

Opinion piece  
**Are patents compatible with Open Science?**

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Historical origin of patents

A patent is a bargain or contract between a government or other patent issuing authority, and an inventor (or an organisation representing the inventor, such as an employer). The government/authority gives the inventor/organisation a monopoly right preventing others from making, using or selling the invention for a certain period of time; in return, the inventor/organisation must disclose all that it knows about the invention in a document, known as a patent specification, which is published and is available for anyone to read.

The word "patent" derives from the Latin word for "open". In the Middle Ages, the monarch would issue important declarations, such as for example the appointment of a judge on "Letters Patent" or "Open Letters", so anyone could read them, with the monarch's seal attached to ensure their authenticity and authority. Letters Patent are still issued to this day, for example when someone is awarded an honour or when a country appoints ambassadors to other nations.

Amongst the Letters Patent that were issued in the Middle Ages were many giving individuals monopoly rights, for example a monopoly right to be the only person to make salt in the country, or the only person allowed to import port. Over time, the word "patent" came to refer to monopoly rights for inventions only.

The first recorded patent for an invention, as we would understand the term nowadays, was issued in 1421 in Florence to Filippo Brunelleschi. This gave the inventor a three-year monopoly over his invention for a method of loading and unloading marble from ships. Over time, an increasing number of patents were issued for monopolies, but few were for inventions. Instead, they were used as a method of raising revenue. The monarch would grant the patent to some wealthy individual in return for badly needed cash. The patent gave the wealthy individual monopoly rights on some routine bit of trade, such as importing wine. This annoyed *bona fide* traders. So, in 1624, the English Parliament passed the important Statute of Monopolies. This Act made all monopolies illegal with three exceptions. One was printing – monopolies continued in printing for a number of years more, as a means of censorship. The second was for making gunpowder and cannon, to ensure that only reliable patriotic organisations made these.

And the final exception to the ban on all monopolies was for patents for invention. This was the first law in the world to protect patents for an invention. This Statute of Monopolies is, of course, long gone, having been replaced in the UK by various Patent Acts. But it has had a significant influence on principles and criteria of patenting inventions as codified in modern patent laws worldwide, including Novelty, Inventive step and Industrial applicability criteria.

### Patents versus Open Science

Even though the etymology and historical origin of patents suggest openness ("Open Letters"), as mentioned above, the protection of intellectual property through patents is often perceived as inherently at odds with Open Science principles. This often leads researchers, even those merely considering the possibility of obtaining a patent, to withhold potentially patentable research findings and to be reluctant to adopt transparent scholarly communication practices, such as open publishing of research articles and sharing of research data. In this opinion piece, we explore the relationship between patents and Open Science practices, highlighting how and when they can co-exist in a balanced way without being mutually exclusive.

One of the main issues contributing to the tension between patents and Open Science is "novelty", a key criterion in patentability assessments. Not meeting the novelty criterion can serve as grounds for refusing the patent application. How does a patent issuing authority decide if an invention is new - or novel as it is known? In most countries' patent law, the key date is the so-called "priority date". This is the date the applicant applies for a patent (files a patent application) for the first time. An invention is novel if, at its priority date, the invention was not known in any way to the public. There are two ways an invention could have become known to the public before the priority date. The first is prior publication; the second is prior use. Prior publication occurs if, at any time before the priority date, a publication was made available to the public describing the invention in sufficient detail for someone "skilled in the art" - a notional expert - to understand it. It makes no difference where in the world the prior publication appeared. It makes no difference how obscure the item was. All that matters is the publication was in a place where the public are entitled to visit, and that someone sometime might have read the item before the priority date. The other way to stop an invention being new is prior use. Here it is a similar definition - before the priority date, the invention must not have been used in such a way that the public could see it in action, or see the products of the invention.

So, what are the choices for researchers who wish to adopt Open Science practices while still meeting the novelty requirements for patenting their inventions? There are three possible options: (1) The inventor can publicly release their research findings in various Open Science formats after they have filed the first patent application (i.e., after the priority date); (2) Certain jurisdictions have patent laws that offer "novelty grace periods", allowing the inventor to openly share their findings before the filing date (priority date), provided they file the application within the grace period; (3) The researcher may publicly share preliminary findings that will not be the subject of a future patent application, provided that a clear policy is established beforehand to delineate which type of data will not be linked to a patent application and can be immediately shared, and which data should be temporarily withheld due to potential patentability.

Looking at these three approaches in a little more detail, the (1) public release of research details using Open Science routes once the patent has been applied for involves some risks. It is possible that a particular Patent Office that has the task of assessing the patent application rejects the application or requires changes to its content – this happens a lot. If those required changes are significantly important, it could be that the rushed into publication Open Science output might ruin the acceptance of the required changes, so the revised patent cannot be accepted by the Patent Office involved. This risk implies that anyone adopting such a "Publish as soon as we've applied for a patent" approach would be better advised to wait till the Patent Office has issued its comment on the application – but that could be many months after the application was submitted, and so makes the use of Open Science tools risky at this stage. To avoid this risk, a possible solution could be for patent management software (e.g., DIAMSiQ, Astria, PATTSY WAVE, or IPM suite) to incorporate functionality that alerts researchers when they are free to start publishing.

Option (2) is much more promising but is only possible for patenting in those countries that have adopted novelty grace periods. According to [data](#) gathered by the World Intellectual Property Organisation (WIPO) as of August 2024, 111 countries have incorporated grace periods (typically 6 or 12 months) in their patent laws. For example, countries that offer a 12-month grace period include the United States, South Korea and Japan, while the majority of European countries provide a 6-month grace period. In some countries, such as South Korea, the grace period is not automatically granted; the applicant must indicate/declare the intention to take advantage of it in writing. Some countries impose restrictions on the types of disclosure covered by the grace period. For example, China specifies the legitimate disclosures under the grace period, including international exhibitions sponsored or recognised by the Chinese Government, academic or technological conferences organised by the State Council or by a national

academic association; however, publishing in journals is not included. The United States law regarding the grace period is generally considered more lenient and comprehensive than in most other countries, with no particular restrictions in place.

An example of the option (3) is the strategy followed by the AI-driven Structure-enabled Antiviral Platform (ASAP) Consortium, which integrates the Open Science approach in the discovery process of new antiviral drugs intended to treat diseases caused by viral infections. The ASAP Consortium has developed the [Policy on Intellectual Property Management and Open Science Disclosure](#), which clearly categorises data into two categories: that which is delayed to enable patent filing for antiviral candidates, and that which is released in the public domain immediately on generation under Open Science disclosure. The latter includes some biomedical data from early discovery activities, such as chemical structures of compounds, which are released immediately after they are screened. The Consortium believes such sharing does not compromise future patent filings for antiviral candidates.

#### Openness of patent documents and information

On April 16, 2024, several universities, funders and other organisations signed the [Barcelona Declaration on Open Research Information](#), aiming to advance the global Open Science movement. They are committed to the following actions: to make openness the default for research information it uses or produces; to work with services and systems that support and enable open research information; to support the sustainability of infrastructures for open research information; and to support collective action to promote open research information. However, the Declaration does not specifically mention patents within its definition of research information. We emphasise the importance of raising awareness about access to patent information, which is significantly locked inside expensive proprietary databases. While there are some free databases, they cannot compete with the comprehensive features and capabilities of commercial patent databases such as Clarivate's Derwent Innovation. Although WIPO is working to facilitate access to those commercial databases through its [Access to Specialised Patent Information \(ASPI\)](#) programme, this initiative is limited to developing countries only, providing free access for the least developed countries and reduced costs for middle-income countries. We therefore argue that those in favour of Open Science promote greater support and investment in non-commercial infrastructures for open patent information.