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University–Industry Collaboration and Patents

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University–Industry Collaboration and Patents

This paper accompanies the release of the 2017 IP report, which describes the Australian network of collaboration in all IP rights and considers the international comparison of university–industry collaboration with patent data.¹

There is substantial interest in maximising the translation of government-funded research into commercial outcomes across the world. University–industry collaboration is assumed to be a key step in this process and it is generally considered that increasing collaboration would lead to more commercial outcomes. Comparing Australia’s performance on collaboration between industry and research organisations with that of other countries is a difficult task. Defining collaboration is complex, as it encompasses many aspects, and not all countries use the same definitions nor collect data in the same manner.

There is no perfect measure of collaborative activity. One example of the typical approach is the often cited OECD measure for innovative firms collaborating with publicly funded research organisations, which ranks Australia last among OECD countries.²

This survey-based measure approaches collaboration from a business point of view, with a broad base of Australian innovation-active businesses asked about their collaboration activities. This assumes that all businesses are equally likely to collaborate with universities, and that innovations identified by business overlaps with research expertise in the university sector.

Patents as a measure of collaboration

Here we approach the problem from the point of view of the research organisations. Instead of asking the question of how well Australian businesses collaborate with Australian research organisations, we reframe the problem to ask how well Australian research organisations collaborate with industry.

Rather than use a survey, the Patent Analytics Hub at IP Australia looked at patent applications filed through the international patent application route—the Patent Cooperation Treaty (PCT) route—and counted the number of applications co-filed by universities and private firms.

One powerful component of the analysis of patent data is the ability to identify research partners collaborating on various inventions. The presence of multiple applicants on a patent application can be used as a proxy indicator for collaboration, as it indicates that multiple parties claim ownership of a new invention.

Patent data also has the advantage of being consistent across countries and openly available. One caveat of using patent data is it only measures a specific type of collaboration; other forms of knowledge transfer and links between entities are not represented and hence this measure underestimates the total interactions that occur between entity types.

¹ IP Australia (2017), “University—Industry Collaboration, not a crisis”, [Australian IP Report 2017](#)

² OECD (2013), [Firms collaborating on innovation with higher education or public research institutions, by firm size, 2008-10](#), in OECD Science, Technology and Industry Scoreboard 2013, OECD Publishing, Paris.

The absolute number of applications from Australian universities is 2119 which places Australia universities in the top ten for the number of PCT applications filed by universities (see Figure 1).

Figure 1: University PCT applications, 2000-2015

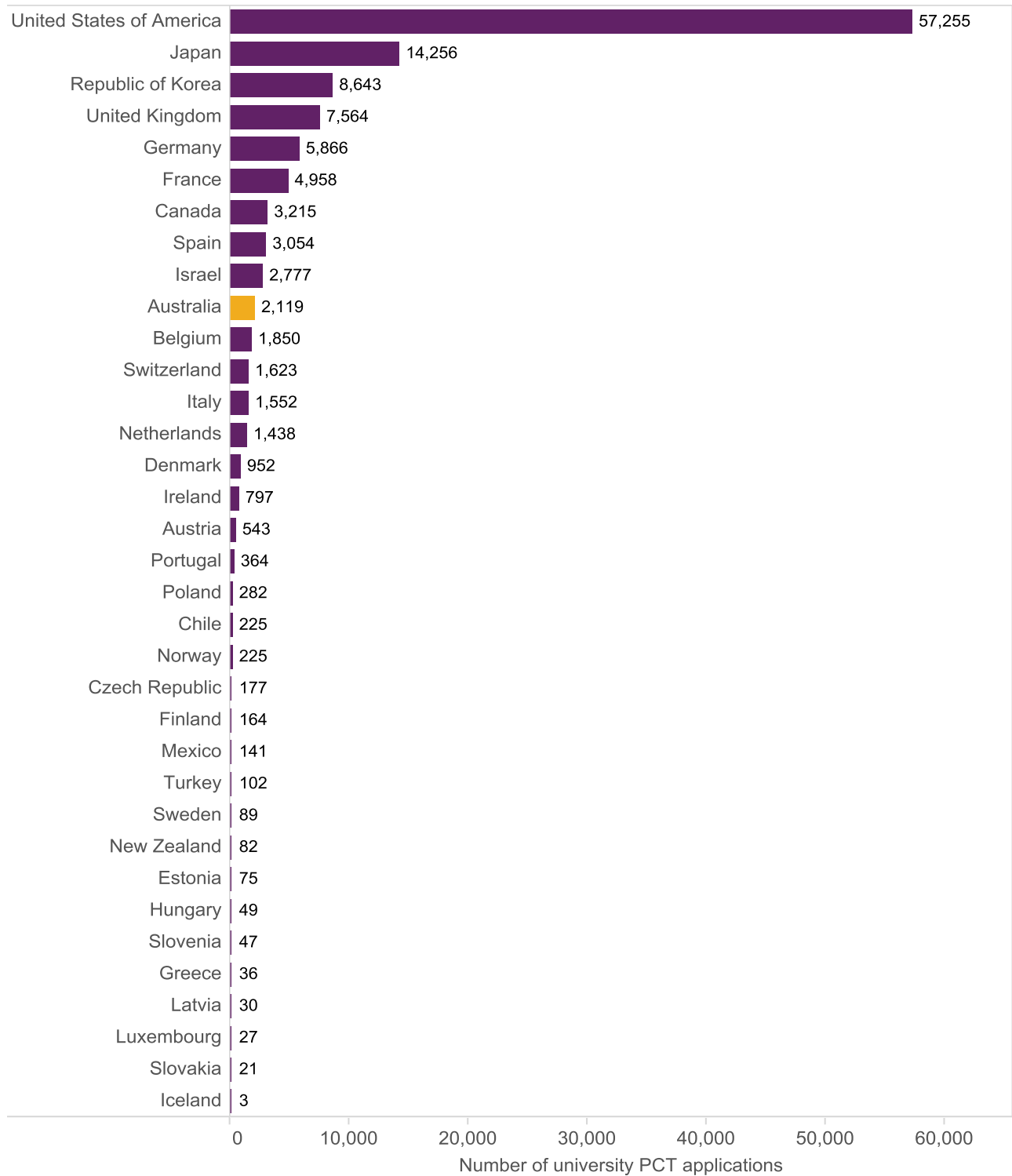
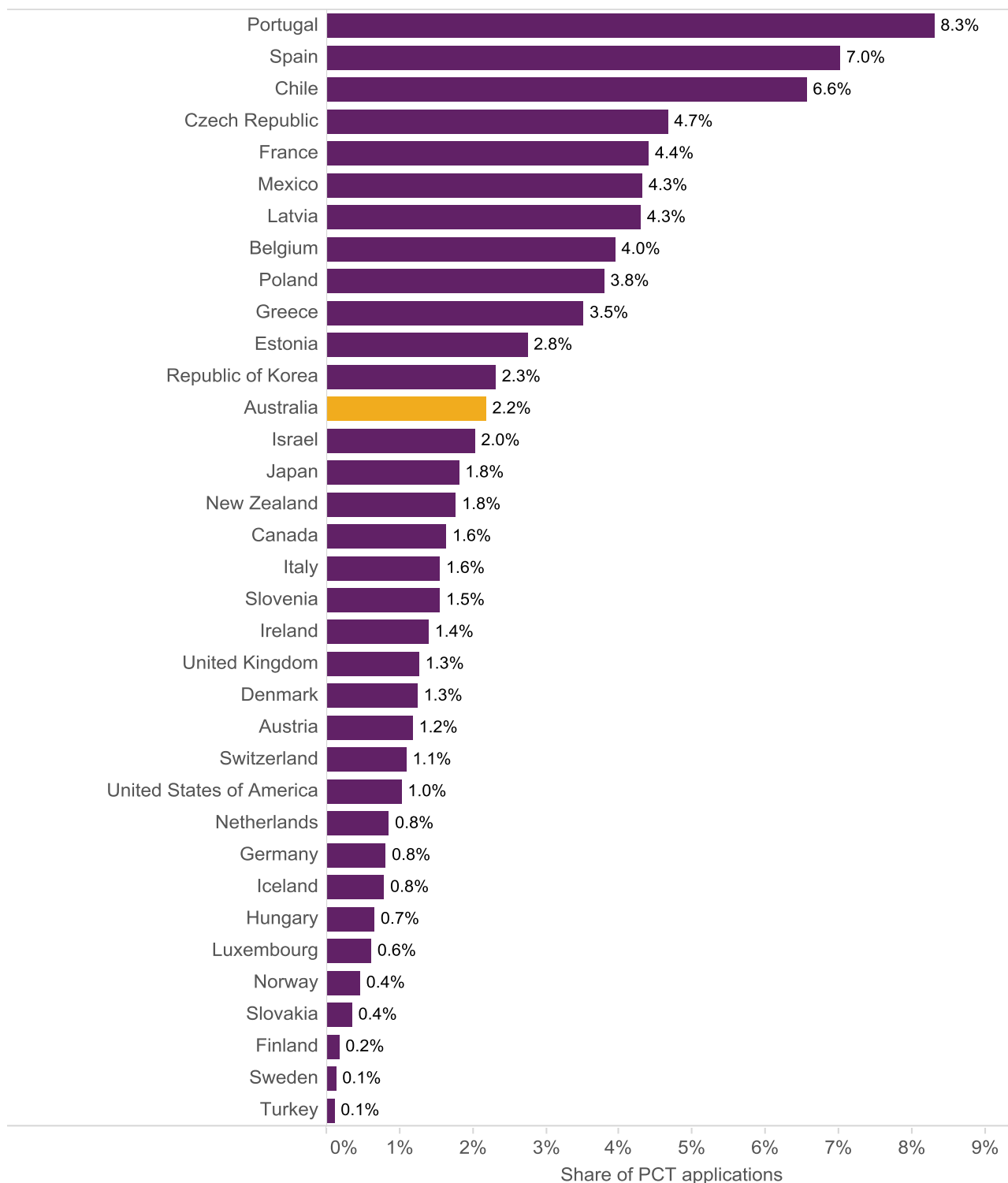


Figure 2 shows that by looking at co-applicants on patents, Australia ranks 13th, ahead of other OECD countries such as the US, UK and Germany. Using this particular measure Australia compares favourably internationally on university-industry collaboration, and is far from the bottom of collaboration. When we break the data down into five-year periods for 2000-05, 2005-10 and 2010-15 this result is relatively stable with Australian ranked 13th, 14th and 13th in the OECD, with 2.1 per cent to 2.2 per cent of PCT applications co-filed by universities and private firms.

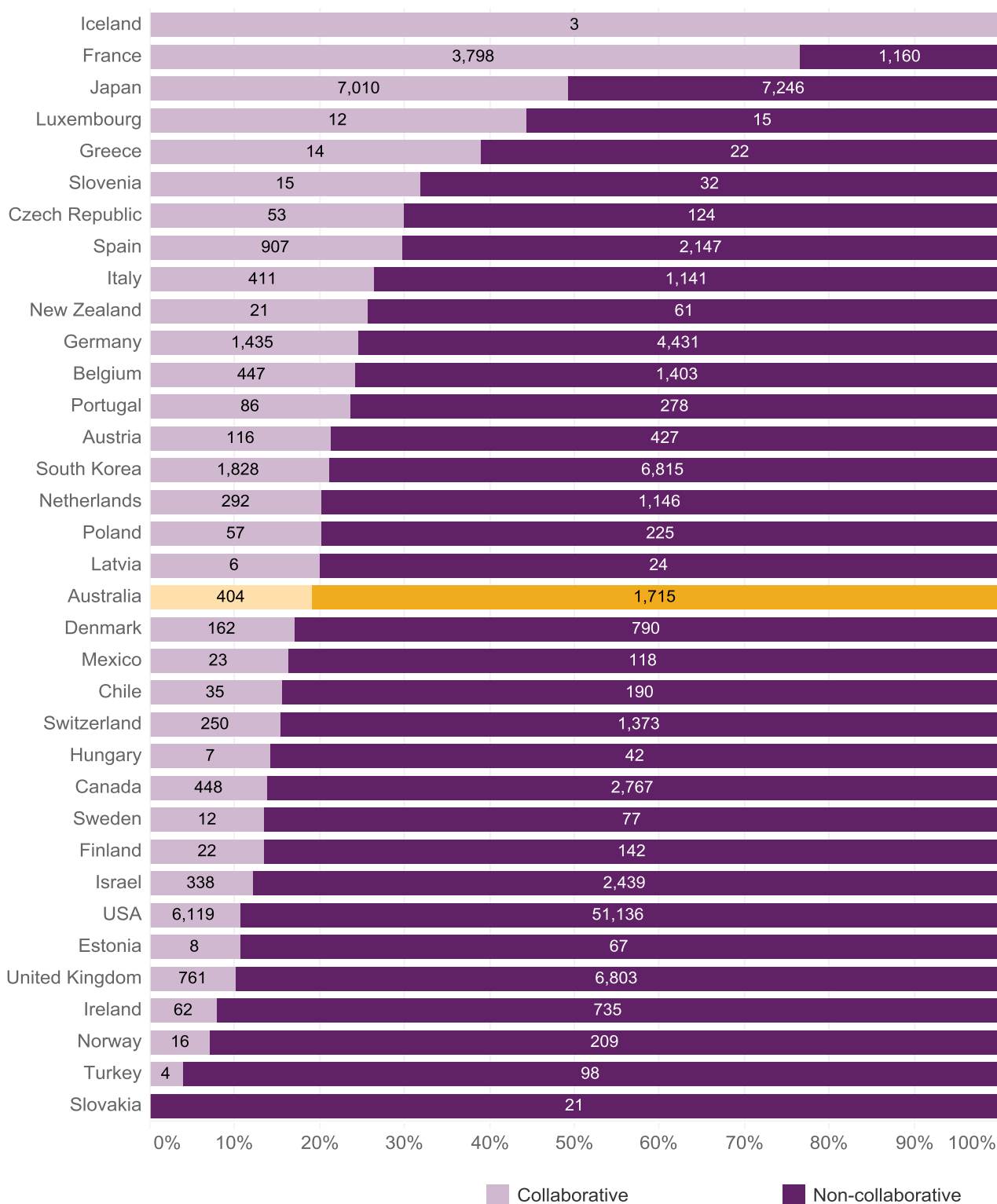
Figure 2: University-Industry Collaboration 2000-2015, as a share of all PCT applications originating in an OECD country



The patent data does allow us to take a more granular look at the level of university patenting across the world. Figure 3 shows the total number of PCT applications from universities between 2000 and 2015, and breaks them down by whether they are collaborative applications with industry or not.

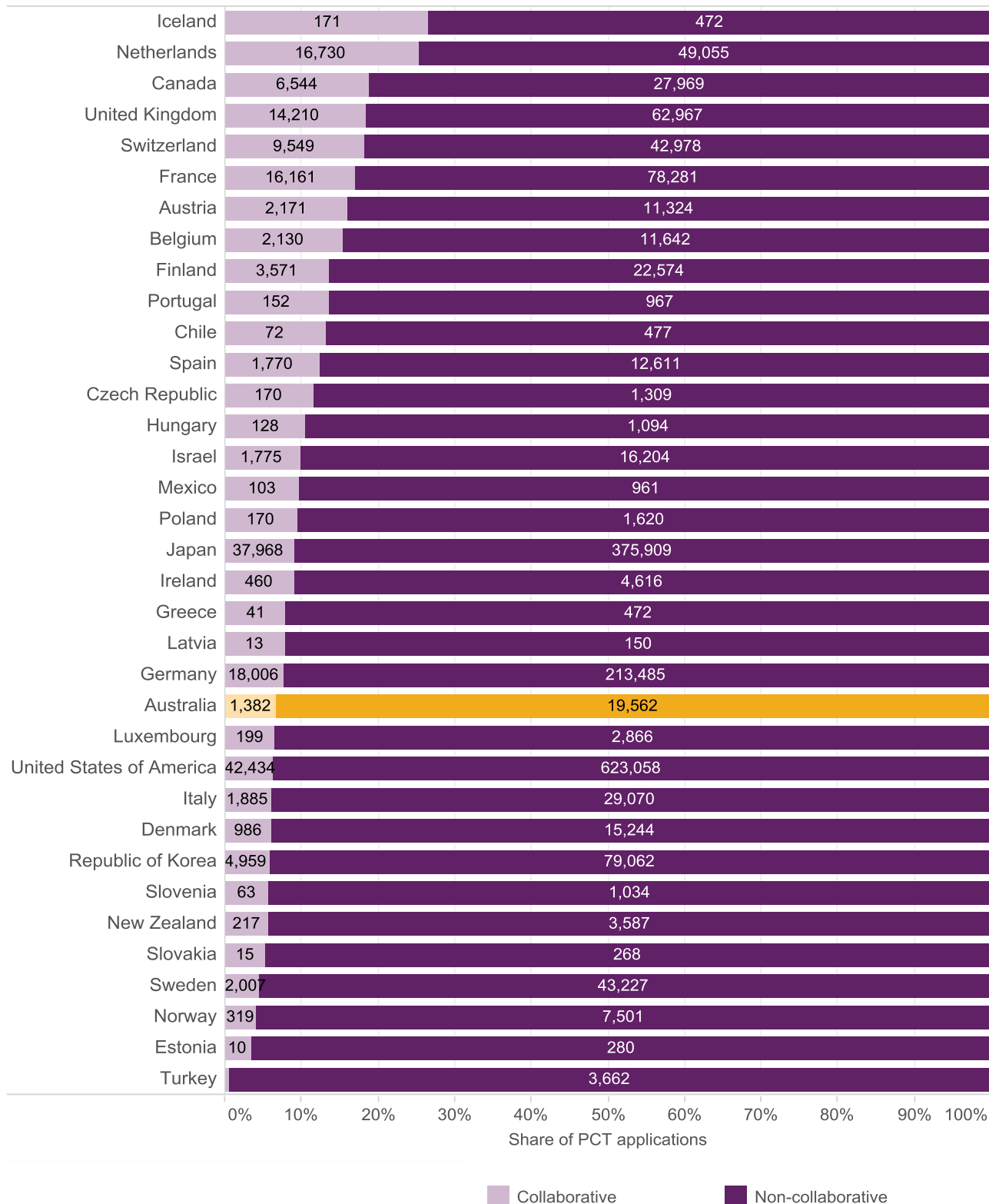
Australia is ranked 19th among all 35 OECD countries in terms of the proportion of PCT applications from universities that are collaborative, which is 21 per cent of applications. In absolute terms, Australian Universities are ranked 10th with 404 collaborative PCT applications between 2000 and 2015.

Figure 3: University PCT applications by collaboration with industry, absolute number of applications and share, 2000-2015



When we look at the filing patterns of all applicants from OECD countries and determine their tendency to collaborate, we can see that Australian entities do not file a high proportion of collaborative PCT applications. Figure 4 shows that Australia rank 23rd in the OECD in terms of the proportion of PCT applications that are the result of collaboration (6.6 per cent). Comparing this result to the ranking of Australian universities that collaborate with industry over the same period (13th, 2.2 per cent) suggests that Australia’s issues with collaboration do not lie with universities.

Figure 4: Proportion of PCT collaboration of applicant country of origin, 2000-2015



Methodology

This paper focuses on Patent Cooperation Treaty (PCT) applications originating in countries that were members of the Organisation for Economic Co-operation and Development (OECD) on 18 October 2016. PCT applications contain address data, allowing us to attribute an application to an OECD country. We use PCT applications to compare countries as it removes home filing bias from cross-country comparisons and PCT applications also have reliable country of origin data. A further advantage of the PCT is that it is increasingly used by applicants from all member countries.

The PCT applications were extracted from the Spring 2016 edition of the PATSTAT database published by the European Patent Office (EPO). This database contains all publications to the beginning of March 2016. In order to analyse the most relevant innovations, this study was conducted in the time period on or after 1 January 2000.

PCT applications were classified as originating from an OECD country if there was at least one non-inventing applicant associated with the application with an address in an OECD member state.

An instance of collaboration between university and industry was identified by firstly determining those applications with an applicant being designated 'UNIVERSITY' in the PATSTAT database, by the allocation of applicant sector sourced from the EEE-PPAT database. The applications were determined as having an industrial collaborator if the application had a co-applicant and the co-applicant was not designated as an 'INDIVIDUAL' or a 'UNIVERSITY'.

The data aggregated to country and sector level accompanies this paper.

Our Research

This work is conducted as part of the research program of the Patent Analytics Hub in the Office of the Chief Economist (OCE) at IP Australia. The OCE aims to provide empirical research and data to support policy advice and operational decision making in matters relating to IP and innovation in Australia. For up to date access to our research program please visit us at <http://www.ipaustralia.gov.au/economics>.

