has been some ramping up of patent activity with patent filing increased in Ireland up to 2008. The subsequent rate of decline in patent filing after 2008 is lower for Ireland than observed in the selected comparators (with the exception of Singapore, which exhibited net volume growth over the period). The data indicates that filing decline in Ireland is driven by falling firm filing, which decreases from a peak in 2006, while other organisation types – particularly HEIs – continue at relatively stable, or slightly growing levels over the same time period.

The data show that the decrease in company filing can mostly be attributed to the pharmaceuticals sector, which displays:

- A sharp decrease from a peak in 2006 in Irish applicant filings, and
- A similar sharp decrease from much earlier – around 2001 – in Irish inventor/foreign applicant filings.
- A steep decline from around 2006 in the combination of Irish inventor with a foreign applicant (a proxy for foreign-owned multinational firms).

In each of these cases, further decline can be seen from 2008 onwards.

Patent filings from indigenous firms (using a proxy of combined Irish inventors with Irish applicants) demonstrate steady growth until 2008, which is then followed by plateauing and slight decline, though lags due to the patent process makes it difficult at this stage to ascertain exactly what follows.

The exact reasons for decreasing patent filing numbers are not clear-cut, but we would suggest the global economic recession plays a role in this, particularly as 2008 appears to be a consistent date in plateauing and decline across sectors and applicant groups. Indeed, some interview evidence points to financial management concerns following the economic crisis and, related, firms becoming more selective in what they patent. The tightening and subsequent closure of the patent exemption scheme occurred over the 2006-2011 period. This may also have had some influence on the decline of patents during that time.

Furthermore, we see from the patenting data that firms' patent filing is highly concentrated, with firms who had filed at least 10 patents over the period accounting for approximately only 0.2% of Ireland's firms. These firms were responsible for three quarters of all patent filing between 1999-2013.

The concentration of patenting returns us to the structure of Ireland's economy. A small minority of firms are actively patenting. Consequently, the change in patent-filing activities of a small number of firms could lead to noticeable changes in the overall level of patent filings for Ireland. Indeed, it was determined that one particular pharmaceutical company was responsible for a significant level of the patenting activity during part of the time period considered in the CambridgeIP quantitative data analysis. This activity level was not sustained (the company was acquired in 2002 by another multinational, and it is feasible to consider that the patent strategy for filing was subsequently changed). This is not to apportion all changes in the patent filing activity to this one multinational company, but it does give an example how a small number of firms can affect the national data trends, when the overall volume levels that are being filed are so low.

The quantitative data study indicates that, despite the economic crisis, the patent applications remained relatively stable since 2008 for indigenous firms. This indicates that there has been headway made in terms of patent activity by indigenous firms. The survey and interviews have highlighted that areas such as cost, timeliness, capacity, culture, etc. inhibit higher patent activity levels in patent active SMEs and micro firms and/or a greater number of SMEs and micro firms from becoming patent active.

Finally, we note the issue of lower patent grant rates for Irish applicants. No clear-cut answer for this emerged from our interviews, with no respondent able to comment on issues of quality or novelty in this context.

6.2.2 Trademarks

The data show that Ireland's trademark registrations are lower than comparators but not as far behind as patents. Like all comparators, Ireland demonstrates strong growth in trademark registrations since 2003. Our survey and interviews confirmed that trademarks are used across a broad range of sectors, with reported increasing awareness of their wide applicability (only 15% of surveyed firms stated that they did not use trademarks, the lowest of all firms' non-use). The survey data also show that trademarks are used – and regarded as important – by all firms in all size groups above 10 FTE employees, and that firms operating in international markets appear to make the most use of trademarks. This is also reinforced by the more macro-level data from the quantitative data study, which show that Ireland demonstrates the highest proportion of international trademark registrations among comparators.

That Ireland remains behind all European comparators in such a broadly applicable and utilised form indicates that perhaps a higher proportion of firms in Ireland than in the comparators are currently IP-inactive, where IP currently has no perceived role in their business. Anecdotal evidence gleaned from interviews highlighted that many indigenous firms do not value IP, with one respondent stating that when working on behalf of Irish clients, suggestions to register trademarks are often refuted as an unnecessary cost, despite that cost being relatively low. This may relate to firms operating in local or regional markets, who do not consider IP protection as valuable. We were unable to directly consult these firms, though several stakeholders and firm respondents mirrored this view. Indeed, several interviewees stated the belief that there is an underlying cultural issue in a majority of indigenous Irish firms, who have not yet learned to value their intangible assets, nor see the benefit of investing in IPR, regarding it as an expense rather than an investment. This is in stark contrast to Germany, for example, which is known to have a culture highly favourable and positive toward IP ownership.

6.2.3 Industrial designs

The macro-level data show that industrial design registrations are rising overall in most countries, but that Ireland is again low despite not showing a recent plateau like other comparators. Our survey confirmed that there is some use of this form of IP in certain sectors in Ireland – medical devices, ICT hardware and food and drink – but that industrial designs are not overall widely used. Interviews revealed a general lack of awareness of industrial designs, and that firms often require prompting from a legal professional to consider utilisation.

6.2.4 Geographical indications

Data show that only six firms in Ireland currently use geographical indications. This is not surprising, due to the specialist nature of the protection. Ireland's performance here, while low-volume, is not too far behind the other comparators, and as such, there is little for comment.

6.2.5 Plant Variety Rights

Plant variety rights activity is low, which is shared across all comparators. Our survey and interview confirmed that firms in Ireland do not widely utilise this form, particularly outside of food and drink and pharmaceuticals, which is expected.

6.2.6 The effect of IP supports

As discussed in chapter 5, the comparator countries offer a range of IP supports for firms. Singapore's growth is not explained entirely by incentives, but it is acknowledged that patent filing has been a condition of some research funding, which may explain some of the net growth seen in the macro-level data. What is apparent from the examination of international practice is that direct support to firms is important, but that the culture, broader enabling conditions and industrial structure of the economy are driving factors of IP performance.

6.3 Key messages

- Economic and industrial structure plays a part in Ireland's low base and low-filing activity; a recent transition from an agriculture-based economy to one oriented toward technology and services, and key growth sectors that include some traditionally low- or non-patenting sectors (particularly services and software). The global economic recession also plays a part in recent patenting decline, as firms report managing down costs and filing more selectively.
- In addition, the concentration of patenting in a small number of firms, and a continued comparative underperformance in trademark filing indicates that more firms are non-active or low-IP active. SMEs and smaller firms interviewed reported filing small amounts due to cost, capacity and timeliness issues, relying on informal IPRs to supplement core IP, with small and young firms also reporting cost issues.
- The relative under-performance in trademark filing – a widely-applicable IPR – plus reported lack of consideration by indigenous firms, appears to indicate a cultural issue and awareness of the value of IP protection.
- Other forms of IPR highlight different reasons: design rights appear to suffer from a lack of awareness among firms, while plant variety rights and geographical indications demonstrate low volumes across the comparators. In the latter cases, this is due to the specialised nature of those protections, and this does not create concern.

7. Conclusions and recommendations

7.1 Introduction

In this final section, we present our key findings from the study[93] and the interpretation of these findings before going on to present a series of recommendations. We end the section with a summary table listing our key recommendations alongside the public sector organisations we believe will need to be involved in implementing the recommendations. We have written at some length on each recommendation, for the sake of clarity. We trust this will aid in debate and prioritisation on the one hand and provide a good basis for Ireland to do further work on scoping / budgeting the proposals beyond the life of this study.

7.2 Key findings of the study

1. Activity in formal and registered IP is low in Ireland relative to the selected comparator countries, but there are other factors to consider, such as economic structure.

- Ireland performs no better than 4th out of the six comparator nations across all forms of formal and registered IP, even when data is normalised for population size and GDP. Patenting in particular is noticeably low compared to the innovation leaders, and more recently compared to Singapore, which has now overtaken Ireland in filing volume.
- Ireland demonstrates a decline in patent filing, driven largely by decreasing firm-level filing, which displays a year-on-year decline since it reached a peak in 2006. Meanwhile, the proportion of total patents that are assigned to the HEIs in Ireland is greater than in other countries. The proportion of patents assigned to HEIs continued to increase steadily until 2008.
- A small number of firms are responsible for the majority of patent applications. Approximately 0.2% of firms in Ireland account for 77% of applications between 1999-2013.[94]
- Data show that the patent filing trend of Irish inventors with foreign applicants (a proxy for foreign-owned multinational firms) has been in general decline since a peak in 2005. The trend is that of a steep decline from 2007 to 2010. Conversely, the filing of Irish inventors with Irish applicants (a proxy for indigenous firms) has demonstrated a positive trend, growing to 2008 and then steadily tapering away.
- Sectorally, patenting appears to be focused in pharmaceuticals, medical devices and ICT hardware, with some activity in the food and drink sector. Data suggests that the pharmaceuticals sector is a major contributor to the decline in patent filing, including the filing activity of foreign-owned multinationals in the sector.
- Trademarks display significant growth since 2003 across the comparator countries and, while Ireland remains lower than some (between 4th and 5th of the 6 countries compared, depending on the normalisation factor), the gap between the innovation leaders and Ireland is much narrower than for patents. Trademarks are widely used across a range of sectors, with growing awareness of their applicability reported among firms. Trademarks appear to be particularly well utilised among firms operating in national and international markets.
- Industrial design rights experienced slow and steady growth from 2002 and, while other comparators demonstrate stagnation from 2006, Ireland's trend remains positive. In terms of volume, Ireland remains low in the comparative list, at 5th out of six.

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[93] In consultation, we have focused on innovation-active firms due to the likelihood of them engaging in IP activity. We have used our knowledge in IP to develop interpretations of the data (in understanding and analysing the responses from firms). We have developed a set of findings drawing on the data from this study and our interpretations of those findings. For example, costs are highlighted as a barrier overall, but broader experience shows that a more nuanced view of this is required, particularly in developing policy to meet these challenges.

[94] With Ireland having approximately 189,000 firms in its economy – Business in Ireland 2011, Central Statistics Office, 2013

- Based on an analysis of agency-client firms, the economic structure of Ireland highlights that key sectors[95] – in terms of Value Added to the economy and employment share – are, for multinational firms: chemicals (including pharmaceuticals), medical device manufacturing and computer, electronic and optical products (ICT hardware). For indigenous firms, these key sectors are: food and drink, business services, and computer consultancy. The latter of these are not traditionally patenting sectors.

2. Informal and unregistered IPRs are of significant importance across the key sectors of the Irish economy.

- While difficult to statistically quantify from other sources, such as those used in the quantitative data study, research shows that informal and unregistered forms of IPR are used by a wide range of sectors, firm sizes and firm ages.
- Unregistered forms, such as copyright, are associated with a number of sectors with high employment, with the highest importance indicated by services firms, with the software sector and food and drink sector also stating importance. Copyright is also an important form of IP in many of the creative sectors such as music, film, literature and the arts.
- Informal mechanisms: trade secrets, complexity of design and lead time advantage were all regarded as important by a majority of firms surveyed. These are often used in combination with formal mechanisms.
- Certain forms of IPRs are not suited to some sectors (for example, the software sector uses patenting sparingly), and accordingly less usage of these forms is seen in those sectors.

3. Barriers to engagement in IPR use vary according to firm size and firm age, though there are also sectoral and ownership-based factors impacting IP management.

- Barriers to use of IP strategies mostly stem from firm size or firm age, however there are sectoral considerations, as some sectors do not make use of patents (e.g. the services sector and the software sector).
- Business perceptions (at least) of costs of protecting IP overall is reported as a barrier to more use of formal IPR, followed by the ability to enforce rights. It is apparent that the issue of cost is complex and dependent on the individual business context and IP strategy followed. Variables include: experience and awareness; whether the firm is operating only in Ireland or abroad, and; whether it is itself filing or only maintaining freedom-to-operate by taking action against potentially damaging third-party IP. We stress that firms' perceptions may change if they were 'fitter' in IP management issues.
- A detailed quantitative examination of costs was outside the scope of this study and thus costs are differentiated in this report only qualitatively, based on particular statements heard in interview. As such, this research could not systematically and in a quantitative manner differentiate the extent to which the cost barrier is based on perception or experience. Furthermore, the research should not be used to make inferences on the degree to which the cost barrier relates to costs in Ireland or abroad, nor which specific cost components[96] the cost issues pertain too. Neither did this study look to compare legal costs internationally, and, as such there is no inference in this study that Ireland is a more expensive location than elsewhere for firms to engage in IP activities.
- A further piece of research would be required to rigorously probe the specific topic of IP costs so as to gain a more in-depth view on the many aspects of IP costs.

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[95] It is recognised that the creative industry is IP intensive and also a strong contributor to the economy. While firms from the creative industry were not excluded from this study, there has been a focus towards firms with a technological underpinning rather than those with foundations in music, film, literature and the arts.

[96] Cost components for IP protection include (but are not limited to) costs in preparing an application and costs in enforcing and maintaining IP after grant, for example performing regular research via databases to identify potentially harmful IP, taking opposition actions, and so forth.

- The research indicates that perceptions (at least) of costs associated with formal IPR are a particular issue for micro and small firms – particularly patenting, as other forms such as trademarks and industrial designs are cheaper. The perception (at least) amongst these firms is that the costs of engaging in IP activities, particularly engaging external expertise[97], were a barrier.
- The next most selected barrier – enforcement of IP rights – is seen to be mostly reported by firms who employ more than 10 full-time equivalent (FTE) employees.
- Small firms stated that a lack of internal capacity to manage IP was a main barrier to increasing their IP activities.
- More mature firms – those operating for more than 20 years – reported that pursuing IP is too complicated.
- There are reported know-how issues with smaller and younger firms being unaware of how to pursue IP or how to resolve particular issues. In broader terms, there is also a lack of value traditionally given to IP management by indigenous Irish firms, and a lack of understanding and awareness of the potential value to their business.
- Research shows that there are a number of sectors, such as food and drink, financial and business services that could potentially benefit from greater awareness and education on how to beneficially utilise formal IPRs.

4. Ireland's (firm level) innovation performance compares reasonably with comparative countries.

- According to the latest comparative data, Ireland ranks well among the selected European comparators when considering the percentage of firms reporting innovation activity.
- Based on the latest Community Innovation Survey (CIS2012) and the international comparison data from 2010 for turnover from product innovation, there does not appear to be Ireland-specific innovation issues giving rise to the low IP activity measured.

  As a related measure, Business Expenditure on Research and Development, while lower than selected European comparators and being slightly below the EU28 average, has demonstrated a proportionally higher growth in Ireland than many comparators.

5. There is most scope to help indigenous firms improve their IPR management capabilities.

- IP supports for firms in Ireland are available through both the tax system and general R&D support schemes[98]. The indirect supports for IP available to firms in Ireland include a number of tax specific measures for the purchase and management of IP, and the development of a Knowledge Development Box is currently under consideration in Ireland. However, comparator countries were found to have a number of direct explicit IP support schemes/programmes already in place, which include financial support and/or non-financial supports for building IP management capability.
- Based on experience in other countries, there is scope to provide support to micro and small firms financing their first patent, to include support for accessing external professional services, and also capacity building. The objective would be to guide and educate firms through the process as funding is released.

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[97] The survey did not disaggregate costs relating to services for preparing and filing applications, statutory fees, costs of enforcing IPRs nor whether the associated activity is within Ireland or abroad. Though statutory fees (which have remained relatively static over the last 30 years) were not highlighted as a cost issue within the interview phase of the study.

[98] Currently direct IP support for firms are embedded in two support programmes in Ireland (through the High Potential Start Up and the R&D grants programmes). However, the supports mentioned here are primarily financial, and without broader coverage. There are currently no specific IP schemes offering direct support on IP to firms. There are a number of tax measures offered as an indirect support (incentive) for IP engagement: these are outlined in Chapter 5. R&D tax credits are not considered here as we distinguish between support for R&D and specific support for IP activities – though the link between R&D as an activity for IP generation is acknowledged.

- There is also an opportunity to educate and raise awareness on the value of a broad range of IPRs that can be used by enterprises. This should be sectorally oriented due to the usage conditions dictated by sector, and should be aimed at various levels of know-how, from the basic to the more sophisticated. It is important to ensure that a broad appreciation of IP and IPRs exists across all firms, so that informed decisions can be made on how and whether to utilise it. Given the importance of informal and unregistered forms of IP, education on IP management will play an important role.
- There is a range of tax and R&D supports available to multinational firms in the area of IP, and the introduction of the Knowledge Development Box should contribute to increased IP activity among these firms[99]. However, a key requirement for the future is building knowledge capacity across the complex area of IP at a senior level in Irish-based subsidiaries of multinational firms, as a means of aiding these local sites in managing existing IP, where relevant, and in identifying and pursuing opportunities associated with IP, if and when they arise.

6. Supports and conditions for IP use by firms should be connected to the broader innovation and business support landscape, not treated as a separate, specialist subject.

- While it is difficult to highlight particular 'impactful' IPR supports, international good practice highlights the importance of keeping IP connected to broader innovation and business supports. Integrated support and services feature among a number of high-performing comparators. This means that even in the case of establishing new programmes or supports, IP should remain an integrated topic with broader innovation and development supports, particularly in terms of helping firms through the IPR systems and its pathways for protection and enforcement (examples of this in practice can be seen in many of the comparator nations profiled here).
- IPR systems should be kept under review and prioritise and value the ease of access and use for firms.
- International good practice also highlights the importance of consistent information, education, communication and co-ordination across the IPR support system.

7.3 Technopolis' interpretations of the findings and considerations for possible policy action

Here we examine the findings in light of Technopolis' broader knowledge in IP to develop interpretations of the data (in understanding and analysing the responses from firms).

7.3.1 Is low IP performance an issue in Ireland?

One of the first issues to consider is whether, and if yes, to what extent, Ireland has a problem with IPR that can or needs to be addressed by policy. One important question to ask in this context is whether the lower performance in terms of the number of IP filings is troubling. The study has shown – in line with international examples – that care must be taken to not over-interpret, for example, the number of patent filings as an indicator of high or low innovation performance.

On the one hand, this is due to the fact that most patents are considered to be of low quality and value. Patent counts do not give an indication on the quality and commercial success of the patented inventions. They are therefore of limited value for defining more specific IP-related policy actions that have as ultimate goal to improve actual economic performance.

On the other hand, the overall level of IPR usage depends on innovation and economic performance, i.e. in order for IPR to be used more, the general level of innovativeness has to be higher. Low IPR usage in this context can therefore be improved by further developing the economy, and the level of innovation taking place, rather than through IPR-specific measures.

[99] Tax and R&D supports are also available for indigenous firms.

Having said that, the research supports the view that **IPR performance in Ireland trails to an extent firm-level innovation performance**, an issue that could be addressed by policy. This means that there may indeed be a quantity problem with respect to IP in Ireland. There are also a number of **IPR-specific barriers observable** (costs, enforceability and awareness) that are found also in other countries and that could, if properly addressed, improve the qualified usage of IPR. The issue at hand is to understand that such policy action may lead only to slight improvements in statistical performance – which would still be largely determined by the level of innovation and economic activity – but that it would much more benefit the quality of IP and decision making at the firm level regarding IP usage. The policy implication of this reasoning is **therefore not to focus only on an increase of the number of IP/patent filings, but also that more high-quality IP is being filed**.

Increasing the quality of IP means that preferred support would be constituted of a package of financing, advice and guidance, which seeks to support firms in learning the process and building capacity and knowledge.

7.3.2 The cost barrier

Irish-based firms consulted stated that, overall, costs are a barrier. There is a differentiated issue here, with both 'real' cost issues stemming from firm finance issues (smaller and younger firms for whom expense on IP is a greater share of turnover, for example), and perception. The data show that cost overall is much less important as a barrier, for example, to foreign-owned multinational firms (with deeper pockets) than it is to indigenous SMEs. In discussion, firms experienced in preparing and filing patents mostly stated that this relates to the costs of professional external supports such as lawyers and agents, as opposed to statutory costs.

This study did not look to compare legal costs internationally and as such there is no inference in this study that Ireland is a more expensive location than elsewhere for firms to engage in IP activities. Indeed, Ireland is part of an open European market with regards to acquiring services of patent/trademark/design agents (with non-Irish based agents simply needing to notify the Patent Office if they are operating with Irish based clients). This open market should assist in sustaining the competitiveness of Irish based IP agents. To add further context to this discussion of cost, a recent study for the EPO on the monetary costs of patenting in Europe found that the costs of a European patent could be significant over its maximum term of 20 years.[100] Depending on the industry and the features of the patent, these costs could range from around € 30,000 to more than € 100,000. However, the study also showed that the real costs, taking inflation into account, have hardly changed over the last ten years, and there is also evidence of firms which have been able, through proper IP management, to reduce their nominal patent costs compared to 2004. However, the same study found that SMEs on average pay a premium on their patents compared to larger firms.[101]

The cost issue is therefore a topic that has to be looked at in a very differentiated way. We conclude that small and micro-firms with resource constraints may indeed have a problem with costs of IP, for example if these costs make up a significant share of turnover.

For other types of firms the perception (at least) of costs as a prime barrier may be high due to lack of awareness of the potential benefits of IPR. There is anecdotal evidence from SMEs in Ireland and considerable anecdotal evidence from SMEs studied in other countries where the conclusion would be that the costs are actually more of an investment (if it comes to high quality IP), i.e. that the costs of well-thought patents and IP are not an issue, while true cost barriers arise from other areas. As well as fear of enforcement costs, a particular case in point is the increasing need of firms to work themselves through dense patent thickets, search regularly for potentially dangerous IP owned by third parties as well as the need to take appropriate actions (such as opposition and nullification procedures) in these cases. Such firms would favour high fees and a lower overall number of patent filings, but with a high quality of the IP ensured.

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[100] Radauer et al. (forthcoming). Based on a survey of 303 firms in Europe, 20 case studies and enquiries with patent attorneys.

[101] This work has not yet been published, and so no further detail on the findings from this study are available as of yet.

7.3.3 The enforceability barrier

Enforceability is another main barrier related intrinsically to cost, taking in the aforementioned monitoring and opposition, as well as defending against litigation. It is apparent that enforceability in this context does not relate to the changes in the legal framework. Many smaller firms appear to be nervous about receiving legislative action, either through trolls or at a point where they 'come on the radar' of more sizeable competitors. This mostly related to the cost of action or settlements, which most small firms stated they would not be able to afford should it occur.

7.3.4 The awareness barrier

Our overall assessment is that the most important barrier to tackle is **IP awareness and culture, and IP management skills**. Once the skills are in place, the various actors (firms, researchers, intermediaries) are in a much better position to gauge the cost issues and define organisation-specific IP strategies. Therefore, our recommendations very much focus on this issue.

7.3.5 IP Supports

Finally, the study has also shown that Ireland has both indirect and direct IP supports for firms in place, though there are no explicit direct IP support schemes, which is different from other countries studied that have higher IP activity levels. Firms in Ireland identified that support via tax incentives, and reduced cost would be of most use. We go on to propose in the recommendations a targeted approach to IP financial support for firms, and note here that the deployment of the Knowledge Development Box should contribute to the calls for tax incentives.

The broader innovation support system is well regarded, however, the noted visibility and ease of navigation issues exemplify in our view a lack of thrust towards common goals in the area of IP service provision. There is a case to be made to expand and boost the amount of IP support provided.

7.4 Recommendations

7.4.1 A vision for firm-centred IP policy in Ireland

The findings indicate that there is a basis for policy to help increase firm usage of IP. As set out here, it is recommended that Ireland look to steadily increase the usage of IPR with the view to deriving more economic value from knowledge generation: focusing on increasing IP filings, as well as increased usage of unregistered and informal forms of IP, without losing sight of the need to develop quality IP and not just additional IP activity. This dual focus on quality and quantity is important, as is ensuring that the right firms are targeted.

The scope of this is not all firms in Ireland, but to focus on innovation-active firms, and internationally trading firms.

***Recommendation 1:* Ireland should seek to increase IP activity across all forms of IPR, with a focus on both quality and quantity**

It is established that IP is important to economic growth and jobs, and that globally, there is a positive trend in IP use, but we see in the data that Ireland trails the innovation leaders across a range of IPRs. As such, we suggest that a positive goal for Ireland around increasing IP activity in the firm base is an important foundation for future activity.

In doing so, we recommend focusing on both quality and quantity, ensuring that not only volumes are affected. In the remainder of the recommendations, we set out how this uplift may be achieved.

***Recommendation 2:* Establish and implement a national IP statement that takes a holistic view on IP**

A national IP statement is our primary piece of advice. An IP statement is valuable in setting out a clear mandate to increase IP activities in the Irish firm base, co-ordinating the activities of support actors (currently lacking) and addressing the overall low awareness level on IP topics in Ireland. IP needs to be embedded in innovation strategy, and the IP statement will focus the

attention of the very many actors in the Irish innovation system on the topic of IP and underlines the importance of the topic for Irish policy. A properly designed IP statement provides guidance for actors in the Irish innovation system with respect to how to treat the topic of IP, starting from basic things of what should be considered IP to tackling specific issues with and courses of action concerning IP. Without such an IP statement, the risk is that the IP topic will be treated only in a patchy manner. There may also be specific sectoral strategies that a national IP statement could better integrate as well as individual strategies such as that of KTI.

We recommend that a national IP statement would form a part of the new Strategy for Science, Technology and Innovation, being integrated also into the new national enterprise strategy currently being developed. It is important to ensure that the aspirations for IP in Ireland contribute to, and are reinforced by, these broader strategies.

There are several options related to measurement of progress against the IP statement, including:

- Adding specific questions to the Irish edition of the Community Innovation Survey. As this survey is now mandatory, there is an opportunity to use it to gain broad-based insight into the IP strategies of innovation-active firms and types of IPRs utilised, as well as on-going views on barriers and mitigating factors for those identifying as non-innovation active. There is an additional opportunity to tie together R&D activity with IP output by asking specific questions around that topic.
- Update this study periodically. Repeating the quantitative data study at a later date will allow progress tracking at the macro and micro levels, though there are limitations on unregistered and informal forms of IPR that should be counteracted in other methods, such as the additional CIS questions, or a separate business survey.
- The reporting of the Knowledge Development Box presents an opportunity to track formal and registered IPRs.
- We recommend a holistic view is taken on the topic of IP by the national IP statement. This means that all forms of IPR should be tackled, from informal means to exploit IP to formal forms of IPR. As a practical consequence, topics such as knowledge transfer (at the broadest sense – from public research organisations to industry, as well as to the capture and exchange of tacit knowledge in actors and firms) or the issues surrounding copyright (fit-for purpose processes, defence and enforcement) should also be included and not seen as separate topics. This means that the IP statement should be endorsed by all key actors, including, for example, the Department of Jobs, Enterprise and Innovation, the Department of Education and Skills, Enterprise Ireland, with its leading role in promoting innovation, and Knowledge Transfer Ireland.

Finally, experience has shown that any national statement or any strategy is likely to fail if there are no steps taken for implementation and no responsibility attached to a person or institution that is to be made accountable. It is vital that the coordinating body is widely accepted by the range of relevant actors in the innovation system, and has powers to drive implementation.

We suggest that the National IP Statement be supported and implemented by a focused implementation team, which would have the IP Champion (below) as a key member.

Recommendation 3: **Create an IP Champion**

An IP Champion would form an important part of the national IP statement. He/she would interact with firms directly, focusing on promoting IP management capability in the business community and developing firms' understanding of the value of IP. The U.S. example of an 'IP Czar' may be considered as a precedent (albeit with a change of nomenclature). In this case, an IP Champion would need to be given a position of authority and resources sufficient to successfully drive the IP agenda. As part of the development of the IP Statement, further consideration of the remit, resourcing and hosting of the IP Champion function would be required, however, it is considered that, regardless of its host location, the IP Champion should work through appropriate agencies and offices of DJEI.

The IP Champion would:

- Lead promotion of IP management capability and engagement with businesses[102]
- Raise the profile of IP across a broad range of support actors and stakeholders and support on-going dialogue
- Strongly support the message of the importance of IP to the knowledge economy, economic growth and job creation.

The link between IP and innovation and also the breadth of possible IP management strategies – from formal to informal IPRs – will also be a core feature, and as such the role will be business-focused. The IP Champion role should be well branded and advertised through all agencies and actors directly engaging with businesses, with due care given to potential branding issues.

The other side of the IP Champion role is to advance the knowledge and issues across the national IP stakeholder community. We would recommend the IP Champion:

- Establishes a forum of key stakeholders (a 'stakeholder group') that meets at regular intervals to facilitate debate around topical issues and harmonisation of good practice through peer learning, while showcasing the potential value of good IP management to growth and jobs, whether through university spinoffs or overseas expansion. This would have the added benefit of continuing the work of the community of the Advisory Group of this project, while bringing in broader stakeholders – and business – with varying levels of knowledge in a continued engagement on IP. We suggest ensuring that IP remains a regular topic, with a rotating, regular series of meetings and guest talks on a variety of subjects (for example, the Unitary Patent Court, the broader Irish filing system, examinations of data trends) that encourages and facilitates a cross-fertilisation of policy and legal actors. We understand that there was a similar network previously, which provides a precedent.
- Works with firms and the HEIs to develop appropriate training options and promote this IP training to senior management and R&D management in IP-sophisticated firms and IP-sophisticated 'elsewhere' firms and indigenous firms.
- Organises and facilitates IP working groups (with participation from industry) as found in Germany.

***Recommendation 4:* Strengthen the IPR activities of central support actors in Ireland**

It is evident that there is currently no suite of public offerings dedicated to IP support, though expertise exists in pockets through the system and the broader system itself is well regarded. As such, we believe that there should be a strengthening of the IP activities of support actors in the Irish system. Direct support to firms is covered in the final recommendation presented below, detailing potential interventions and new or replacement schemes, so this recommendation covers support to the public sector actors in the IP system in terms of resourcing and types of activities.

While there are private actors, such as the legal profession, there are three main 'public' actors that have come out as potentially and actually important in the context of improved IPR service provision: Enterprise Ireland, the Irish Patents Office and Knowledge Transfer Ireland. In particular, EI and the IPO have IP-related roles that could be strengthened and improved[103]:

- We would recommend:
  - Increasing the resources to Enterprise Ireland to establish a funding scheme and surrounding support structures for micro, small and medium firms (similar to the German "SME Patent Action" scheme, more details in recommendation 5).

[102] Including initiating discussions with IP-sophisticated 'elsewhere' firms with regard to the potential opportunities for increased IP activity in the local sites in Ireland.

[103] Knowledge Transfer Ireland is newly established

- Resourcing the provision of 1:1 advice for start-ups through IP coaches, as found in Switzerland within the CTI Start-Up scheme (again, more detail in recommendation 5). This could be conducted in partnership with industry representative bodies, who would have a key role to play in sectoral activities and orientations. Indeed, further collaboration and consistent information across agencies and actors will benefit firms in general.
- Resourcing the provision of IP-audit tools and services and respective follow-ups.

- The Irish Patents Office is in many respects already a modern representation of a patents office. It is responsible for a wide range of IP topics (including copyrights), has training and awareness raising services, provides intelligence and input to policy making. However, that role could be expanded within the constraints of its statutory role. We note that the Patents Office could not engage in IP valuation or in providing funding, however, we were told information available is improvable. We recommend:
  - Adding to the basic business information on IP with national case study examples on IP usage.
  - Increasing the focus on IPR strategies in the 'Practical IP Guide', which is very much focused on single IPR tools and protection at present.
  - Increasing the resourcing to the Patent Office to further add to its information offering and to enable it to further conduct its educational activities at greater scale and frequency.

Recommendation 5: **Tailor support to different usage levels of IP**

The usage level of IP defines a typology of firms with different support needs. Four such groups have been defined[104], and this four-part recommendation specifically deals with the findings of the consultation for this study, suggesting policy interventions for each group.

- IP non-active firms: This group of firms do not use IP, either because they are unaware of the system's functioning or because they consciously decided against using IP. This group of firms is the largest of the four segments, and as such it is the group where improved promotion and business support has the best chance of delivering a step-change in the level of IP usage in Ireland. It is however, likely to be the hardest to engage and persuade about the merits of IP; there is also a need to avoid causing firms to pursue low-quality IP.
- Start-ups and new firms: Start-ups are a particularly interesting group of firms because of their need to put in place, in rather little time, all elements that are needed to run a business from scratch. This includes also properly dealing with IP, where a well-defined IP strategy can make a very real difference to a young business's growth prospects.
- IP low-active firms: These firms are IP-literate and will occasionally file for patents and other forms of IP, but are likely to contract in most IP-related services and are therefore most interested in the quality / pricing of legal services and the 'health' of the wider IP environment in Ireland. This is the group where a more open and creative approach to thinking about their IP needs, ought to improve the quality of their IP portfolio and strengthen their commercial position in key markets.
- IP-sophisticated firms and IP-sophisticated 'elsewhere' firms:
  - IP-sophisticated firms makes full use of IP already and have the capacity and skills to handle most of their IP issues internally, and are therefore most interested in the 'health' of the wider IP environment in Ireland.
  - IP-sophisticated 'elsewhere' firms represent the subsidiaries of foreign-owned multinational companies present in Ireland, but where IP activities are not located here. At the overall company level, IP is well understood and managed, however the capacity of the subsidiary located in Ireland may often be more limited in terms of advanced IP

[104] A more detailed description of the firm groups can be seen in Appendix F

knowledge. The management in these subsidiaries are key drivers in affecting change in the activities at the Irish sites, and increased IP capacity at these Irish sites offers the potential for advancing engagement in IP activities at the local level.

It is important to underline that any policy action taken should not assume that being in one group is worse than being in another group. There may be good and rational reasons to not use IP, or to use it only occasionally. Therefore, there should not be a goal of "forced changes" from one group to another. Rather, each group should be individually supported. Some supports constitute new schemes to fill gaps in the existing provision (i.e. supports that are broadly available and visible, and not residing within higher level schemes).

In terms of IP, the following behavioural characteristics and support needs can be usually observed in the four groups:

→ Recommendation 5.1: Basic awareness raising, guidance and financial support for first steps in the IP area for non-IP users.

The group of non-IP users needs to be made aware of the possibilities and caveats of using IP, in order to raise know-how levels of those not knowing anything about IP and to have the others consciously re-examine whether the choice not to use IP was a good one. Therefore, the appropriate policy action is primarily in the domain of awareness raising / capability building and IP education in all forms (workshops, talks series, sign-posting to the Irish Patents Office information online tools and information and European IPR-helpdesk[105]) and in simple IP audit tools (e.g. IP Pre-diagnosis, IP Management, IP health check questionnaires).

If a need is identified to use IP more, follow-up services should be provided, for example, like the German SME Patent Action scheme, which seems a reasonable programme to both familiarise Irish SMEs with patent issues and to drive up the number of patent filings with a quality background. The approach to subsidise the first patent and link payment of the subsidy to milestones of the patenting process (and the taking out of professional advice) has to be seen as an awareness-raising/capability-building instrument. The increase in the number of patents filed, directly attributable to the subsidy, should be seen as a nice side effect rather than the major impact. If a German-style "SME-Patent-Action" is implemented, it should be made sure that prior to taking out the subsidy a proper audit is made to ensure that no SME is coerced into taking out a patent if the patent is of no benefit to the firm. The provision of any funds to firms should be based on supporting the exploitation of their innovation efforts, and criteria for accessing funding should reflect this. An important success factor is to make these services appealing to businesses in terms of language (industry-specific) and not too loaded with legal terminology. "Why to use IP" should be the focus, and not so much the "how to protect and apply."

→ Recommendation 5.2: Basic awareness raising, guidance, financial support plus 1:1 advice on-demand for entrepreneurs, for start-ups and new firms.

Start-ups and new firms may be headed by a range of entrepreneurs ranging from those who know nothing about IP to those that have some knowledge of IP (e.g., because they work in IP-intensive sectors such as pharmaceuticals and may have been in touch with IP issues with their former employers). The (innovation policy-wise) most interesting group of high-tech start-ups will, in all likelihood, need a sound IP strategy. Yet, we find that even the knowledgeable entrepreneurs have know-how gaps. For all entrepreneurs the challenge is to cope with dealing with multiple management topics at a time, and it is usually the one problem that is most pressing in a given day that gets the attention. And this topic is mostly not IP.

The set of recommendations for policy action is the same as for the 'non-IP user group' (at least in the sense of having the same type of services available), but it should be complemented by

[105] The European IPR Helpdesk is the official IP service initiative of the European Commission providing free-of-charge, first-line advice and information on Intellectual Property (IP) and Intellectual Property Rights (IPR). The service is targeted at researchers and European small and medium-sized enterprises (SMEs) participating in EU-funded collaborative research projects. In addition it addresses SMEs involved in international technology transfer processes. This assistance is available to Irish companies and is currently signposted by entities such as the Enterprise Europe Network (EI is the national Irish coordinator of EEN).

one-to-one coaching, on demand, for promising high-tech start-ups in IP-intensive industries. A possible role model here is the Swiss CTI Start-Up programme, however there a numerous alternatives whether that is business-development focused IP 'hackathons' or various forms of peer-learning mechanisms, from one-to-one mentoring schemes commonly used by business incubators or more open-ended visit schemes, whereby entrepreneurs can visit other young businesses to learn more about how their IP strategy was used successfully to support business growth. The aim with start-ups is to make them establish early on a long-term IP strategy that is part of the general business plan.

→ Recommendation 5.3: IP-audit services and respective follow-ups for IP low-active firms.

IP low-active firms by definition will have some IP knowledge, but may look into options to optimise their use of IP. Typically, such firms are good in understanding and using a certain set of tools of the IP system, but may not have considered the potential of other IP.[106] There may be also some very specific IP problems to consider that are 'dormant' in these firms (a case in this context is for example co-patenting[107], a topic which is sometimes poorly understood by some firms).

The group of IP low-active firms are most likely not a good target group for low-level awareness raising services, as they will perceive the presented information as too basic and generalist. To understand the reasons for low usage, the best way is to provide a more tailored form of IP audits in a one-to-one manner, with the option of follow-up advice and services. These types of audits will be looking in more depth and detail at the companies under scrutiny, compared to the more simple forms such as, for example, using an online questionnaire like the UK IP Office's health-check questionnaire. The design of an IP audit that is suitable for the Irish context may be warranted.

→ Recommendation 5.4: Facilitate exchange platform and IP management education and training for sophisticated IP users and for IP-sophisticated 'elsewhere' firms.

Sophisticated IP users already use the IP system appropriately, but there may be a need for specific information for individual problems as well as inspirations regarding potential opportunities arising from IP.

Sophisticated IP users should by definition know about the craft of IP management, and will in all likelihood not need basic information. Their demand typically is for very specific issues. In many firms, the respective IP managers may not be necessarily educated patent attorneys or IP lawyers, and they may share IP responsibilities, for example, with other duties of an R&D or legal department. Against this backdrop, the companies benefit most from a) advanced IP management education offerings and b) the exchange with practitioners and IP experts from other firms. In Germany, working groups on IP, as established for example by the WTSH agency in the province of Schleswig-Holstein, have proven successful in advancing the firms competencies and IP strategies further, at intermediate or pro level. We therefore recommend that the IP Champion should take also such a facilitating function for the development of working groups, and work with the HEIs to develop specific training courses with practitioner participation on advanced IP management topics.

While multinational companies would typically be labelled sophisticated IP users, the sophisticated IP knowledge within foreign-owned multinationals does not typically reside within the Irish based. Thus with regard to the Irish base, there is a cohort of IP-sophisticated 'elsewhere' firms. The topic of IP is complex and for Irish based multinationals to participate in discussion in this area they need to have knowledge of the terminology, processes and concepts associated with IP if they are to engage with confidence. We therefore recommend that the IP

[106] For example, our evaluation of the Austrian IP audit service 'discover.IP' has shown that firms may well know the basics and rationales for patenting, but have weaknesses with respect to using Non-Disclosure Agreements. They may also not be familiar with other forms of IPR, such as designs or utility models.

[107] Co-ownership of IP between firms or organisations: firms active in the same industry, inter-industry partners, and HEIs

Champion should work with industry and the HEIs to develop specific training options to support the development of this IP capacity within the cohort of IP-sophisticated 'elsewhere' firms. We also recommend that the IP champion initiates interactions with this cohort of firms to raise the IP agenda and discuss potential opportunities in IP with these firms.

In all of the above, we suggest allowing for a feedback mechanism once interventions are implemented, to ensure that firms are able to communicate what is working and what is not. This – like the Swiss and Danish examples of on-going dialogue between support actors and recipient firms – will ensure that the supports can be reviewed and iteratively developed to best meet the needs of firms.

Finally, as tax incentives are reported very strongly as a key support that firms would see as most useful, we add here that the Knowledge Development Box will go towards addressing this.

Recommendation 6: **Bake-in IP advice / support across general business support measures as well as research and innovation supports**

The research has shown that IPR should not be perceived as a topic in isolation. For an IP policy to be successful, be it a corporate level or innovation-systems level, IPR should be regarded as an integral element of more wide-reaching business or policy considerations. While there are generic IPR issues, so to-speak "horizontal" dimensions of IPR such as with respect to general awareness on that topic, an IPR policy gets teeth if it can answer the question on what it is truly that it wants to achieve.

These "vertical dimensions" lead to sectorial questions and to innovation policy overall: In which sectors does the government want Ireland to become a leading player globally? The question for an IP policy should then identify the IP aspects in these sectors and provide for specific measures within the sectorial policies. The research has also shown that usage patterns of IP depend very much on industry and technology field, which further substantiates the need for industry-specific approaches and close ties with sectorial policies. Similarly, IP is also part of general innovation policy, and as such it should integrate itself accordingly. In the context of Ireland, this would be the (successor to the) Strategy for Science, Technology and Innovation.

"Baking in" IP policies with general (business) strategies and, consequently, respective support provided to firms also means that the IP topics will be delivered as part of general business support and by those agencies (primarily Enterprise Ireland and IDA and possibly the LEOs in the regions, for micros and small firms) that are close to the target company audiences. The concept of the "IP Coaches" that are part of the Swiss CTI Start-Up programme exemplifies this approach. "Baking in" will also mean that when funding requests for grants are examined, IP will be an item to assess the proposal against.

Recommendation 7: **Invest in widespread IP education**

A report from the Expert Group for Future Skills Needs notes the importance of intellectual property knowledge and skills as a driver of change for the trading performance of Irish firms. The low level of IP awareness among businesses can only be overcome in the long run if significant and relevant parts of the population are trained at appropriate levels on IP. There do exist pockets of education activities in third level universities in Ireland in intellectual property as part of entrepreneurship training courses. There is a role here for the Department of Education and Skills in mandating and enforcing the inclusion of such courses across the education institutions.

In the higher education sector, mandatory IP courses are lacking. This is particularly with students of engineering/natural sciences, in business schools and in the creative sector (design, music, etc.), where there would be immense benefit. This is an issue throughout Europe, and the European Commission has been championing the development of new training materials and learning experiences as part of its wider commitment to promote the development of entrepreneurship through more entrepreneurial universities. We therefore recommend integrating respective mandatory courses at undergraduate and graduate level. These should be courses that introduce the concept of IP not so much from a legal perspective, but from a business perspective.

The specific ask of the Third Level institutions includes:

- Add a module in structured PhD courses
- Add a compulsory module to relevant Bachelors and Masters courses, particularly engineering, science and design

There is also an ask of the Second Level institutions, namely:

- Include a compulsory, basic module on Business Studies courses
- Include a basic, elective module in the Transition Year

Recommendation 8: **Continue to review and provide an enabling IP environment for firms in Ireland**

Ireland has enjoyed great success during the past 20 years attracting substantial inward investment from the world's largest and most dynamic multinational firms, many of which invested originally to secure market access to Europe and to the skills base but have since increased their investment in research and innovation and are among the most frequent users of formal IP. This is an important and on-going policy focus, albeit one that is centred less on intervention.

Traditionally, advocacy for multinationals – as for example reflected in the USTR-301 report of the U.S. government – is focused, at national level, on having an enabling and unproblematic IPR system. This aspect is also an important one with regards to supporting IP activity in indigenous firms.

Such an IPR system should be "smooth running" with respect to issues such as IPR enforcement, ownership issues in collaborative (research) agreements and the like, efficient and knowledgeable courts, customs, etc.

Thus the recommendation is therefore to ensure such an enabling environment. In this respect, we recommend a continual review of the enabling environment for IP for firms in Ireland; this could include, for example, regular consultation with firms in Ireland, and/or an ongoing international comparator review as per Chapter 5 of this report. The development of the Knowledge Development Box is an important element to this, as it is clear that benefits are intended to multinationals as well as indigenous firms. Such schemes are a new innovation, the effects of which have been hardly studied yet, and are a hot topic of debate, but with similar schemes being present or developed in key competitors such as the UK and the Netherlands, it is clear that Ireland should continue this development.

7.5 Linking recommendations with actors

Figure 54 presents a list of the 8 recommendations tabulated against the key public actors in the Irish innovation ecosystem that we believe will need to be involved in progressing this agenda with enterprises.

We have not separately itemised businesses, or other stakeholders however, we recommend the relevant communities in Ireland be involved in the implementation of each recommendation, whether as consultees, delivery partners (mentoring, visits, peer learning) or beneficiaries of these various services.

The creation of a national IP Statement and assignment of an IP Champion are key recommendations, and implementation will need to be driven by the Department for Jobs, Enterprise and Innovation. Given the focus on IP as a platform for increased innovation and growth we would recommend DJEI be responsible for the establishment and implementation of the IP Statement. As part of the development of the IP Statement, further consideration of the remit, resourcing and hosting of the IP Champion function would be required. The IP Champion needs to be an experienced high-calibre individual with the authority and political skills to drive change, and will need to be supported with communications, tool development and operational activities. The IP Champion will have a key role in promoting IP management capability amongst the firm base in Ireland.

The launch of a national IP Statement and the creation of an IP Champion would improve visibility around IP and IP inter-service coordination immediately, and provide a focal point for

IP information and tool development. This will in turn provide the platform for strengthening the IP commitment and capacity of Ireland's main innovation actors and will also provide the wherewithal for those actors to bake-in IP advice to their wider service offer.

The new tools and information should build on existing resources and there is a range of material available in the public domain through various other countries' IP support services, which is freely available for re-use and modification. There is however a need to develop Ireland-specific case material, to bring to life these more generic tools.

These data, case studies and tools, would also provide the basis for extension of other business support measures and the implementation of a very much larger programme of seminars and other introductory events, to bring IP to the attention of Ireland's numerous non-users.

We see a need for an information campaign too, with a focus on the chief executives and senior management teams across all of the key actors in Ireland's research and innovation system. This would be achieved via the on going meetings and revolving topics of the broader stakeholder group to be established by the IP Champion (information updates on topical developments, e.g. around the Unitary Patent). This should also provide an opportunity to put successful businesses and programme managers in front of the senior officials to explain the benefits of IP and where it fits within their world and the bigger national innovation support jigsaw.

The other major cost item in our basket of recommendations is the design and implementation of a new national IP support measure that has several modules, beginning with a rolling programme of events to raise awareness and bring in new client businesses, a light-touch diagnostic, a needs-based subsidy for first patent filings (cf German SME Patent Action) or a more substantive programme of coaching and mentorship, as described in more detail in the course of each recommendation above.

Figure 54 Summary table of recommendations and actors

Recommendation	**Public Sector Actors**
1. Seek to increase IP activity across all forms of IPR, with a focus on quality and quantity	DJEI Enterprise Ireland IDA
2. Establish and implement national IP statement, which takes an holistic view of IP	DJEI Enterprise Ireland Irish Patent Office Knowledge Transfer Ireland Irish Patent Office LEOs
3. Create an IP Champion	DJEI
4. Strengthen the IPR activities of the central actors in Ireland	DJEI Enterprise Ireland Irish Patent Office
5. Develop tailored explicit IP supports for businesses according to different levels of IP awareness / usage (finance and guidance, information, advice and diagnostics; IP mentoring; IP exchanges; training in IP management)	Enterprise Ireland Irish Patent Office IDA HEIs IP Champion
6. Bake-in IP advice / support across management development and business support measures as well as research and innovation supports	Enterprise Ireland IDA LEOs

Recommendation	Public Sector Actors
7. Invest in widespread IP education	Department of Education and Skills Second Level: Schools Third Level: HEIs
8. Continue to review and provide an enabling environment for firms in Ireland.	DJEI

Appendix A Study Advisory Group membership

A.1 Chair

Declan Hughes	Assistant Secretary, Strategic Policy Division, Department of Jobs, Enterprise and Innovation

A.2 Members

Anne Coleman Dunne	Head of Intellectual Property Unit, Department of Jobs, Enterprise and Innovation
Dara Dunican	Programme Manager, Science Foundation Ireland
Gearoid Mooney	Divisional Manager, Research & Innovation, Enterprise Ireland
Barry Heavy	Head of Life Sciences, IDA
Alison Campbell	Director, Knowledge Transfer Ireland
Karen Hynes	Manager of New Sources of Growth Unit, Strategic Policy Division, Department of Jobs, Enterprise and Innovation
Fred Logue	Founder of NewmorningIP, representing the IP Law Committee of the Law Society of Ireland
Mark Carmody	Senior Associate, PURDYLUCEY Intellectual Property, representing the Association of Patent and Trademark Attorneys
Aidan Sweeney	Senior Policy Executive, Ibec

A.3 Research and Analysis

Elizabeth Harvey	Strategic Policy Division, Department of Jobs, Enterprise and Innovation

Appendix B Survey of firms

B.1 Survey questionnaire

	Question	Categories/options
1	*Information about your business*	
	Please provide the following information: • Your position • Name of organisation for which you are responding • Founding year of organisation (approx.)	[Free text]
	Please indicate the size of the organisation (FTE approx.)	0-9, 10-19, 20-49, 50-249, 250+
	Please indicate the ownership of the organisation	• Independent • Part of a Group If part of a group, is it Irish-owned or foreign-owned?
	Is the organisation an exporter?	• Yes No If 'yes' what is the approximate % share of turnover?
	Please indicate your industry sector	• Agri/food • Medical devices • Pharma • ICT hardware • ICT software • Business services • Financial services • Other (please specify)
2	*Innovation activities*	
	How does your organisation generate intellectual property?	• In-house R&D • External R&D • Acquisition • Not applicable • Other (please specify)

	Question	Categories/options
3	*IP protection*	
	How important are the following kinds of IP protection mechanisms to your organisation within your site in Ireland? Please rate each mechanism. *[High Importance / Moderate importance / Low importance / Not used]*	• Patent • Short term patent / Utility model • Industrial design • Trademark • Copyright • Plant Variety Rights • Geographical Indication • Trade Secret • Complexity of design (the protection mechanism here is to rely on the fact that it is too complicated to copy/re-engineer the product) • Lead time advantage (the company follows an innovation leader strategy and can ensure that the competition does not catch up)
4	Commercial benefits	
	To what extent are more formal approaches to managing IP beneficial for the following? Please rate each. *[5-point Likert scale: very beneficial to not at all, plus N/A]*	• Prevent unauthorised use of protected IP in general • Protect against copying of products or services we actually produce or offer • For marketing/signalling purposes and/or to support brands • For attracting investors • For creating bargaining power in deals/negotiations with competitors • For creating direct revenue through out-licensing • To maintain “Freedom-to-Operate”108 • Facilitate collaboration on innovation projects with other partners (competitors, academia) • Strategic purposes (e.g., to scare off the competition) • Other (please specify)
5	*Location*	
	Where does the majority of your IP protection take place?	• Ireland • EU (other than Ireland) • US and Canada • Latin Americas • Asia • Africa

108 "Freedom to operate", abbreviated "FTO", is usually used to mean determining whether a particular action, such as testing or commercialising a product, can be done without infringing valid intellectual property rights of others. (http://www.bios.net/daisy/patentlens/2768.html)

	Question	Categories/options
6	*Licensing*	
	Do you currently out-license IP?	• Yes, patent license • Yes, trademark license • Yes, know-how license • Yes, other (please specify) • No
7	*Use of external service providers*	
	What type of external service providers have you used when you have dealt with issues related to IP? Please select all that apply.	• Irish Patent Office • Other national / international patent Office • Enterprise Ireland (e.g., IP assistance scheme, advice) • Patent attorneys in Ireland • Patent attorneys abroad • Attorneys at-law (abroad/home) • Private business consultants internationally • Chambers of Commerce • Regional innovation/development agency • Other (please specify)
8	*Satisfaction with external support*	
	Please rate how satisfied you are with external (state) support available for each of the following: *[5-point Likert scale: very good to very poor, plus N/A]*	• Quality of advice and services • Consistency of advice and services • Speed / timeliness of services • Price of advice / services • Overall value for money
9	*Barriers to IP use in Ireland*	
	What are the main barriers for a more beneficial use of IP for your organisation? Please select all that apply.	• IP not relevant to our business • Unclear benefits of IP usage • Too complicated / time-consuming • Process too expensive • Costs too high • No internal capacity to manage IP • Affordability of external professional services (IP agents / lawyers) • No or little independent advice available • Not confident of ability to enforce any such IP rights • Disclosure of our principal IP is too great a risk • Other (please specify)

	Question	Categories/options
10	*Need for state help*	
	In which areas do you see the most need for state help in improving beneficial use of IP for firms in Ireland? Please rate each according to necessity. *[Necessary / Rather necessary / Rather unnecessary / Unnecessary]*	• Changes in the legal system/framework (e.g., antitrust laws, IPR laws, introduction of Community Patent or central patent court, etc.) • Advice on why to use IP • Advice on how to use IP • General quality of external support • Tax provisions or incentives • Higher availability of trained personnel • Better external legal support (quality and or quantity) • Lower costs of patenting (e.g., discounts on renewal fees) • Other (please specify)
11	*Further comments*	
	Finally, if you have a view, please briefly describe: One change you would recommend to improve Ireland's IP support The main thing that would enable Ireland's businesses to derive more commercial benefit from IP	[Free text]
12	*Further consultation*	
	The study team would welcome the opportunity to discuss your responses in a little more depth, to learn a little more about the 'how' and 'why' and to learn first hand your experiences with IP. If you would be willing to give a short interview (not more than 30 minutes), please provide us with a your contact details.	• Name • Direct telephone number • E-mail

Appendix C Interviews

C.1 Interview guidelines for firms

About the company

- Please briefly introduce yourself, your background (any IP background) and position in the company
- Please provide a brief overview of the organisations:
  - Main areas of work
  - Sector
  - Size of the company
  - Is it part of a group or individual company?
  - Export-oriented?

Motivations and barriers to using IP, management of IP in the company

- Has your organisation been exposed to the topic of intellectual property in the past couple of years?
  - If yes, in which regard? Does it generate IP?
  - Which types of IP?
- What are your main motivations for using IPR?
- Please describe shortly your existing IPR strategy and how it interacts with your business strategy. To what extent do you use IP and what is your motive of doing so?
- Please describe shortly how IP is handled/organised in your firm.
  - Own department? In-house patent attorney?
  - Whose responsibility is it in the company?
  - How is it regarded in the company (holistic approach vs separated activity)
  - [For multinationals only]: How important is Irish IP and/or the Irish IPR system for your firms?
  - How do you make the decision in which country to apply for IP protection? Is it made at the HQs or in the subsidiaries?]
- How did the way of dealing with IP change over time in your organisation?
  - What were learning effects? Anecdotes? What was changed? What still needs to be changed?
- Do you find that you/your colleagues are well equipped with knowledge of a series of tools to deal with IP and how to exploit it or do you use external advice?
  - If external advice, whom do you refer to when you have questions/problems related to IP e.g. Irish Patent Office, Enterprise Ireland, patent attorneys, private business consultants, chamber of commerce
  - For what topics do you rely on external advice?

Collaboration, access to IP

- Do you collaborate with external persons/organisations on the topic of IP?

- If yes, how do you assess the respective activities in terms of usefulness, efficiency and effectiveness?
- Does your organisation access IP from HEIs?
  - If yes,
    - *In what form e.g. collaborative activities, contract research, access to students*
    - *What were your experiences regarding such knowledge transfer? Have you experienced any problems?*
  - If not, why e.g. not needed, does not know whom to contact, seems to complicated
- Have you experienced difficulties (finance/structures) for generating / buying / licencing / protecting and maintaining IPR in general?

Access to support

- To what extent does (or could) IP / IP policy help fulfil your/your organisations mission and goals?
- What would be necessary to foster better usage of IP by yourself/your organisation, and what type of external support could help?
- Would you agree that the lack of awareness of the potential value of the various IPR types to the business is still a major barrier in Ireland?
- Are there particular barriers that could be addressed through state support?
- Could you outline one particular change that you would make in Ireland's IP support system?
- Could you outline your experiences with non-state support, such as IP lawyers, attorneys, accountants? Are there any areas that you would like to see improvements?
- Based on our preliminary survey results, there seems to be a lack of confidence regarding the enforcement of IP rights in Ireland. Are you aware of cases where a firm's rights were infringed or someone has allegedly been said to have infringed other's rights? What was the solution for such problem? Can you relate to this? What is worrying about defence?

C.2 Interview guidelines for stakeholders

About the organisation

- Please introduce yourself, your background (any IP background) and position in the organisation
- Please describe the mission and main activities of the organisation (e.g. business support, IP support) and its main customer basis
- [Applicable only to some]: Which kinds of IP support do you provide?
- To what extent does (or could) IP / IP policy help fulfil your/your organisations mission and goals? (e.g. wealth creation, inward investment offer, etc.)

Irish innovation system

- Please provide a brief account of the main players when it comes to your country's innovation system.
  - Who/which institution is particularly important and why? Performers or supporters or both?
  - How are they interrelated?
- Please discuss from your/your organisation's point of view the:
  - (i) Main strengths and

- (ii) Challenges of the innovation system in Ireland
- To what extent is the system – the full set of institutions, organisations, actors – capable to facilitate innovation?

IP support in Ireland

- Please provide a brief account of the recent changes of Irish IP-related policy issues.
  - Do you feel there are particular good examples that helped to achieve increased IP use in the firm base? Or the opposite i.e. prevented?
- What are the focal areas of Irish firms regarding IP i.e. types of IP used
- Do you feel in general that IP is viewed as integrated, or as a specialist topic to be left to IP lawyers and others by policy makers?
- What are, form your point of view, the most important problems and issues that need to be addressed in order to allow a better use of IPR by the Irish firm and research base?
  - The level of understanding of the use and benefits of IP
  - Regarding the different types of IP e.g., patents, copyrights, trademarks, enforcement, informal means to protect IP, trade secrets, licensing
  - Regarding the procedures of IP protection
  - What role should the government play in this regard
- Could you recommend policy measures / support activities to increase the use of IP in the Irish firm base?
- In your view, is there a case for a national Irish IP strategy?

Appendix D International comparators – detailed portraits

D.1 Ireland

The on-going development of Ireland's research base has changed the perception of Irish research and institutions. The investment in both individual researchers and larger scale Research Centres by Science Foundation Ireland, and investment in commercialisation by Enterprise Ireland resulted in increased quality, quantity and reputation.

There has been a great deal of attention given to various elements of Ireland's support system in recent years, from changing tax treatments to reallocation of funding for prior support structures, such as the IP Assistance Scheme, into other areas. The low levels of corporation tax and business-friendly tax regime are two very valuable and attractive elements central to the Foreign Direct Investment (FDI) offer to multinational corporations[109]. Previous IP supports have been closed in the recent past, as part of the government's broader cost saving measures but Ireland continues to prioritise support for public research and knowledge transfer. The recent decision to create the Knowledge Development Box is an important new departure, and should have the effect of lowering costs for IP.

As well as a modern legislative framework, Ireland is party to the majority of international co-operations treaties and memberships such as the EPC and TRIPS Agreement, the World Intellectual Property Organisation (WIPO), European Patent Office (EPO), European Community (EU), Office for Harmonisation of the Internal Market (OHIM), the World Trade Organisation, the Paris Convention and various WIPO-administered Treaties as well as the following:

- Patents - The Patent Cooperation Treaty, The European Patent Convention and The Patent Law Treaty
- Trademarks – The Madrid Protocol, The Community Trademark, The Nice Agreement and the Trademark Treaty
- Designs – The Geneva Act, Community Designs, The Locarno Agreement
- Copyrights – The Berne Convention, Paris Convention

Patents are protected under the 1992 Irish Patents Act, with both full (20 years) and short-term (10 years) patents able to be sought by registering an application with the IPO. There is a requirement to pay annual renewal fees (every year from the third year). A patent may also be registered at the EPO, if Ireland is designated as the jurisdiction. The Irish short-term patent is quite unique in the Anglo-Saxon world as only Australia has a second-tier patent in place. A process is currently underway to participate in the Unitary Patent System, with a local branch to be established in Dublin, which would facilitate businesses or inventors filing actions under patent law in a single court case to decide on the validity of patents throughout 25 EU Member States. This saves the need to proceed country-by-country with patent litigation, substantially reducing legal costs and time and making patenting of inventions and protection for those patents in Europe more streamlined and cost effective.

Trademarks are regulated by the Irish Trademarks Act of 1996, and Ireland is party to the EU-wide Community Trademark System. Trademarks are initially valid for 10 years if granted, and may be renewed every 10 years thereafter.

Copyrights enforcement is automatic (Irish Copyrights Act 2000), with no requirement to register a copyright. This places the emphasis of protection on the creator. Currently, creators of multimedia are more protected due to the protection of original databases and 15 years protection of unlawful copying. Some favourable elements include the presumption in legal procedures as to the originality of the work and that the plaintiff is the owner. Copyright

[109] "Next phase of FDI policy must be based on talent, technology, sectors and great places to live", DJEI

legislation is currently under review, following the Modernising Copyright review (2013), which made recommendations to streamline and simplify the processes of protecting Copyright, from undertaking the full amount of exemptions permissible in the EU, and offering early and expeditious resolution structures. Recommendations were also made for renaming the role of the IPO Controller, to reflect the broadening scope of IP, and empowering the Circuit and District Court to deal with IP issues, though some up-skilling will be required here.

Designs protection limits protection for 'must fit' and 'must match' designs. Design protection is valid for five years and may be renewed every five years for up to 25 years. There is also the unregistered design, and a parallel domestic design, though this is becoming less important and protection for a design registered in Ireland is only valid in Ireland.

The **Intellectual Property Unit of DJEI** is responsible for intellectual property laws and policies.

The **Irish Patents Office** implements the system of intellectual property registration across all registered types (patent, trademark, industrial design) though copyright is , and provides input in the drafting of certain legislation and in the formulation of policy. The website of the Irish Patents Office offers a range of brief orientation and guidance materials on uses of Intellectual Property for businesses, as well as a Good Practice Guide[110] on how to better integrate IP into business plans and strategies. There are links to a number of searchable databases for patents, trademarks and designs, though the IPO recommend taking professional assistance in doing so over self-searching. Businesses have indicated that these databases could be more user-friendly.

The IPO is active in general awareness raising and has a role with some (though not all) LEOs in Ireland, participating in introductory courses for those wishing to start a business. There is also a role for the IPO in Young Enterprise competitions through secondary schools, including an award to the entrant making best demonstrable consideration of IP in their submitted business plans.

The IPO had at the last reporting point 47 staff, including four patent examiners, 21 executive officers, and 17 clerical officers.

Enterprise Ireland offers financial support for IP, which is an eligible expenditure under the High Potential Start Up support and under the R&D grant support programme. Enterprise Ireland offers a broad range of customised support to firms, including general advice and information on the protection, technical development and commercialisation of inventions. Irish companies may be assigned a Development Advisor, who will signpost to various services offered by EI. Previous financial supports for IP, such as the IP Assistance Scheme and capped patent-filing grants have been removed.

Science Foundation Ireland (SFI) funds oriented basic and applied research in the areas of science, technology, engineering, and mathematics (STEM). SFI programmes such as the Research Centres Programme which enable collaborative engagement between Industry and Irish academic researchers include IP generation and exploitation as key objectives.

IDA Ireland provides support for RD&I operations, and used to run an R&D Fund[111].

Knowledge Transfer Ireland was established to help industry access to intellectual property generated by Ireland's public sector research performing organisations, as a recommendation of the review "Putting public research to work for Ireland". Responsibilities involve ensuring that IP is managed "in a professional way" by Irish RPOs.

The Commercial Court is a division of the Irish High Court, with all IP matters eligible for consideration under this court.

Local Enterprise Offices, providing services to start-ups and small businesses.

Indirect supports for IP are available to firms in Ireland via a variety of **tax-related measures**. The key features of the tax environment pertaining to IP include[112]:

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[110] IPO Good Practice Guide

[111] Evaluation of Enterprise Supports for RD&I

- Tax relief for capital expenditure incurred by companies on the provision or acquisition of intangible assets for the purpose of trade.[113]
- Credit for foreign royalty income.
- Withholding tax on patent royalty payments.
- Stamp Duty – Exemption: Transfers of IP; e.g. trademarks, patents and any goodwill directly attributable to such intangible assets, are exempt from stamp duty in Ireland.

Recent changes to the IP support system include the closure and re-assignment of some funding from the IP Assistance Scheme and the closure in 2011 of the Patent Royalty Exemption Scheme, under which there was a capped corporation tax incentive and an income tax incentive.

There is **no distinct national strategy for IP**, though R&D is a major component of national strategies of the recent past, including the Strategy for Science, Technology and Innovation 2006-2013, which included a target for growing BERD. Evidence suggests that progress was made in this area – increasing €0.6bn 2003-2011 as well as a percentage of GNP (up to 1.4% in 2010), research reputation developed in disciplines of relevance to Ireland's industrial base, with concomitant upturns in related FDI and support to indigenous firm in-house R&D). The National IP Protocol, published in 2012, sets goals for increasing the technology and knowledge transfer from publicly funded research, and sets goals for simplification in the process (such as guidance and template agreements). The latest Annual Knowledge Transfer Survey highlights some progress in this, though it focuses on public research organisations.

D.2 Denmark

Denmark is known to be very active in terms of providing support to businesses in the IP area. The Danish patents office has developed a range of tools and services, such as; i) the IP Score tool, a tool that helps firms establish the value of their IPR or ii) a marketplace for licensing technologies, more tailored to Danish needs than the pan-European EEN offering.

The Danish legislative framework for IP is to a large extent based on international law and the Danish Patent Office (DKPTO) actively participates in international IPR forums and co-operations to help shape IPR legislation internationally, also allowing the interests of Danish businesses to be taken into account.

In terms of tax support, costs relating to the purchase of patents and know-how (including rights / licences to utilise patents or know how) may either be fully expensed in the year of acquisition or amortised over a seven-year period. For each of the tax incentives / reliefs described here the same is applicable to R&D performed outside of Denmark by a Danish company as well as any resulting IP that resides outside of Denmark.

Denmark does not have a national IP strategy / policy. However, since 2007 they have launched a variety of tools and websites to facilitate Danish companies' use and understanding of IPR. The DKPTO also has an Enterprise Policy Unit, which provides analysis and input on policy development to the Danish Government, implements policy initiatives such as the IP Trade-Portal, works to place IPR on the general agenda of growth and innovation and explores how IPR can be used to increase growth and the ability to innovate in enterprises.

The **DKPTO** is part of the **Danish Ministry of Business and Growth** and is the national IPR competence centre for information regarding IPR and the protection of technology and know-how. The DKPTO is responsible for intellectual property laws and policies in Denmark and implements the system of intellectual property protections across all formal types. The DKPTO has a strong role, and is 100% financed through fees and services. It is responsible for all IP topics except copyrights (but feels comfortable in addressing the topic with tools and in consulting/advice); it issues Patents and Industrial designs and registers Trademarks to assist businesses in expanding their innovation capacity. The DKPTO strives to be a centre for

[112] R&D tax credits are not considered here as we distinguish between support for R&D and specific support for IP

[113] Section 291A of the Taxes Consolidation Act 1997 – as amended by the Finance Act 2012.

strategic information and to protect the rights of both techniques and business marks to secure an efficient system for the protection of IP rights at reasonable costs.

The DKPTO has 200 staff, of which at least 30% are not in administration or examination, and offers a range of services by DKPTO include:

- Organisation for awareness raising measures and initiatives
- Diagnostic and valuation tools
- Training sessions and seminars to discuss IPR issues and policy
- Legal and other assistance in licencing negotiation.

In relation to diagnostic and valuation tools the DKPTO website offers users free access to a number of databases with Danish Patent, Trademark and Industrial designs (PVSonline) in addition to access to a searchable database (TMView) available online where trademark registers of the official Intellectual Property Offices of the European Union (this database currently contains databases from OHIM, WIPO, the UK, Czech, Italian, Benelux, Portuguese and Danish IPO's, a further 8 European offices are due to be added to this database over the coming months).

The website also has 4 further tools available as well as an online filing for validation of an EP patent, registering a trademark and filing a patent (Danish only for patent filing). These tools include:

- IP Survey – a customised database for searching patent information through which you can set up a profile with DKPTO covering the areas of technologies for which you wish to maintain a regular surveillance to enable you to monitor the patent activity of your competitors.
- IP Response – an online management tool, freely available, which users can use to test their company's work with IP. During the online assessment, the user works through 20 questions concerning various aspects of their work with IPR. Based on the answers to these questions a report is generated with an overview of the user's company's efforts and results and tips with how you can be improved further.
- IP Marketplace – a freely accessible online tool where buyers and sellers can look for trading partners and other kinds of partnerships. At IP Marketplace, patents, patent applications, utility models, design and trademarks can be put up for sale or out-licencing. The marketplace can also be used when searching for IP rights to buy or in-licence or when you are looking for partners for innovation projects that build on patentable knowledge. There is some acknowledged difficulty with this in terms of demand.
- IP Trade Portal – a complete guide to trading IP rights. The freely accessible online portal provides guidance on reducing costs, increasing returns and generating additional sales from trading patents, trademarks, utility models and designs.
- The DKPTO also runs a 'stop counterfeiting' programme, and has a policy to continually develop new tools and more direct SME contact.

In this context, the DKPTO has been very active in commissioning research on the use of IP by Danish innovators and on various IP topics. This research also informs the office when developing and improving existing services. For example, through a series of research initiatives, it was shown that Danish SMEs could be classified into four clusters: "IP Rookies", which are often family owned SMEs operating domestically with rather little use of IP. "IP dealers" differ from the rookies in that they have some level of expertise. "IP Strategic" denotes firms that are already IP aware and active, however with rather little internal capacity to handle IP; rather decentralised organisations with a high share of technically/scientifically educated staff. The final cluster is "IP Strategic Dealer", which are firms that have both know-how and in-house expertise, and are usually internationally- and growth-focused firms. These four classes have been further analysed in terms of their activity characteristics, and, following that, three types ("circles") of IP support services have been developed to target specific company profiles.

Denmark also has an **Invention Centre** based at the **Danish Technological Institute**, which assists Danish private investors, scientists and SMEs in all phases of their invention

activities. The assistance provided receives funding from the Danish Ministry of Science, technology and Innovation and includes the following activities:

- A hotline for researchers, private inventors and entrepreneurs, offering advice in all phases of the process of commercialising new ideas.
- Web-based toolbox for Danish researchers, inventors and entrepreneurs consisting of 'dos' and 'don'ts', FAQ's, evaluation and assessment checklists, checklists for licensing, model contracts and secrecy agreements.
- Collective information and awareness activities for groups of researchers, inventors and entrepreneurs including e-mail newsletters on topics like IPR, prototype technology, licensing and thematic conferences in selected areas.
- Courses for researchers, SMEs and inventors

Denmark also participates in the Global Patent Prosecution Highway (PPH) programme pilot arrangement, which involves offices from 17 other countries. This pilot allows patent applicants to request accelerated examination at any of the offices involved in the pilot if their claims have be found to be acceptable by any of the other offices involved in the pilot. The Patent Prosecution Highway is a framework in which an application whose claims have been determined to be patentable in the Office of Fist Filing is eligible to go through an accelerated examination in the Office of Second Filing with a simple procedure upon an applicant's request.

The 'ministerial network against IPR infringements' was formed in 2009 by ten government authorities and is hosted by the Danish Patent and Trademark Office. It works as an umbrella network supplemented by a number of subordinate, issue-specific networks. It aims to improve collaboration between its members, ensure dialogue between government authorities and the business community, promote knowledge and action on IPR infringements and follow up on initiatives to strengthen the efforts against IPR infringements.

Other players in the Danish system include the Danish Technological Institute, with their own 'innovation and IPR' department that assists not only researchers but also firms to commercialise their ideas. The Start-Up platform 'Startvaekst.dk' offers information on IPR and links also to the DKPTO.

D.3 Germany

The publicly-funded system to support the take-up of IP by the German firm base rests, at the federal level, on two main pillars: on the one hand, the SIGNO programme of the German Federal Ministry of Economics and Innovation (BMWi). The SIGNO programme is the central pillar with measures particularly in awareness-raising, funding schemes for the registration of IP and commercialisation of research results. On the other hand, there is the network of patent libraries that provides advice and search services in IP and patent databases. There is no national patent or IP policy, although there are some remarks with respect to IP in the national 'high-tech' strategy.

Interestingly, the German patent office (DPMA) – which is subordinated to the German Ministry of Justice – has only a small role to play in the actual provision of services to users such as SMEs or researchers. Its legal mandate is *"…to grant and administer Industrial property rights and provide information on industrial property rights effective in Germany."* In practice, this means that the DPMA has not the legal possibility to service and support SMEs directly, although it tries to maintain a role in this context by reaching out to organisations such as the patent libraries, teaching them how to search in DPMA databases or by conveying information on support services concepts and IP consulting tools to which the DPMA has access through international networks of IP and patent offices.

The major player in IPR support for industry and research is the BMWi and its SIGNO programme. The programme has been in existence since 1996 and has been modified only slightly since then. It has three major programme tracks:

- SIGNO Higher Education: This scheme aims at science industry collaboration and supports respective technology transfer endeavours. Supported undertakings are projects that aim to exploit IP developed in universities. 70% of project costs are funded up to a ceiling of € 42,000 per undertaking. Undertakings are either single projects/technologies that are to be

commercialised ('Verwertungsprojekte') or are strategic undertakings to improve commercialisation activities of the universities as a whole. 'SIGNO Higher Education' draws for its execution on 22 PVAs ('Patentverwertungsgenturen') that have been established for the 350 HEIs in Germany and act very much like external technology transfer offices (TTOs).

- SIGNO Enterprise: The Enterprise scheme addresses industry, and here – through its main tool the SIGNO SME patent action – SMEs. The SME patent action is basically a subsidy of up to € 8,000 for the first patent application of a firm. The aim of the scheme is not so much to lower the cost barrier for SMEs, but to raise awareness on how to correctly use the tool of a patent. Payment of the subsidy is done in five instalments that are linked to certain parts of the patenting process and the mandatory involvement of professional advice in these steps, i.e. through patent attorneys. The money thus acts only as 'carrot' for the provision of consultancy services. There is no other financial incentive for IP offered at federal level, although a 'patent box' regime is currently under consideration. Besides the SME patent action, the SIGNO Enterprise Scheme entails also two standards/guides, one on how to value patents and one on how to conduct searches in patent databases. The guides have been implemented, as one of the few tools in SIGNO, rather recently.
- SIGNO Inventors: The last schemes aims at private inventors. It comprises mainly a first free-of-charge consultation with an expert to value an invention and advise on possible next steps for commercialisation. The duration of this consultation is at most four hours. In addition to this free offer, 'SIGNO inventors' organises also a yearly prize/competition for children who have invented something.

Actual implementation of the SIGNO scheme, particularly the SIGNO Enterprise scheme, is done in a decentralised manner through regional network partners that have to qualify as SIGNO partners. SIGNO partners can be regional funding/development agencies, chambers of commerce or regional certification organisations such as the TÜV Rheinland (which would also offer services like the NCT in Ireland). This particular set-up entails that the SIGNO offerings are used in regionally different ways as an addition to an existing portfolio of other services, which could or could not be in the IPR domain.

Many organisations that are SIGNO partners – however, not all of them – are also members of the second most important network for the provision of IPR support in Germany, the network of patent libraries. Patent libraries are in fact a very old institution in Germany, some dating back to the late 19th century. They were established as physical reading rooms for patent literature so that potential readers would not need to travel all to the central DPMA premises. Many such libraries were established as add-ons to university libraries. Modern technology has of course made this original function obsolete. However, the centres developed further and now offer value-added search services, IPR advice or training, too, sometimes on commercial basis and sometimes on a for-free basis. However, each patent library works somewhat differently and has a different portfolio of activities and pricing schemes.

This particular set-up of two overlapping networks of regional service providers is a result of the federal set-up of Germany. It also entails that the regions can and do enrich their agencies (SIGNO partners and/or PATLIB centres) with additional regional support schemes in the field of IPR. For example, some federal states also offer additional financial support for the filing of IP and in particular patents (not necessarily limited to the first patent), while others do not have such schemes.

Eventually, this means that a firm in Germany will be, depending on the region, confronted with very different types of and capabilities of service providers in the field of IPR (and hence also some heterogeneous quality of such services, despite of quality assurance mechanisms in place in the two individual networks).

Support service providers such as the SIGNO network or the patent libraries are by comparison of secondary importance, however far from irrelevant. In our practice we found several examples where SMEs formed associations or collaborated in working groups organised by chambers or regional funding agencies on patenting matters.

With respect to the SIGNO patent action, there were some 4,000 SMEs funded between 2008 and 2013, which would correspond to around 670 supported SMEs per year. This figure has

been rather constant since the early 2000s. With respect to PATLIBs, there are no aggregate user statistics available. Of the two networks, only the SIGNO network has been subjected to regular reviews. The latest one took place in 2014 and came to the following main conclusions:

- The evaluation found it difficult to conclude whether the SME patent action has succeeded in reaching out to its intended target group, because only a small share of all SMEs in relevant industries where R&D takes place are actively patenting. However, it noted a 'constant good demand' for the measure.
- Many applicants (around one third) are actually start-ups which where founded only a short time before funding from SIGNO was applied for. The firms found the costs associated with patenting and the administrative burdens to be particular barriers to the use of patents.
- The main reason for applying for funding was access to funds. However, satisfaction with this aspect was not that great. Satisfaction with the non-monetary aspects was greater; around 50% of the SMEs would not have dealt with IP topics at all if it were not for the support measure. The measure succeeded in increasing awareness on IP topics.

The overall conclusion for Germany would be that Germany has a well-established support structure in place for its industry to support firms on IP matters. The individual measures are for the most part well and cleverly designed, and the SIGNO SME action has a track and performance record to show.

Nonetheless, there are also conceptual drawbacks:

- The federal character of the German support system creates heterogeneity also with respect to the type of support provided. There is at least anecdotal evidence that SMEs are not well forwarded to other service providers across the border of individual federal states, even if certain competencies and services are stronger in one state compared to another.
- The network of patent libraries receives somewhat less attention from policy, and its needs, strengths and weaknesses are less known. There is at least some anecdotal evidence that indicates that some PATLIBs are actually sub-critically funded and find it hard to perform according to their mission.
- The support system in place is – despite efforts in the advice and complementary consulting – very much focussed on patents. It seems to fall somewhat short of supporting adequately other forms of IP and, hence, industries that rely on such IP: copyright industries, design industries, i.e. the creative industries. This would include also the software industry.
- In general, there is too little attention possibly provided on general IP management aspects and skills. In this context, we have heard in many interviews – as in other countries – that the higher education sector has been to date falling short of providing adequate mandatory training on IP for students in business and engineering schools. This has, in the long-term, much higher impact on IP awareness than support provided directly to firms.

Germany's industrial heritage endows it with a culture of respect for IP, with stricter laws against copying, for example, than in some comparators. Germany's courts take IP rights very seriously, and the costs of exercising rights for owners are much less expensive that Ireland.

D.4 Singapore

Recently, Asia and more notably East Asia has been emerging as a new hotbed for IP activities overtaking North America and Western Europe in the amounts of applications filed under the Patent Cooperation Treaty (PCT). These developments have pushed Singapore to position itself as a Global IP Hub in Asia and play a facilitative role for regional and international transactions offering a neutral and trusted platform in supporting the development fort growth. Additionally, Singapore has a world-class legal and financial infrastructure, high quality workforce and strategic geographical location that provide a good cradle and base for establishing itself as a strong global player[114].

[114] Intellectual Property (IP) Hub Master Plan – Developing Singapore as a Global IP Hub in Asia, 2013

The leading governmental body for IP related issues is the **Ministry of Law**. The **Intellectual Property Office of Singapore (IPOS)** is the main agency responsible for IP laws and policies. IPOS provides intellectual property protection across all formal types, including patent, trademark, industrial design and copyright. As a statutory organisation under the Ministry of Law, IPOS main role is to advice ad administer the IP regime, support various stakeholders, as well as to promote the usage of IP and to develop further expertise.

IPOS strives to reach out to and deliver its services for:

- Businesses, IPOS continues to provide tools and information to enable them to create, own, protect and profit from their ideas and knowledge.
- IP professionals, IPOS seeks to upgrade their technical know-how and expertise, as well as provide opportunities for IP professionals to network and exchange views with IP thought-leaders around the world.
- International stakeholders, IPOS strives to further its cross-border IP cooperation so as to provide a strong and connected IP system for creators.
- IPOS also reaches out to a wide array of audiences including the general public, government, and the youth, to educate them and raise IP awareness.

The scope of services that IPOS undertakes is quite vast. Companies can submit their applications for patents, trademarks, designs and plant varieties protection. Businesses who chose to file their IP and develop their IP management strategies can benefit from different available schemes, including:

- IP Management (IPM) for SMEs – grants that support small and medium enterprise for increasing their business competitiveness under the guidance of IP consultants
- Productivity and Innovation Credit Scheme – an option that allows cost savings in the form of Cash Payout and / or Tax Deductions for the registration of Patents, Trade marks, Designs and Plant Varieties, or for acquisition of IPR. The tax deduction is granted to up to 400% on amounts of $400,000 of company's spending each year, whereas cash payouts are converted up to $100,000 of the total spending into a non-taxable cash payout instead of claiming tax deduction.
- IP Financing Scheme
- Global Company Partnership (GCP)

In order to secure its place as an IP Hub, the Singapore government established an **IP Hub Masterplan** in 2013, to guide Singapore's development over a 10-year plan. It includes 14 initiatives to achieve this with 3 areas of focus. More specifically, those initiatives are grouped as IP transactions and management, quality IP findings and IP dispute resolution.

There are a number of elements of good practice in Singapore:

Embracing IP is a new campaign run by IPOS that tries to get IP-related work closer to the end users through three key thrusts:

- Enabling local business through IP – this helps IPOS to reach their consumers through numerous innitiatives and programmes such as IP Financing Scheme. IPOS has lunched a new one-stop ervice centre IP 101 that has been dedicated to help businesses access a full suite of IP
- Growing Singapore-based business with IP – this path helps businesses that seek to venture overseas to learn more about IPOS' suite of patent agreements that have been established both regionally and internationally. A good example is ASEAN Patent Examination Cooperation (ASPEC) that is a regional patent work sharing programme.
- Respecting and Caring with IP – as a driver of social growth and community improvement, IP needs to gain its place in the community. IPOS is determined to bring closer initiatives such as World IP Day and promote examples like partnership with the Singapore Association for the Visual Handicapped (SAVH)

Patent Application Fund (PAF) is a package that provides financial assistance for covering the costs (or part of it) of patent applications, from drafting to filing. Through this initiative that was established in 1992 by Singapore National Science and Technology Board (NSTB), IPOS tries to encourage SMEs and individuals to formally apply for the protection of IPR. PAF was believed to have greatly contributed to the increase in patent applications from 145 (1995) to 516 (2000).

SurfIP Marketplace was introduced by IPOS as a platform enabling IP owners, potential buyers and sellers and licensees to come together and commercialise IP assets

IP Academy aims to be a leading centre of excellence for executive IP education and thought leadership development, as well as a world-class resource for the development of knowledge and capabilities in the protection, exploitation and management of IP. There are two key strategies underpinning IPOS work and the first one looks at developing practical IP training and educational courses for IP professionals, business managers and leaders, inventors and creators. The second supporting strategy acts towards conducting a range of IP thought-leadership programmes including multi-disciplinary research into IP and related areas, as well as organising high-level conferences and roundtables. Within their resources, IPA has a IP Academy Knowledge Centre that acts as a specialised information and knowledge resource centre focused on the intellectual property. The collection go the IPA Academy Knowledge Centre contains all aspects of IP law across various jurisdictions, key texts, periodicals, reference materials, primary legislation and case reports.

IPOS-International is an international arm and a member of IPOS family that acts in capacity to internationalise Singapore's IP services and help realise IPOS' aims towards becoming the IP Hub of Asia. The work is delivered by collaborating with partners from both public and private sector. Some of the services involve Asian-based patent search and evaluation services, professional training for emerging markets and IP management consultancy.

IP ValueLab aims to help businesses unlock the value if their intellectual property so as to realise IPOS vision of becoming an IP Hub of Asia. The main work focuses on providing businesses with a suite of solutions in IP management, valuation and monetisation, including initiatives such as IP Financing Scheme and promoting best practices.

IDA Singapore provides support in the info-communications aspects.

Appendix E Supporting data

E.1 Survey data tables, by question

Generation of intellectual property

Overall

How does your organisation generate intellectual property? Please tick all that apply.		
Answer Options	**Response Percent**	**Response Count**
In-house Research and Development	86%	103
External Research and Development	30%	36
Acquisition	17%	21
Not applicable	12%	14
Other (please specify)	0%	0
	answered question	**121**
	skipped question	7

By ownership

		In-house R&D	**External R&D**	**Acquisition**	**Not applicable**	**Total**
Independent		94%	33%	10%	5%	78
Part of a group	Foreign-owned	75%	18%	36%	21%	28
	Irish-owned	67%	42%	17%	25%	12
					Answered question	118

By sector

	In-house R&D	**External R&D**	**Acquisition**	**Not applicable**	**Total**
Agri / food and drink	88%	63%	13%	13%	8
Business services	89%	22%	11%	11%	9
Financial services	100%	0%	25%	0%	4
ICT hardware	100%	50%	25%	0%	12
ICT software	96%	12%	19%	4%	26
Manufacturing	44%	11%	22%	56%	9
Medical devices	79%	37%	11%	16%	19
Other	92%	33%	17%	4%	24
Pharmaceuticals	86%	57%	29%	0%	7
				Answered question	118

By firm size

	In-house R&D	**External R&D**	**Acquisition**	**Not applicable**	**Total**
0-9	93%	34%	10%	3%	29
10-49	89%	27%	14%	11%	37
50-249	76%	27%	16%	19%	37
250+	94%	38%	44%	6%	16
				Answered question	119

By firm age

	In-house R&D	External R&D	Acquisition	Not applicable	Total
5 or less	100%	46%	31%	0%	13
6 to 10	91%	31%	19%	6%	32
11 to 20	87%	26%	11%	13%	38
21 to 50	78%	33%	22%	17%	18
51 plus	60%	40%	20%	20%	5
				Answered question	106

Use of IPRs

Overall

How important are the following kinds of IP protection mechanisms to your organisation within your organisation? Please rate each mechanism.					
Answer Options	**High importance**	**Moderate importance**	**Low importance**	**Not used**	**Response Count**
Patent	57	16	14	24	111
Short term patent/Utility model	13	19	22	50	104
Industrial design	21	33	17	34	105
Trademark	34	42	15	16	107
Copyright	29	36	18	25	108
Plant Variety Rights	4	9	16	73	102
Geographical Indication	8	17	20	54	99
Trade Secret	47	26	9	25	107
Complexity of design	30	43	10	22	105
Lead time advantage	33	43	12	17	105
				answered question	**112**
				skipped question	**16**

By ownership (high and medium importance)

		Patents	Short-term patents	Industrial design	Trademark	Copyright	Plant Variety Rights	Geographical Indication	Trade Secret	Complexity of design	Lead time advantage	Total
Independent		69%	31%	55%	66%	61%	14%	25%	73%	75%	76%	63-74
Part of a group	Foreign-owned	62%	38%	42%	81%	62%	8%	27%	65%	65%	69%	26
	Irish-owned	55%	10%	50%	82%	50%	20%	20%	45%	45%	55%	10-11
											Answered question	99-111

By sector (high and medium importance)

	Patents	Short term patent	Industrial design	Trademark	Copyright	Plant Variety Rights	Geographical Indication	Trade Secret	Complexity of design	Lead time advantage	Total
Agri / food and drink	83%	50%	67%	100 %	83%	17%	17%	50%	67%	67%	6
Business services	33%	13%	13%	71%	78%	11%	25%	25%	38%	50%	7-9
Financial services	75%	50%	25%	75%	100%	0%	50%	50%	50%	75%	4
ICT hardware	92%	36%	75%	55%	58%	9%	9%	100 %	100 %	73%	11-12
ICT software	50%	29%	26%	58%	63%	4%	22%	67%	83%	79%	23-24
Manufacturing	63%	43%	43%	63%	38%	14%	14%	43%	29%	43%	7-8
Medical devices	76%	27%	81%	76%	63%	21%	31%	88%	82%	82%	15-17
Other	61%	23%	64%	82%	50%	23%	33%	68%	64%	81%	21-23
Pharmaceuticals	100 %	50%	50%	86%	50%	0%	40%	86%	67%	67%	5-7
										Answered question	100-112

By firm size (high and medium importance)

	0-9	10-19	20-49	50-249	250+
Patents	82%	73%	65%	39%	87%
Short term patents	38%	21%	33%	16%	53%
Industrial Design	59%	36%	47%	43%	73%
Trademark	67%	93%	61%	63%	87%
Copyright	54%	71%	68%	56%	60%
Plant variety rights	15%	0%	11%	13%	21%
Geographical indications	31%	8%	28%	23%	29%
Trade secret	81%	67%	56%	56%	87%
Complexity of design	85%	71%	50%	66%	73%
Lead time advantage	77%	57%	67%	72%	87%
Total	26-28	13-15	18-20	30-33	14-15
				Answered question	102-111

By firm age (high and medium importance)

	5 or less	6 to 10	11 to 20	21 to 50	51 plus
Patents	77%	75%	50%	40%	40%
Short Term Patents	38%	22%	20%	20%	40%
Industrial Design	46%	53%	33%	45%	80%
Trademarks	62%	63%	65%	55%	60%
Copyright	62%	59%	48%	40%	60%
Plant Variety Rights	8%	9%	3%	15%	20%
Geographical Indications	38%	19%	15%	25%	0%
Trade Secrets	69%	72%	60%	45%	60%
Complexity of Design	85%	72%	53%	55%	40%
Lead Time Advantage	77%	78%	53%	60%	60%
Total	13	32	40	20	5
				Answered question	110

Motivation to use formal IPRs

Overall

To what extent are more formal approaches to managing IP beneficial for the following? Please rate each.							
Answer Options	**5 - very beneficial**	**4**	**3**	**2**	**1 - not at all**	**N/A**	**Response Count**
Prevent unauthorised use of protected IP in general	45	24	15	6	2	15	107
Protect against copying of products or services we actually produce or offer	43	27	12	9	3	13	107
For marketing / signalling purposes and / or to support our brands	26	39	13	9	1	13	101
For attracting investors	38	22	10	8	9	17	104
For creating bargaining power in deals / negotiations with competitors	28	19	26	8	7	15	103
For creating direct revenue through out-licensing	17	13	20	21	13	19	103
To maintain "Freedom-to-Operate"	23	24	18	14	7	16	102
To facilitate collaboration on innovation projects with other partners (competitors, academia)	18	27	25	11	6	16	103
For strategic purposes (e.g. to scare the competition off)	31	28	15	9	5	14	102
Other	5	2	0	3	0	23	33
						answered question	**108**
						skipped question	**20**

By ownership (very beneficial)

		Prevent unauthorised use	**Protect against copying**	**For marketing / signalling**	**For attracting investors**	**For creating bargaining power in deals**	**For creating direct revenue through out-licensing**	**To maintain "Freedom-to-Operate"**	**To facilitate collaboration on innovation projects**	**For strategic purposes (e.g. to scare the competition off)**	**Total**
Independent		46%	46%	28%	51%	32%	22%	30%	21%	37%	67-71
Part of a group	Foreign-owned	42%	38%	23%	13%	17%	4%	9%	9%	18%	22-24
	Irish-owned	18%	9%	18%	0%	20%	9%	9%	18%	22%	10-11
										Answered question	101-106

By sector (very beneficial)

	Agri / Food and drink	Business services	Financial services	ICT hardware	ICT software	Manufacturing	Medical devices	Other	Pharmaceuticals
Preventing unauthorised use of protected IP in general	33%	25%	100%	33%	22%	33%	59%	41%	100%
Protecting against copying of products or services we actually produce or offer	33%	25%	75%	33%	30%	29%	59%	38%	71%
For marketing / signalling purposes and / or to support our brands	33%	13%	33%	36%	13%	17%	44%	30%	17%
For attracting investors	17%	25%	50%	64%	30%	0%	47%	30%	71%
For creating bargaining power in deals / negotiations with competitors	0%	14%	25%	36%	13%	29%	35%	42%	43%
For creating direct revenue through out-licensing	17%	0%	33%	8%	14%	29%	6%	35%	14%
To maintain "Freedom-to-Operate"	17%	0%	0%	27%	18%	17%	24%	30%	57%
To facilitate collaboration on innovation projects with other partners	0%	14%	50%	25%	9%	17%	12%	32%	14%
For strategic purposes (e.g. to scare the competition off)	33%	14%	50%	42%	10%	17%	41%	35%	57%
Total	6	7-8	3-4	11-12	21-23	6-7	16-17	19-22	6-7
Answered question					100-106				

By firm size (very beneficial)

	0-9	10-19	20-49	50-249	250+
Prevent unauthorised use of protected IP in general	59%	43%	28%	27%	64%
Protect against copying of products or services we actually produce or offer	50%	43%	35%	21%	71%
For marketing / signalling purposes and / or to support our brands	35%	21%	19%	19%	42%
For attracting investors	67%	43%	19%	19%	36%
For creating bargaining power in deals / negotiations with competitors	54%	21%	6%	13%	36%
For creating direct revenue through out-licensing	26%	14%	13%	10%	21%
To maintain "Freedom-to-Operate"	22%	29%	27%	13%	36%
To facilitate collaboration on innovation projects with other partners (competitors, academia)	30%	14%	13%	10%	21%
For strategic purposes (e.g. to scare the competition off)	37%	29%	29%	14%	57%
Total	26-28	14	15-18	12-14	29-33
Answered question					100-106

By firm age (very beneficial)

	5 or less	6 to 10	11 to 20	21 to 50	51 plus
Prevent unauthorised use of protected IP in general	58%	52%	24%	38%	33%
Protect against copying of products or services we actually produce or offer	58%	48%	21%	38%	33%
For marketing / signalling purposes and / or to support our brands	27%	27%	16%	40%	33%
For attracting investors	67%	43%	30%	13%	0%
For creating bargaining power in deals / negotiations with competitors	25%	33%	18%	21%	0%
For creating direct revenue through out-licensing	9%	20%	9%	20%	0%
To maintain "Freedom-to-Operate"	17%	38%	9%	20%	0%
To facilitate collaboration on innovation projects with other partners (competitors, academia)	25%	23%	6%	14%	0%
For strategic purposes (e.g. to scare the competition off)	36%	39%	16%	27%	33%
Total	11-12	29-31	32-34	15-16	3
				Answered question	91-96

Location of protection

Overall

Where does the majority of your IP protection take place?		
Answer Options	**Response Percentage**	**Response Count**
Ireland	66.7%	70
EU (other than Ireland)	58.1%	61
US and Canada	52.4%	55
Latin America	2.9%	3
Asia	15.2%	16
Africa	0.0%	0
	answered question	**105**
	skipped question	**23**

By ownership

		Ireland	EU	US and Canada	Latin America	Asia	Africa	Total
Independent		71%	66%	57%	3%	13%	0%	70
Part of a group	Foreign-owned	33%	42%	58%	0%	29%	0%	24
	Irish-owned	90%	30%	10%	0%	0%	0%	10
							Answered question	104

By sector

	Ireland	EU	US and Canada	Latin America	Asia	Africa	Total
Agri / food and drink	100%	50%	50%	17%	17%	0	6
Business services	100%	38%	13%	0%	0%	0	8
Financial services	100%	50%	25%	0%	0%	0	4
ICT hardware	67%	92%	83%	0%	42%	0	12
ICT software	57%	43%	57%	4%	22%	0	23
Manufacturing	50%	67%	33%	0%	17%	0	6
Medical devices	44%	44%	75%	0%	6%	0	16
Other	77%	64%	41%	0%	14%	0	22
Pharmaceuticals	77%	64%	41%	0%	14%	0	7
						Answered question	104

By firm size

	Ireland	EU	US and Canada	Latin America	Asia	Africa	Total
0-9	75%	71%	54%	0%	7%	0%	28
10-49	69%	59%	53%	3%	28%	0%	32
50-249	70%	47%	33%	3%	10%	0%	30
250+	36%	50%	93%	0%	14%	0%	14
						Answered question	104

By firm age

	Ireland	EU	US and Canada	Latin America	Asia	Africa	Total
5 or less	67%	83%	50%	0%	0%	0%	12
6 to 10	73%	60%	63%	3%	17%	0%	30
11 to 20	65%	55%	52%	3%	16%	0%	31
21 to 50	69%	50%	44%	0%	19%	0%	16
51 plus	50%	25%	50%	0%	0%	0%	4
						Answered question	93

7.5.1 Out-licencing of IP

Overall

Do you currently have an out-licence IP?		
Answer Options	**Response Percentage**	**Response Count**
Yes, patent licence	23.0%	23
Yes, trademark licence	10.0%	10
Yes, know-how licence	7.0%	7
Yes, other type of licence (please specify below)	3.0%	3
No	66.3%	69
Other (please specify)		3
	answered question	**104**
	skipped question	**24**

By ownership

		Yes, patent licence	Yes, trademark licence	Yes, know-how licence	Yes, other type of licence (please specify below)	No	Total
Independent		25%	4%	7%	3%	65%	71
Part of a group	Foreign-owned	17%	21%	8%	4%	63%	24
	Irish-owned	9%	18%	0%	0%	73%	11
						Answered question	106

By sector

	Yes, patent licence	Yes, trademark licence	Yes, know-how licence	Yes, other type of licence (please specify below)	No	Total
Agri / food and drink	17%	17%	17%	0%	67%	6
Business services	0%	0%	0%	0%	100%	9
Financial services	0%	0%	0%	25%	50%	4
ICT hardware	45%	9%	9%	0%	55%	11
ICT software	8%	8%	0%	8%	71%	24
Manufacturing	14%	29%	0%	0%	57%	7
Medical devices	24%	6%	0%	0%	76%	17
Other	29%	10%	14%	0%	57%	21
Pharmaceuticals	67%	17%	33%	0%	17%	6
					Answered question	105

By firm size

	Yes, patent licence	Yes, trademark licence	Yes, know-how licence	Yes, other type of licence (please specify below)	No	Total
0-9	29%	4%	11%	7%	54%	28
10-49	28%	9%	3%	3%	63%	32
50-249	12%	15%	6%	0%	70%	33
250+	15%	8%	8%	0%	85%	13
					Answered question	106

By firm age

	Yes, patent licence	Yes, trademark licence	Yes, know-how licence	Yes, other type of licence (please specify below)	No	Total
5 or less	33%	0%	17%	8%	50%	12
6 to 10	33%	3%	13%	3%	60%	30
11 to 20	6%	12%	0%	0%	79%	33
21 to 50	24%	24%	6%	0%	65%	17
51 plus	0%	33%	0%	0%	67%	3
					Answered question	95

Use of external support

Overall

What type of external service providers have you used when you have dealt with issues related to IP? Please select all that apply.		
Answer Options	**Response Percentage**	**Response Count**
Irish Patent Office	36.7%	36
Other national / international patent Office	41.8%	41
Enterprise Ireland (e.g. IP assistance scheme, advice)	35.7%	35
Patent attorneys in Ireland	57.1%	56
Patent attorneys abroad	48.0%	47
Attorneys at-law (abroad / home)	16.3%	16
Private business consultants internationally	12.2%	12
Chambers of Commerce	2.0%	2
Regional innovation / development agency	4.1%	4
Other (please specify)	3.1%	3
	answered question	**98**
	skipped question	**30**

By ownership

		Irish Patent Office	**Other national / international patent Office**	**Enterprise Ireland (e.g. IP assistance scheme, advice)**	**Patent attorneys in Ireland**	**Patent attorneys abroad**	**Attorneys at-law (abroad / home)**	**Private business consultants internationally**	**Chambers of Commerce**	**Regional / innovation development agency**	**Total**
Independent		42%	39%	43%	70%	46%	10%	12%	3%	4%	69
Part of a group	Foreign-owned	16%	58%	11%	11%	63%	37%	5%	0%	0%	19
	Irish-owned	40%	30%	30%	60%	30%	20%	30%	0%	0%	10
										Answered question	98

By sector

	Irish Patent Office	**Other national / international patent Office**	**Enterprise Ireland (e.g. IP assistance scheme, advice)**	**Patent attorneys in Ireland**	**Patent attorneys abroad**	**Attorneys at-law (abroad / home)**	**Private business consultants internationally**	**Chambers of Commerce**	**Regional / innovation development agency**	**Total**
Agri / food and drink	67%	33%	83%	83%	50%	17%	17%	0%	0%	6
Business services	11%	0%	33%	44%	0%	22%	11%	0%	0%	9
Financial services	50%	75%	50%	25%	50%	25%	25%	25%	0%	4
ICT hardware	33%	25%	33%	75%	75%	8%	8%	0%	8%	12
ICT software	30%	55%	30%	50%	45%	25%	10%	0%	0%	20
Manufacturing	33%	67%	17%	33%	67%	17%	0%	0%	0%	6
Medical devices	40%	47%	27%	60%	73%	20%	13%	7%	0%	15
Other	45%	35%	45%	70%	30%	10%	15%	0%	10%	20
Pharmaceuticals	33%	67%	17%	33%	50%	0%	17%	0%	0%	6
									Answered question	98

By firm size

	0-9	10-49	50-249	250+
Irish Patent Office	44%	31%	30%	50%
Other national / international patent Office	56%	28%	37%	58%
Enterprise Ireland (e.g. IP assistance scheme, advice)	56%	38%	23%	17%
Patent attorneys in Ireland	70%	59%	53%	33%
Patent attorneys abroad	52%	52%	27%	83%
Attorneys at-law (abroad / home)	11%	14%	10%	50%
Private business consultants internationally	7%	10%	13%	25%
Chambers of Commerce	7%	0%	0%	0%
Regional innovation / development agency	7%	3%	0%	0%
Total	27	29	30	12
			Answered question	98

By firm age

	5 or less	6 to 10	11 to 20	21 to 50	51 plus
Irish Patent Office	25%	38%	46%	20%	100%
Other national / international patent Office	33%	48%	39%	47%	33%
Enterprise Ireland (e.g. IP assistance scheme, advice)	50%	38%	32%	33%	67%
Patent attorneys in Ireland	58%	66%	57%	53%	67%
Patent attorneys abroad	42%	52%	61%	33%	33%
Attorneys at-law (abroad / home)	0%	7%	29%	20%	33%
Private business consultants internationally	17%	10%	18%	7%	33%
Chambers of Commerce	17%	0%	0%	0%	0%
Regional innovation / development agency	0%	3%	4%	7%	0%
Total	12	29	28	15	3
				Answered question	87

Satisfaction with external (state) support

Overall

Please rate how satisfied you are with external (state) support related to IP available for each of the following:							
Answer Options	**Very good**	**Good**	**Neither good nor poor**	**Poor**	**Very poor**	**Not applicable**	**Response Count**
Quality of advice and services	11	25	26	9	7	25	104
Consistency of advice and services	10	25	28	6	5	27	102
Speed / timeliness of services	10	19	31	10	6	25	102
Price of advice / services	8	13	33	13	7	26	101
Overall value for money	7	13	38	6	9	27	101
						answered question	**104**
						skipped question	**24**

Barriers to IPR use

Overall

What are the main barriers for a more beneficial use of IP for your organisation? Please select all that apply.		
Answer Options	**Response Percentage**	**Response Count**
IP not relevant to our business	17.7%	17
Unclear benefits of IP usage	16.7%	16
Too complicated / time-consuming	30.2%	29
Process too expensive	46.9%	45
Costs too high	47.9%	46
No internal capacity to manage IP	19.8%	19
Affordability of external professional services (IP agents / lawyers)	42.7%	41
No or little independent advice available	12.5%	12
Not confident of ability to enforce any such IP rights	44.8%	43
Disclosure of our principal IP is too great a risk	18.8%	18
Other (please specify)	7.3%	7
	answered question	**96**
	skipped question	**32**

By ownership

		IP not relevant to our business	**Unclear benefits of IP usage**	**Too complicated / time-consuming**	**Process too expensive**	**Costs too high**	**No internal capacity to manage IP**	**Affordability of external professional services**	**No or little independent advice available**	**Not confident of ability to enforce**	**Disclosure of our principal IP is too great a risk**	**Total**
Independent		14%	17%	30%	53%	59%	21%	46%	17%	49%	20%	70
Part of a group	Foreign	31%	6%	31%	25%	6%	13%	19%	0%	19%	6%	16
	Irish	20%	20%	20%	30%	30%	20%	40%	0%	60%	20%	10
											Answered question	96

By sector

	IP not relevant to our business	Unclear benefits of IP usage	Too complicated / time-consuming	Process too expensive	Costs too high	No internal capacity to manage IP	Affordability of external professional services	No or little independent advice available	Total
Agri / food and drink	17%	50%	50%	17%	50%	17%	17%	17%	6
Business services	44%	33%	22%	33%	44%	22%	33%	22%	9
Financial services	0%	0%	50%	100%	50%	0%	25%	25%	4
ICT hardware	0%	8%	25%	67%	83%	17%	58%	8%	12
ICT software	14%	14%	38%	38%	33%	29%	29%	10%	21
Manufacturing	33%	17%	17%	17%	0%	33%	17%	0%	6
Medical devices	15%	8%	31%	54%	54%	8%	54%	15%	13
Other	20%	15%	20%	50%	55%	20%	50%	10%	20
Pharmaceuticals	0%	0%	20%	40%	20%	20%	60%	20%	5
								Answered question	96

By firm size

	0-9	10-49	50-249	250+
Costs too high	69%	50%	33%	20%
Process too expensive	77%	33%	40%	20%
Not confident of ability to enforce any such IP rights	46%	43%	50%	30%
Affordability of external professional services (IP agents / lawyers)	77%	33%	27%	10%
Too complicated / time-consuming	35%	23%	30%	30%
No internal capacity to manage IP	4%	33%	27%	0%
IP not relevant to our business	8%	20%	23%	20%
Disclosure of our principal IP is too great a risk	19%	13%	17%	30%
Unclear benefits of IP usage	4%	17%	27%	10%
No or little independent advice available	12%	23%	3%	10%
Total	26	30	30	10
			Answered question	96

By firm age

	5 or less	6 to 10	11 to 20	21 to 50	51 plus
Costs too high	82%	52%	50%	17%	66%
Process too expensive	55%	55%	53%	25%	33%
Not confident of ability to enforce any such IP rights	55%	48%	44%	42%	33%
Affordability of external professional services (IP agents / lawyers)	55%	55%	28%	17%	33%
Too complicated / time-consuming	45%	28%	25%	25%	66%
No internal capacity to manage IP	9%	21%	25%	17%	33%
Disclosure of our principal IP is too great a risk	9%	24%	19%	8%	66%
IP not relevant to our business	9%	10%	25%	25%	33%
Unclear benefits of IP usage	18%	7%	19%	25%	66%
No or little independent advice available	9%	14%	16%	17%	0%
Total	11	29	32	12	3
				Answered question	87

Scope for state help

Overall

In which areas do you see the most need for state help in improving beneficial use of IP for firms in Ireland? Please rate each according to necessity.					
Answer Options	**Necessary**	**Rather necessary**	**Rather unnecessary**	**Unnecessary**	**Response Count**
Changes in the legal system / framework	33	27	14	10	84
Advice on why to use IP	24	33	17	15	89
Advice on how to use IP	27	34	17	12	90
General quality of external support	18	44	13	10	85
Tax provisions or incentives	52	33	4	3	92
Higher availability of trained personnel	24	42	12	7	85
Better external legal support (quality and / or quantity)	20	41	12	10	83
Lower costs of patenting (e.g. discounts on renewal fees)	47	25	13	3	88
Other (please specify)	5	3	2	9	19
				answered question	**98**
				skipped question	**29**

By ownership

		Changes in the legal system	**Advice on why to use IP**	**Advice on how to use IP**	**General quality of external support**	**Tax provisions or incentives**	**Higher availability of trained personnel**	**Better external legal support (quality and / or quantity)**	**Lower costs of patenting (e.g. discounts on renewal fees)**	**Total**
Independent		83%	91%	91%	87%	94%	87%	87%	87%	70
Part of a group	Foreign-owned	83%	78%	83%	72%	83%	72%	67%	67%	18
	Irish-owned	100%	100%	100%	100%	100%	100%	90%	100%	10
									Answered question	98

E.2 Sectoral data – Annual Survey of Business Impact, Forfás 2012

Figure 55 Value added and employment shares by sector – indigenous firms

	Value Added by Irish-owned firms (% of total)	**Employment by Irish-owned firms (% of total)**
Agriculture, Fishing, Forestry, Mining & Quarrying (1-9)	1.01%	1.41%
Food, Drink & Tobacco (10-12)	19.22%	25.45%
Textiles, Clothing, Footwear & Leather (13-15)	0.87%	1.38%
Wood & Wood Products (16)	1.32%	1.92%
Paper & Printing (17-18)	2.73%	3.27%
Chemicals (19-21)	1.84%	2.02%
Rubber & Plastics (22)	2.46%	2.74%
Non-Metallic Minerals (23)	2.68%	3.07%
Basic & Fabricated Metal Products (24-25)	3.65%	5.57%
Computer, Electronic & Optical Products (26)	2.70%	3.40%
Electrical Equipment (27)	1.52%	2.04%
Machinery & Equipment (28)	3.59%	4.33%
Transport Equipment (29-30)	0.67%	0.83%
Medical Device Manufacturing (32.5)	0.33%	0.49%
Other Misc. Manufacturing (31-32.4,32.6-33)	1.37%	2.28%
Internationally Traded Services Category		
Publishing, Broadcasting & Telecommunications (58-61)	2.19%	2.30%
Computer Programming (62.01)	0.33%	0.36%
Computer Consultancy (62.02)	9.47%	7.69%
Computer Facilities Management (62.03)	0.40%	0.18%
Other IT and Computer Services (62.09-63)	2.30%	2.92%
Financial Services (64-66)	6.24%	2.69%
Business Services (68-84, 94-96)	19.83%	12.29%
Education (85)	3.90%	0.79%
Other services (45-56)(86-93)	1.85%	3.83%
Energy, Water, Waste & Construction Category		
Energy (35)	0.17%	0.31%
Recycling & Waste (36-39)	1.90%	2.42%
Construction (41-43)	5.46%	4.02%

Source: DJEI data from an analysis of Annual Survey of Business Impact, Forfás, 2012

Figure 56 Value added and employment shares by sector – foreign-owned multinational firms

	Value Added by Foreign-owned Firms (% of total)	**Employment by Foreign-owned Firms (% of total)**
Manufacturing Category		
Agriculture, Fishing, Forestry, Mining & Quarrying (1-9)	0.05%	0.21%
Food, Drink & Tobacco (10-12)	6.92%	5.49%
Textiles, Clothing, Footwear & Leather (13-15)	0.00%	0.11%
Wood & Wood Products (16)	0.10%	0.60%
Paper & Printing (17-18)	0.11%	0.46%
Chemicals (19-21)	33.63%	13.77%
Rubber & Plastics (22)	1.04%	2.06%
Non-Metallic Minerals (23)	0.10%	0.48%
Basic & Fabricated Metal Products (24-25)	0.35%	1.38%
Computer, Electronic & Optical Products (26)	11.95%	10.05%
Electrical Equipment (27)	0.55%	1.51%
Machinery & Equipment (28)	0.90%	2.46%
Transport Equipment (29-30)	0.55%	2.07%
Medical Device Manufacturing (32.5)	7.33%	16.14%
Other Misc. Manufacturing (31-32.4,32.6-33)	0.24%	1.17%
Publishing, Broadcasting & Telecommunications (58-61)	0.08%	0.02%
Computer Programming (62.01)	15.71%	14.89%
Computer Consultancy (62.02)	8.07%	10.29%
Computer Facilities Management (62.03)	5.89%	6.30%
Other IT and Computer Services (62.09-63)	1.92%	3.55%
Financial Services (64-66)	4.50%	6.65%
Business Services (68-84, 94-96)	0.03%	0.17%
Education (85)	0.00%	0.00%
Other services (45-56)(86-93)	-0.01%	0.17%
Energy (35)		0.00%
Recycling & Waste (36-39)		0.00%
Construction (41-43)		0.00%

Source: DJEI data from an analysis of Annual Survey of Business Impact, Forfás, 2012

Appendix F Developing a framework for firm-based policy recommendations

In order to formulate specific policy recommendations, we have developed a framework that centres around four groupings of firms according to IP activity level and underpinned by broader framework conditions. Below, we discuss for each firm group:

- The characteristics of the firms in the group, and
- The different needs of the groups from an IP intervention perspective

In designing effective policy, it is better to selectively target certain groups in order to understand the characteristics, enabling and blocking factors that the policy aims to address in context. As above, analysis shows that there are particular issues that should be considered, related to firm size, firm age and firm ownership, as well as particular sectoral sensitivities to remain cognisant of going forward. It is not possible to address each of these small, distinct groups separately, and this in itself would be reductive, missing out on a number of synergies and crossovers, particularly as good practice examples show that integrated support is key.

F.1 Firm groups

F.1.1 IP-non Active

The filing and registration statistics suggest that the proportion of firms who are not active in IP may be higher in Ireland than in selected comparators. The scope of this study precluded direct dialogue with non-active firms, though anecdotal evidence through interviews, plus broader experience suggests that such firms would benefit from greater exposure, education and awareness raising activities. This would be targeted at ensuring that firm owners understand the basics of IP and can make informed decisions, even if non-usage remains the decision. Many interviewed – stakeholders, but also some firms – expressed the opinion that there is a cultural issue in a majority indigenous Irish firms, with a lack of value traditionally given to IPR in Ireland, and a lack of understanding of the value of IPR.

F.1.2 Start-ups and new firms

Start-ups and new firms, as highlighted through the survey and interviews, may have a distinct focus on IP and IPR, but may be hampered by cash flow, a lack of experience and a lack of networks to learn through. The data collected suggests that the expense of the process and of external expertise is difficult for this group of firms, and interviews suggested that there may be a life-cycle issue in terms of forward planning and timing to progress IP protection. This set of firms require specific educational intervention and funding for first filing activity (if non-VC backed), as well as access to learning networks.

F.1.3 IP-low Active

A large number of firms that are IP active have a low level of activity, focusing on a small amount of core IP. This was confirmed via interviews, where the majority of micro, small and medium sized firms spoken to stated that their use of IPR was around protecting core IP. These users have sound reasons to utilise a small amount of formal IPR, including the cost of maintenance and defence. This is in contrast to larger firms and multinationals, which continue to build defensive portfolios and expand market share.

Within this group are likely to be micro, small and medium firms in particular, who find the costs – of filing, defence and of purchasing external expertise and professional services – to be particularly difficult barriers to pursuing formal IPR, as well as medium-sized firms who find the internal capacity to manage IP difficult.

By contrast, there were a number of more mature firms in this category who stated that the main barriers to more IPR activity were complexity and lack of clear benefit of pursuing formal IPR, indicating that they might benefit most from more education on broader usages of IPR, aid in navigating the system and processes, and potentially support to allow them to become active again.

If patent activity is often of less practical value to innovative SMEs due to costs, timescales and difficulty of enforcement against much larger enterprises, then there is a danger that it becomes a symbolic or 'added value on paper' exercise. It may be that there is an argument for policy and support that encourages SMEs to follow behaviours and approaches that make them targets for acquisition, but this a controversial goal for public policy, and should only be a by-product of increased awareness, knowledge, ability and capacity in Irish entrepreneurs, start-ups and SMEs. There are a number of 'carrot and stick' measures to encourage and support increased broad-based IP activity, from 'carrots' such as specialist advice and guidance and IP grant support, to 'sticks' such as making a qualified IP strategy a condition of funding or tax credits. Policy to address the findings of this study should enable firms to build their own capacity and capability for the general betterment of the system. Policy to support indigenous firms should also reinforce the generally well-regarded support available through Enterprise Ireland and Ibec.

F.1.4 IP-Sophisticated

Those firms who are more sophisticated users of IP already utilise the system well and fulfil their needs independently. There is a need for specific information on advanced issues or problems, such as complex legal precedents or situational events, and access to other IP through collaboration or acquisition. This is confirmed in interviews with firms who stated that their main concern is to "unstick" IP from other organisations – firms and universities – that historically have reportedly been difficult to collaborate with.

Multinationals are within this group. There appear to be few policy levers to drastically affect the IPR activities of foreign-owned multinationals, simply due to the international character of their IP. There are few other policy measures, beyond the proposed Knowledge Development Box, identified. The FDI offer is very compelling, with good support through a number of key agencies, and consultation confirmed that RD&I grants offered to foreign-owned multinationals through IDA Ireland may be upgraded to reward those firms exploiting IP in Ireland.

From this research and other sources, foreign-owned multinationals generally state that legal functions, and key corporate IP players will always remain at corporate headquarters. This is likely to continue, and so Ireland may consider policy options to attract fledgling, upwardly mobile headquarters and seek to embed them. Further gains maybe through Irish individuals leading personalised mandates – seeking to bring their firms to Ireland – though this cannot be systematised or scaled.

A subset of this IP-sophisticated grouping is identified as the IP-sophisticated 'elsewhere' firms. This specifically points to the subsidiaries of foreign-owned multinationals located in Ireland. While at the overall company level, IP is well understood and managed, the capacity of the subsidiary located in Ireland may be more limited in terms of IP knowledge. The management in these subsidiaries are key drivers in affecting change in the activities at the Irish sites and increased IP capacity at these Irish sites may offer the potential for advancing engagement in IP activities at this local level. Increased understanding of IP in these firms across the multiple dimensions of IP - IP trading, IP valuing, IP for developing brands - and in the language, processes and concepts in IP will support this cohort to engage in IP discussions with knowledge and confidence. It will also support management to identify and take advantage of opportunities associated with IP, if and when they arise. While, for now at least, it is considered that legal functions, and key corporate IP players will always remain at corporate headquarters, the role and use of IP is evolving internationally and thus opportunities not yet foreseen may well arise in the future. It is in the interest of the State to develop IP knowledge locally so that opportunities related to IP can be capitalised upon and further embed the subsidiaries in Ireland.