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Purpose of the guide

This guide is a reference for researchers on intellectual property (IP) and technology transfer at the CSIR. It aims to give the researcher an overview of IP management and technology transfer by:

- Illustrating why these are key strategic issues for the CSIR
- Introducing the concepts of IP and technology transfer
- Describing how IP management and technology transfer take place at the CSIR
- Explaining how this impacts on the activities of researchers at the CSIR.

The key elements of IP management and technology transfer processes are outlined, and some of the questions most commonly asked by researchers are answered, to aid researchers’ understanding of how IP and technology transfer considerations can effectively be integrated into their research activities.

For any further questions which are not covered here, or for more detailed information, consult the following:

- http://techtransfer.csir.co.za/
- Operating unit/centre R&D Outcomes function
- CSIR Licensing & Ventures
Strategic importance of effective IP management and technology transfer for the CSIR

IP management and technology transfer are important activities for enhancing the impact of the CSIR’s R&D, by facilitating the application and use of products and services developed at the CSIR, by companies who can take them to market, and ultimately by communities and end-users who can benefit from them.

A strong IP portfolio can attract R&D partnerships and funding and facilitate wider interaction between the research community and industry, leading to more needs-based R&D which can offer solutions to real-life problems. Successful technology transfer may also generate new income streams for the CSIR, to be ploughed back into R&D and to create incentives for CSIR innovators.

Maximising income generation is, however, not the main objective of our strategic approach. More importantly, by increasing the number of new ideas, discoveries and inventions generated from CSIR R&D, which are translated into true innovations by virtue of being used and applied, the CSIR’s mandate ‘to foster industrial and scientific development’ and ‘to contribute to the improvement of the quality of life of the people of South Africa’ can be successfully carried out.

The role of CSIR researchers

CSIR researchers are essential to the process of technology transfer. Most importantly, as innovators, researchers are the source of new technologies. Innovators possess key technical know-how which is required for the identification of potential applications, drafting of patent specifications, defending a patent in the course of patent prosecution or infringement actions, marketing technologies and assisting licensees with implementation. The chances of successful technology transfer diminish significantly without the participation of key inventors to champion their technologies.

In some cases, researchers might wish to play a role in the further development and commercialisation of their technology, either by providing technical advice and expertise to licensees or by getting involved in spinning out a new company for commercialising their technology. This is welcomed and encouraged.
RESEARCHERS THEREFORE PLAY A ROLE BY:

- Keeping up-to-date with the latest developments in their field to ensure that their work is new and relevant
- Keeping proper records of all R&D leading up to the development of new technologies
- Disclosing their inventions and technologies timeously so that they can be evaluated, and a strategy formulated for their protection and transfer (note that researchers are obligated to disclose new IP under CSIR policy and by law)
- Refraining from publishing or discussing sensitive information about a technology with outside parties before the technology has been evaluated and a decision taken about how it ought to be protected
- Considering the possible different applications of their technologies
- Providing all necessary technical information and assistance in the course of the patent prosecution process
- Suggesting potential licensees and marketing leads for the technology.

RESEARCHERS BENEFIT FROM TECHNOLOGY TRANSFER BY:

- Sharing in the proceeds received by the CSIR from successful technology transfer
- Seeing the fruits of their R&D making an impact in society
- Achieving recognition
- Progressing up the CSIR career ladders
- Attracting funding to support further R&D activities
- Receiving incentive awards
What is intellectual property?

IP deals with creations of the mind, arising from intellectual activity in the scientific, commercial, literary and artistic fields. Intellectual property rights (IPRs) refer to the protection afforded by the law to various forms of IP. IPRs are designed to stimulate innovative and creative activity, to encourage the dissemination of the outcomes of such activity and to promote economic and social development. Innovators and creators are typically rewarded with exclusionary time-limited rights to control how their IP is used, and by whom, allowing them to recoup the investment they made in the development of the IP concerned.

When these rights expire, the IP enters the public domain, allowing anyone to use it in the development of new knowledge and IP. The IP system therefore aims to achieve a balance between private rights (by rewarding innovative behaviour) and the public good (by ensuring that knowledge and innovations are optimally disseminated and improved).

IP management activities at the CSIR aim to promote the effective identification, disclosure, protection and management of discoveries and inventions, to facilitate informed and appropriate decision-making in respect of how the IP concerned can best be utilised for the benefit of society and the economy. Formal IP protection is sought where this will improve the prospects for successful technology transfer.
Types of IP

<table>
<thead>
<tr>
<th>Type of IP</th>
<th>Protection provided</th>
<th>Term of protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patents</td>
<td>Inventions, including products, processes, compounds and devices</td>
<td>20 years from date of filing</td>
</tr>
<tr>
<td>Registered designs</td>
<td>Industrial designs and features of appearance</td>
<td>• Aesthetic designs: 15 years from date of filing or release date (whichever is earlier)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Functional designs: 10 years from date of filing or release date (whichever is earlier)</td>
</tr>
<tr>
<td>Plant breeders’ rights</td>
<td>New plant varieties</td>
<td>• Trees and vines: 25 years from date of registration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• All other eligible plants: 20 years from date of registration</td>
</tr>
<tr>
<td>Copyright</td>
<td>Artistic and literary works, computer programs, photographs, music, films, drawings and reports</td>
<td>50 years from date of first publication, or for the lifetime of the author plus 50 years</td>
</tr>
<tr>
<td>Trade marks</td>
<td>Words, phrases, symbols, logos and colours that distinguish goods or services in commerce</td>
<td>10 years from date of filing, renewable indefinitely for subsequent 10-year periods</td>
</tr>
<tr>
<td>Trade secrets</td>
<td>Confidential information and know-how which is kept secret</td>
<td>As long as the information remains confidential – may be indefinite</td>
</tr>
<tr>
<td>Geographical indications</td>
<td>Products whose key characteristics, quality and/or reputation are attributable to their place of origin (regional product names)</td>
<td>Indefinite</td>
</tr>
</tbody>
</table>
Technology transfer is the process of transferring new knowledge and technology developed at the CSIR to third parties who can realise value from them by making them available to the market and society, commercially and for social good. Technology transfer can assist in improving South Africa’s industrial and commercial competitiveness, creating employment, serving society and enhancing quality of life.

Knowledge and technology can be transferred in many different ways, which are not mutually exclusive. For example:

- Technology may be transferred in the course of carrying out **R&D contract work** for a client, who pays to access the research results.
- **Human capital development initiatives** such as training programmes, courses, seminars and workshops equip people to use or master new technologies.
- Skills and knowledge are transferred by the **movement of staff** to and from other organisations (e.g. secondments, internships, changing jobs).
- **Publication** in peer-reviewed journals can disclose knowledge that others can use and build on, and **conference presentations** can serve a similar purpose.
- **IP and/or know-how** can be transferred through the provision of **consulting services**.
- IP produced from CSIR R&D activities can be transferred by **licence** to third parties, (which may be existing companies or new ventures set up for the purpose of taking the technology to market), to develop further and ultimately make products and services based on the IP available to society for commercial and/or social benefit.
This Guide focuses specifically on technology transfer via licensing and the establishment of new ventures. The CSIR’s efforts in this regard focus on identifying those opportunities with the potential to create sustainable, technology-based jobs in the South African economy; to promote economic development and the competitiveness of South African industry; and to improve the quality of life of South Africans and society in general.

**INTELLECTUAL PROPERTY RIGHTS FROM PUBLICLY FINANCED R&D ACT (IPRPFRD ACT)**

The IPRPFRD Act aims to achieve more effective utilisation of IP emanating from publicly financed R&D. As a beneficiary of public funding, the CSIR needs to ensure that its IP is identified, protected, utilised and commercialised for the benefit of the people of South Africa, in accordance with the requirements of the Act and its implementing Regulations.

The legislation contains provisions for the disclosure, reporting and licensing of IP, grants rights to the South African government to use IP for national health, security or emergency needs and to ensure effective commercialisation, and governs certain aspects of R&D collaboration. A National IP Management Office (NIPMO) is the implementing agency responsible for monitoring compliance and providing support for IP management and technology transfer to recipients of public R&D funds.
Support for IP management and technology transfer at the CSIR

R&D Outcomes function

Most of the CSIR operating units/centres have one or more people carrying out the **R&D Outcomes function** (whether in a part-time or a full-time capacity). They are the first point of contact to give advice to researchers on IP and technology transfer, with the responsibility of managing IP and technology transfer opportunities in their operating unit/centre and of guiding the development of IP management and technology transfer strategies appropriate to their respective domains. They work closely with CSIR Licensing & Ventures.

CSIR Licensing & Ventures

**CSIR Licensing & Ventures** facilitates the effective transfer of technology and knowledge, in order to contribute to improving the quality of life of South Africans, by:

- **Giving support and advice** to CSIR researchers and operating units/centres in market research, commercialisation and technology transfer activities
- **Building networks** with relevant stakeholders and funding organisations and linking opportunities with funding
- Creating a technology transfer **policy environment conducive to innovation**
- Increasing **awareness** and providing relevant **capacity-building** interventions and opportunities.
The CSIR Intellectual Property and Technology Transfer Policy (IP&TT Policy) is a high-level policy document aimed at:

• Encouraging and promoting the generation, development and commercialisation of IP, with the objectives of improving quality of life, contributing to economic growth, creating jobs and promoting environmental sustainability; and

• Providing a framework for the ownership, management and protection of IP developed by employees of the CSIR and other parties contracted to the CSIR.

The IP&TT Policy is underpinned by other framework, guideline and process documents which provide more detailed guidance for implementation. These are periodically updated and supplemented and include the following (available on the CSIR Licensing & Ventures Technology Transfer Portal http://techtransfer.csir.co.za):

• Technology Disclosure Process
• Benefit-Sharing Framework
• Commercialisation Framework
• Free and Open Source Software Guidelines
• Entrepreneur Selection Framework
• Licensee Due Diligence Guideline
• Seed Fund Guideline
• Guideline on IP Aspects in Inter-Operating Unit Collaboration
• CSIR Staff Shareholding in Licensee Companies
• CSIR IP Screening Guideline
• IP and University Collaboration.
The technology transfer process

**RESEARCH**

IP and new technologies are developed in the course of R&D carried out by researchers in the various CSIR operating units/centres.

**TECHNOLOGY DISCLOSURE AND EVALUATION**

Where such IP/technology shows potential for application in industry or society, a technology disclosure is made. With support from R&D Outcomes and CSIR Licensing & Ventures, technology disclosures are evaluated to test their technical and commercial feasibility, assess the market need/opportunity and the IP position, and agree on further actions required to render the technologies concerned ready for transfer.

**IP PROTECTION**

Where formal IP protection is expected to improve the prospects for successful technology transfer, patent applications (or applications for other IPRs) will be made.
Technologies are transferred, typically via licence agreements, to existing companies or to new ventures established for the purpose of commercialising the relevant technologies.

When technologies are successfully transferred and commercialised, CSIR receives licence fees and/or equity, which is shared with innovators of the technology concerned. In the broader economy, new products may reach the market, new jobs may be created and quality of life may be improved.

LICENSING AND COMMERCIALISATION

Once appropriate protection is obtained or an enabling technology package assembled (or in parallel), efforts are made to develop an appropriate business model for technology transfer, as well as identify potential licensees, entrepreneurs and investors. This might involve activities such as proof of concept studies, piloting, incubation, business plan development, market research and technology marketing.
Who owns the IP I develop in the course of my research at the CSIR?

All IP developed in the course and scope of one’s employment at the CSIR is owned by the CSIR, in terms of the CSIR Act, the Intellectual Property Rights from Publicly Financed R&D Act (IPRPFRD Act) and the CSIR’s Conditions of Service.

IP generated by a CSIR employee:
• In his/her own time
• Which is unrelated to the course and scope of his/her normal duties as a CSIR employee, and
• Which is generated without making use of CSIR resources

Would be owned by the employee in his/her personal capacity.

At what point in a research project should I consider IP issues?

IP should be considered as early as possible, and ideally be incorporated into the project design. Just as literature searches are necessary to avoid ‘reinventing the wheel’ and duplicating research that has already been done by someone else, so too, are patent searches important prior to commencing a research project, as many patented inventions are never actually published. The patent databases also offer useful information on experts and companies in one’s field of interest (such as potential competitors, collaborators or licensees), as well as providing an idea of how crowded one’s focus area is in terms of patents and activity, and where there are gaps and opportunities. Patent searches (see page 28) should then be updated periodically during the course of one’s research project, so that one can remain up-to-date with the latest developments.
What do I need to do before publishing or presenting my research results?

All CSIR publications need to be evaluated and approved through line management, prior to being submitted for publication, in order to avoid inadvertent premature disclosure of protectable IP. A Workflow IP screening process has been put in place for this purpose. Where necessary, a technology disclosure can then be made (see page 21) and a decision taken on whether or not to seek IP protection, prior to the publication or presentation concerned.

Laboratory notebooks and record-keeping

Research records must be kept in compliance with the CSIR’s Conduct of Research and Records Management Policies. Laboratory notebooks are important not only for recording research data, but can also be of evidentiary value in matters relating to IP and research fraud. Researchers should record their research results daily in a bound notebook in permanent ink, and ensure that this is witnessed and signed off at least weekly by another researcher. Completed notebooks must be properly archived.
R&D collaborations and externally funded R&D projects

Appropriate contracts must be executed prior to commencing work on collaborative and/or externally-funded R&D projects and should include provisions for the ownership and management of IP in accordance with the CSIR Contract R&D Policy. These terms are negotiated on a case-by-case basis, taking into account the contributions made by the relevant parties and the resources available to them, as well as the requirements of the IPRPFRD Act, which dictates that IP emanating from publicly-financed R&D will be owned by the recipient of the funding. As a result, private entities may only own or co-own IP in certain defined circumstances. As a default position, IP developed at the CSIR or on behalf of the CSIR will be owned by the CSIR. Any background IP being contributed to a project by either party, or IP which is being deliberately excluded from a project, should be listed. All contracts are route-mapped, approved and signed according to the CSIR Approval Framework.

**Background IP:** IP which may be relevant to a particular project, held by a party when the project begins or developed outside the scope of the project concerned.

**Foreground IP:** IP developed in the course of a project.
## Relevant IP-related contracts, when they are needed, and key provisions

<table>
<thead>
<tr>
<th>Type of agreement</th>
<th>When it is needed</th>
<th>Key terms</th>
</tr>
</thead>
</table>
| **Memorandum of Understanding (MoU)**    | Usually signed at an early stage of discussions, to set out a common understanding between parties for future collaboration, providing for detail to be agreed in subsequent agreements | • Depends on the envisaged collaboration  
• Contains few binding terms, with the exception of confidentiality provisions |
| **Memorandum of Agreement (MoA)**        | Records the underlying understanding between contracting parties in a binding document | • Legally enforceable contract conferring rights and obligations on the parties  
• The agreements listed below are all types of MoA |
| **Funding/sponsored research agreements** | When R&D funding is received from an outside party | • Work to be delivered  
• Payment to be made  
• IP and publication |
| **Collaboration agreements/consortium agreements** | Collaboration between two or more parties on an agreed project or programme | • Roles and responsibilities  
• Funding  
• Governance and decision-making  
• IP ownership, management and benefit-sharing  
• Publication |
### Relevant IP-related contracts, when they are needed, and key provisions

<table>
<thead>
<tr>
<th>Type of agreement</th>
<th>When it is needed</th>
<th>Key terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-institutional agreements</td>
<td>Management of jointly owned IP</td>
<td>• Roles and responsibilities in respect of IP protection actions and decisions, technology transfer, sharing benefits, dealing with litigation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Rights of use of and access to the jointly-owned IP</td>
</tr>
<tr>
<td>Non-disclosure agreements (NDAs) (also called confidentiality or secrecy agreements)</td>
<td>To facilitate discussions with potential collaborators, investors or licensees May involve unilateral or mutual exchange of information</td>
<td>• Undertaking to maintain the confidentiality of information received from the other party and to use it only for the specified purpose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Standard exclusions</td>
</tr>
</tbody>
</table>
| Material transfer agreements (MTAs)         | For the transfer of proprietary material (most commonly, biological material) to or from the CSIR | • Who may use the material  
• Purpose of use  
• Who owns IP (including modifications) |
<table>
<thead>
<tr>
<th>Type of agreement</th>
<th>When it is needed</th>
<th>Key terms</th>
</tr>
</thead>
</table>
| Evaluation agreements | To allow a party with an interest in licensing a technology to access the technology for evaluation purposes | • How the technology may be used  
• Duration of use  
• Reporting results  
• Payment (optional)  
• Licence option terms (optional) |
| Option agreements   | When a potential licensee has an interest in a particular technology and wants to secure rights in the technology concerned, but is not ready to take up the technology immediately (e.g. if they wish to evaluate the technology, obtain finance, do feasibility studies, etc.) | • The right (but not the obligation) to take up a particular technology on specified terms  
• Term of option  
• Option fee (optional)  
• Process for exercising option  
• Pre-agreed licence terms specified upfront, which become binding if the option is exercised |
| Sub-contracts       | Where a principal contractor needs the services of another party to assist it in delivering on the principal agreement | • Work to be performed  
• Payment  
• IP  
• Other terms from the principal agreement applicable to the sub-contractor |
### Relevant IP-related contracts, when they are needed, and key provisions

<table>
<thead>
<tr>
<th>Type of agreement</th>
<th>When it is needed</th>
<th>Key terms</th>
</tr>
</thead>
</table>
| Deeds of recordal on IP | When CSIR staff (permanent staff or those on studentships) are sponsored by the CSIR for higher degrees, for which they register as students at a university but carry out the research towards their degree entirely or substantially at the CSIR, using CSIR facilities and funded by the CSIR. Prior to registration, an agreement must be reached on IP which may be developed by the student in the course of his/her studies, with the university at which the student is registered. | • Background IP is recorded  
• Ownership of foreground IP developed by the student  
• Recognition of contribution by university co-supervisor  
• Responsibilities for disclosing, protecting and managing the IP  
• Publication  
• Certain rights reserved for the university |
| Licence agreements      | To facilitate the transfer of CSIR technologies to parties who can take the technology to market  
On occasion, the CSIR may in-license technology from others                                                                                                                                          | • See page 45                                                                                                                                                                                          |
Technical or commercial discussions with people outside the CSIR

If one wishes to discuss a new technology with people outside the CSIR (e.g. current or potential collaborators, funders or commercial partners), it is very important that this be done under conditions of confidentiality. Whenever possible, it is desirable to postpone discussions until the technology has been disclosed and evaluated (see page 21), and a decision has been taken on whether or not to patent or otherwise protect it.

Prior to discussions, an NDA should be entered into, stating the purpose of the disclosure and the nature of the confidential information to be shared. It should be noted that such an agreement does not provide ironclad protection, so one should always consider carefully what information to share at any given time, and what to hold back. Nonetheless, a non-disclosure agreement may assist in proving and enforcing one’s rights if the other party breaches confidentiality, and also helps make sure that the receiving party is aware that the information is confidential, thereby preventing inadvertent disclosure on their part.

Most collaboration and funding agreements contain provisions dealing with the exchange of confidential information between the parties, in order to facilitate free discussion between the parties. In such cases, provided that the subject matter of the discussions is within the scope of the agreement, a separate non-disclosure agreement will not be needed.
Visiting scientists and visitors to the CSIR

Appropriate IP arrangements should be made in advance of the arrival of visiting scientists at the CSIR and agreed upon in a contract between the CSIR, the scientist’s employer and the visiting scientist.

This also applies to cases where CSIR researchers spend time working at other research institutions. Such CSIR researchers should ensure that they do not inadvertently agree to any terms imposed by a host institution which might prejudice any CSIR IP. All agreements from the host institution should be properly vetted in accordance with CSIR procedures.

Where short visits to CSIR facilities take place by people external to the organisation, due precautions should be taken to avoid inadvertent disclosure of IP or confidential information. These might include ensuring that visible computer monitors and whiteboards do not display confidential data, that access is supervised at all times and that discussions do not disclose confidential or proprietary information in the absence of an NDA.

Indigenous knowledge and biodiversity

The CSIR acknowledges the importance of indigenous knowledge systems and their contribution to scientific research. The CSIR works closely with indigenous knowledge holders to validate properties of indigenous knowledge and biological material brought to the CSIR. Where indigenous knowledge is used in the development of IP at the CSIR, the CSIR shares the benefits with the relevant indigenous knowledge holders according to the principles set out in South African and international law.
What is an invention?

An invention can be defined as the conception and/or development of a product or process which is new and useful.

A research outcome might constitute an invention if it meets some or all of the following criteria:

- It can be described as new, novel, unique and/or inventive
- It is unusual or unexpected
- It solves a significant problem
- It has commercial application and commercial value
- It is useful.

What is a technology disclosure?

This is the process of formally describing and recording an invention/idea/technology, together with relevant associated information, in order to set in motion the process of technology transfer. It involves an evaluation of the invention for patentability (or other forms of IP protection) and for its potential commercial and/or social value.

A technology disclosure may also be referred to as an invention disclosure.

When should I make a technology disclosure?

The process should be triggered as soon as one identifies that one has developed an invention or technology which offers a potential technology transfer opportunity. Technology disclosure must take place prior to any public disclosure (publication or presentation).
Technology disclosure process

1. **Potential for technology transfer identified**
   When an invention or technology is developed which has the potential to be applied in industry or society, the R&D Outcomes function should be informed. Where there is urgency to seek patent protection (e.g. because of pending publication or presentation), this should be clearly communicated as promptly as possible.

2. **Triage by R&D Outcomes function**
   The R&D Outcomes function carries out invention/technology triage (initial screening), with inputs from the inventors/developers/IP creators, to assess whether it is appropriate to take the disclosure further. This involves a preliminary assessment of the technology and the market and includes prior art searching (both literature and patent searches) to determine whether similar technologies have been patented or commercialised by others.

   - If there is no apparent market need, the disclosure process will not continue
   - If the technology is still too early-stage or if more information on commercial potential is required in order to make a decision on whether or not to make a formal technology disclosure, the R&D Outcomes function will recommend that further R&D and/or market research be performed, after which the disclosure process can be resumed.
5 Outcome of disclosure meeting
The discussion at the meeting, by consensus of those present, is intended to:

- Assess commercial potential, market opportunity, alternative applications, etc.
- Evaluate whether the invention is patentable, whether any other forms of formal IP protection apply and whether IP protection is likely to promote technology transfer
- Identify a project team to drive technology transfer
- Agree on key next steps and responsibilities (technical/IP protection/commercial).

4 Disclosure meeting with Licensing & Ventures
The R&D Outcomes function schedules a meeting with CSIR Licensing & Ventures, where the inventor/s and R&D Outcomes function present the technology so that the technology transfer opportunity can be evaluated and next steps discussed.

The NABC approach\(^1\) provides a useful framework for consideration of the key issues:

- Setting out the Need for the invention
- The Approach taken to address the need
- The Benefits of the technology and
- The Competition or alternatives, but alternative formats may be used.

3 Submission of technology disclosure
Where triage indicates a preliminary case for technology transfer, a technology disclosure form should be completed by the R&D Outcomes function, with input from the inventor/s. Log-in credentials should be requested from CSIR Licensing & Ventures for the online disclosure portal. Once completed, the form is submitted to CSIR Licensing & Ventures.

\(^1\) Adapted from Innovation – The Five Disciplines for Creating What Customers Want
How do I make a technology disclosure?

Researchers should promptly inform their R&D Outcomes function, either directly or via line management. Note that it is a duty to make disclosure, under the CSIR IP&TT Policy and in terms of the IPRPFRD Act. The R&D Outcomes function will screen the invention initially to determine whether it meets the criteria for a technology disclosure and advise on the next steps. These might include further R&D, supplying further data (technical and/or commercial), patent searching, etc.

If criteria are met and adequate data are available, the R&D Outcomes function will recommend that a formal technology disclosure be made to CSIR Licensing & Ventures.

What are the requirements for an invention to be patentable?

A patentable invention must be novel, have an inventive step (i.e. be unobvious) and be useful. It must also consist of subject matter which is eligible for patenting.

In order to be considered new, an invention must not have been made available or disclosed to the public before the patent application is filed, anywhere in the world.

An invention is considered to have an inventive step if such step would not be obvious to someone skilled in the technical field concerned.

Examples of subject matter which is not patentable are discoveries, theories, literary, musical and aesthetic works, business methods and computer programs.
When is it advisable to obtain patent protection?

In evaluating whether or not to obtain patent protection for a particular technology, the CSIR considers several factors. Patenting is generally advised when some or all of the following apply:

- The technology consists of patentable subject matter, and meets the requirements for patentability (i.e. novelty, inventive step and usefulness)
- A patent is likely to be a requirement for attracting a licensee who needs to exclude competitors in order to justify the investment necessary to take the technology to market
- The technology can be easily imitated or reverse engineered
- There is a reasonable possibility of someone else independently developing the same or a similar technology
- There is a need to publish information about the technology.

However, not all technologies are patentable, and some which may be patentable are not necessarily worth patenting, if this will not promote technology transfer. If the technology does not meet the requirements for patentability, if the costs of patenting cannot be justified in relation to the expected proceeds that the technology is likely to generate, or if a patent is not important to potential licensees, filing a patent application would not be desirable. Technologies with a short lifespan are typically not patented, as the technology may become obsolete before the patent is even issued. Conversely, certain technologies can enjoy protection indefinitely if they are maintained as trade secrets rather than patented, since if patented, the technology enters the public domain when the patent lapses and anyone is free to exploit it).

At the CSIR, we evaluate each case on its merits to determine which form/s of IP protection, if any, will represent the most effective route for dissemination and technology transfer.
WHERE THE DECISION IS TAKEN TO PROTECT CSIR IP FORMALLY, THE CSIR WILL:

- Select which form/s of protection will best promote technology transfer
- Decide when to file a patent application
- Evaluate where to seek IP protection
- Prosecute applications for IPRs
- Be responsible for the costs associated with patenting
- Seek to ensure that any relevant third party rights are taken into account.

Technology demonstrators and packages

A technology demonstrator can be defined as an output of an experimental development project that is ready to enhance capability, manufacture a product or deliver a service in a new manner. Technology demonstrators are typically at technology readiness level (TRL) 6. Technology demonstrators are managed by the R&D Office.

A technology package is an R&D output that is available for transfer in tangible form (such as a product, process, data pack or software, or some combination of these). It is developed and packaged into a format that allows the recipient to use, manufacture or reproduce it without additional development work by the CSIR. Technology packages should be disclosed via the technology disclosure process (see page 22) as they represent a technology transfer opportunity. TRLs for technology packages are typically around 8 – 9.
**Technology Readiness Levels (TRL)**

TRLs are a method of estimating technology maturity.

<table>
<thead>
<tr>
<th>TRL</th>
<th>Description</th>
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<tbody>
<tr>
<td>TRL 1</td>
<td>Basic principles observed</td>
</tr>
<tr>
<td>TRL 2</td>
<td>Technology concept formulated</td>
</tr>
<tr>
<td>TRL 3</td>
<td>Experimental proof of concept</td>
</tr>
<tr>
<td>TRL 4</td>
<td>Technology validated in lab</td>
</tr>
<tr>
<td>TRL 5</td>
<td>Technology validated in relevant environment</td>
</tr>
<tr>
<td>TRL 6</td>
<td>Technology demonstrated in relevant environment</td>
</tr>
<tr>
<td>TRL 7</td>
<td>System prototype demonstration in operational environment</td>
</tr>
<tr>
<td>TRL 8</td>
<td>System complete and qualified</td>
</tr>
<tr>
<td>TRL 9</td>
<td>Actual system proven in operational environment</td>
</tr>
</tbody>
</table>
Patent searching: Types of searches

Patent searches can be carried out for various reasons. The approach followed and the information sources consulted are determined by the reason for the search.

A **state-of-the-art search** provides information on patenting activity and trends in a particular field. The patent landscape information yielded by a state-of-the-art search allows researchers to keep track of developments in their fields of interest. The information obtained can be used to improve research design, by helping avoid duplicating work already done by others or providing inspiration for new research which works around the patents of others. It can also be used to gain intelligence on the R&D of one’s competitors.

A **novelty or prior art search** is performed to establish whether or not one’s invention is novel. It identifies publications and patents which pre-date one’s own invention and disclose inventions or technologies relevant or similar to one’s new invention. If any prior art is in existence prior to filing a patent application for one’s invention, the invention may not be patentable. One therefore wants to know about as much of the prior art as possible in advance, or as soon as possible, in order to avoid wasting resources on trying to patent something which in fact is not patentable, and to prevent costly legal liabilities from mounting up. The results of a novelty or prior art search are also valuable in guiding the formulation of one’s patent specification and developing one’s patenting strategy.

A **validity search** involves the identification of relevant prior art in order to be able to challenge the validity of an existing patent or patent application belonging to someone else, which competes with one’s own technology or affects one’s ability to practise one’s invention.

An **infringement or freedom-to-operate search** is carried out when one needs to determine whether practising a particular invention infringes on patent rights awarded over another invention. One examines patents which are in force in any territory of interest, whose claims might cover features of the invention in question, or the invention itself.
Patent searching: Resources

There are several patent databases available for searching. Some are free and others may be accessed only via paid subscription. One must of course also remember to search non-patent sources, including scientific publications and the Internet, when performing state-of-the-art and novelty/prior art searches. Assistance with patent searches can be obtained from your R&D Outcomes function, CSIR Licensing & Ventures and CSIRIS.

Because of the overwhelming amount of information that needs to be searched and the limitations inherent in the various available search tools, even when one uses one’s best efforts to try and locate all relevant information, it cannot be guaranteed that no relevant prior art exists, even when none is found after a thorough search. A diligent, systematic search will, however, significantly reduce the risks.

What happens if the CSIR decides not to obtain formal IP protection for a technology?

If as an outcome of the technology disclosure process a decision is made not to obtain formal IP protection for a technology, the technology may instead be protected as a trade secret. This requires all relevant information to be kept confidential, as the protection subsists only as long as the confidentiality remains in place. The technology can be transferred as know-how embodied in a technology package.

Alternatively, a decision might be made to put the technology into the public domain, so that it is freely available to anyone who wishes to exploit it.
IP PROTECTION

What is the difference between a provisional patent application and a complete application?

A **provisional patent application** requires a specification which fairly describes the invention, whereas a **complete application** requires a specification which fully describes the invention and contains claims defining the invention for which protection is being sought, together with methods for performing the invention and illustrative figures and examples.

If no further experimental work is envisaged, a complete application may be filed initially. But, more typically at the CSIR, a provisional patent application is filed in the first instance, as this offers certain advantages over filing a complete application at the start of the patenting process. A provisional application can usually be filed more quickly and at less cost, as the information required is less detailed. It secures a **priority date** for the invention, which means that novelty and inventive step are assessed according to information available up until the priority date. At the same time, it allows the patent applicant to obtain additional technical and/or commercial information before taking the process further and incurring further costs. Enhancements and improvements to the invention described in the provisional specification which are developed in the course of the priority period can be covered in a new provisional application or added to the complete application at the time of filing.

If no subsequent complete application is filed for an invention, the provisional application lapses. If the subject matter has not been publicly disclosed and remains novel and unobvious, the application may be re-filed at a later date.

However, if the applicant wishes to take the process further in order to obtain patent protection, a complete application must be filed within a year of the provisional filing date (priority date).
What is the PCT?

Where patent protection is required in multiple countries, the complete application is usually filed through the Patent Cooperation Treaty (PCT). The PCT system provides a centralised search and examination service, but it is not a patent-issuing authority. It issues an International Search Report, Written Opinion and International Preliminary Report on Patentability, which gives applicants the opportunity to respond at specified stages of the process, and assess whether it is worth taking the application to the next stage, based on whether a patent of wide enough scope is ultimately likely to be granted by an examining patent office. The PCT system allows applicants to defer the substantial costs and efforts of prosecuting a patent application in multiple territories until such time as the prospects of patentability and marketability of the invention are more certain.

However, where patent protection is only required in a couple of countries, complete applications can be filed directly in each of those countries within a year of the priority date, taking priority from the first application.

What is the National Phase of the PCT?

After the PCT process is complete, patent applications have to be filed at the national and regional patent offices of the territories where protection is sought. Some of these patent offices then proceed to conduct their own search and examination processes, while others will rely to a large extent on the PCT search and examination, before either granting or deciding not to grant a patent for the invention concerned.
How long does it take to obtain a patent?

0 MONTHS

Provisional Patent Application – Provides a priority date i.e. any similar subject matter developed or patent applications filed after the priority date do not affect the novelty of the invention application. Quicker, cheaper filing process.

12 MONTHS FROM THE DATE OF FIRST FILING

Patent Cooperation Treaty (PCT) application – A centralised application, search and examination process (but not a patent-granting authority). Retains the option for the patentee to obtain patents in multiple countries, while deferring the cost of a large number of individual applications.

16 MONTHS

International Search Report & Written Opinion issued – An international search is performed to find information that has been made available to the public in any form before the priority date that might be relevant to a patent’s claims of novelty and inventiveness, allowing the patentee to decide whether it is worth pursuing the patent application further.

18 MONTHS

Publication – PCT application is published and can be viewed by the public.

19 MONTHS

Demand for International Preliminary Examination – Optional step in the process, for cases where the patentee might wish to respond to the Written Opinion.

28 MONTHS

International Preliminary Report on Patentability (IPER) – Where no Demand is filed, this will follow the Written Opinion. Where a Demand has been filed, this might differ from the Written Opinion.

30-31 MONTHS

National phase entry – Patent applications filed in each country/region in which the patentee desires protection. Some examining national/regional patent offices accept the results of the IPER, while others conduct a new search and examination.

1 TO 5 YEARS AFTER ENTERING NATIONAL PHASE

Patent granted – Typical timeframe varies from case to case.

20 YEARS

Patent life-span – From the filing date of a complete application.
How much does it cost to obtain a patent?

Patenting is an expensive activity, with costs payable at different stages throughout the patent prosecution process. Once a patent is granted, renewal fees must be paid to keep a patent in force. Actual costs will vary depending on the technology, the documentation and data relating to the technology and the patent strategy for the invention concerned and will be determined by factors such as:

- Hourly charge-out rates of local and international patent attorneys
- Complexity of the invention (which may influence the length of the specification, number of claims and amount of time spent by the patent attorney)
- Official disbursements to patent offices
- Number and type of objections raised by patent examiners
- Number of countries in which applications are filed
- Translation costs for certain foreign filings.

### Estimated costs

- **Provisional:** R15-25K
- **PCT:** R80-100K
- **Demand for examination:** R50K
- **National phase applications:** R15-80K/territory
- **National phase prosecution:** ~50% of costs already incurred
- **Patent maintenance:** R5-15K/year/territory

The CSIR is entitled to apply for a rebate to claim back up to half of eligible IP expenses from NIPMO’s IP Support Fund.

Is it possible to obtain a “worldwide” patent?

A worldwide patent does not exist – patents are territorial and applications have to be filed in each territory where protection is required.
What is the effect of filing a patent application?
Once a patent application has been filed, one may disclose the subject matter it covers without prejudicing the novelty of the invention. One may not, however, stop others from using or exploiting the invention until such time as the patent is granted.

What is the effect of a patent grant?
Once granted, the patent right allows the holder to prevent others from using or exploiting the patented invention, for a period of **20 years** from the date of filing a complete application.

One may use or exploit an invention covered by a patent application or a patent only if one has “freedom-to-operate” – in other words, such use or exploitation must not infringe the rights of any other party.

What is the impact of patenting on publications?
When subject matter is publicly disclosed prior to filing a patent application, the novelty of that subject matter is destroyed. So, while the CSIR encourages the publication of research results, all proposed publications must be approved prior to submission for publication to ensure that opportunities for patenting or technology transfer are not inadvertently lost (see page 13). After a patent application has been filed and a priority date secured, any subject matter contained in the patent application may be published in scholarly journals or other publications without affecting novelty. There are, though, circumstances where it is advisable to delay publication even after a patent application has been filed. All relevant factors are taken into account to balance the benefits of publication and the technology transfer opportunity appropriately.
Who qualifies as an inventor on a patent?

Inventors must be properly named on a patent, as failure to do so may constitute grounds for invalidation of a patent. Only those individuals who actually make an inventive contribution to the claimed invention qualify as inventors and must be distinguished from those individuals who may have contributed to the invention by performing routine or tangential tasks under the instruction of the inventor/s. Determination of inventorship is both a factual and technical enquiry.

Assigning inventorship on a patent does not rely on the same criteria as assigning authorship on an academic paper, where under certain circumstances, individuals may be named as authors as a courtesy, or on the basis of only a minor contribution.

What happens if the CSIR does not wish to continue prosecuting a patent application or maintaining a patent?

Abandonment or lapsing of patents must be approved by the CSIR Executive Management Committee, who will generally only do so with a recommendation to that effect from CSIR Licensing & Ventures.

The CSIR is then obligated to refer the IP concerned to NIPMO, so that NIPMO may determine whether or not they should acquire the IP for the national good. If NIPMO decides to take up the IP, the CSIR will assign the IP to NIPMO. Inventors will retain the right to share in any benefits which might ultimately accrue from the commercialisation of the technology concerned. If NIPMO chooses not to take up the IP, the CSIR must offer it to any party who might have funded its development, and thereafter to the inventor/s. Where another party might have an interest in the IP concerned, the CSIR or NIPMO might recommend assignment of the IP to that party, on agreed terms.
WHAT FACTORS INFLUENCE THE CHOICE OF ROUTE TO MARKET FOR A PARTICULAR TECHNOLOGY?

Identifying the best route to market for a particular technology requires consideration of a range of factors, including:

• Potential applications of the technology
• Does it span more than one industry sector or not?
• Is the technology more commercially or more socially-oriented?
• Stage of development of the IP and associated technology
• Early stage, proof-of-concept or ready-to-use?
• Size and structure of the market for the technology and the associated value chains
• Additional investment required to bring a product to market
• Risks to the CSIR (both financial and reputational)
• Potential benefits which could be realised from the technology
• CSIR technology transfer preferences.
**CSIR technology transfer preferences**

The CSIR has developed a set of preferences that guide its technology transfer decisions and licensee selection. The preferences (set out in the CSIR Commercialisation Framework) are, wherever feasible, to transfer our technologies:

- By means of licence rather than assignment
- On a non-exclusive basis rather than on an exclusive basis
- To BBBEE (Broad-Based Black Economic Empowerment) entities
- To small enterprises
- To parties that made material contribution to the R&D giving rise to the IP to be transferred
- To parties that seek to use the technology/IP for the benefit of South Africa
- In a manner which seeks to maximise the impact of the technology/IP concerned
- In alignment with prevailing CSIR and national priorities.

**To license or to venture?**

One of the most important questions to consider in identifying the best route to market is whether to license the technology to an existing company, or whether to spin out a new company for the purpose of exploiting the technology. The advantages and disadvantages of each route depend on the nature of the particular technology and its market.

The choice will always be guided by the CSIR’s strategic objectives for technology transfer, and will be further influenced by the specific circumstances. New venture creation will invariably be a higher risk endeavour than a conventional licence to an existing company.
To license or to venture? (continued)

A licence may be the preferred route when:

• There is a single technology or application which on its own is unlikely to sustain a company.

• A company has an interest in the technology, which may complement its existing technologies and/or product lines, together with associated knowledge and expertise. It is difficult for a new company to compete in an established market unless the technology is overwhelmingly superior.

• There is a champion within the company to support and guide the process of taking the technology to market.

• The potential licensee has necessary supporting infrastructure, such as facilities and equipment.

• The licensee has sufficient funds to invest in further development and marketing of the technology.

• There are established distribution channels for the technology.

• A licensee’s brand name and reputation can promote quick take-up of the technology by customers.

• A low risk way to exploit the innovative technology is desired.

A new venture may be the preferred route when:

• The invention is a platform technology which may pave the way for multiple products or applications. A start-up company is more likely to try to exploit the full range of potential applications of a technology, whereas an established company will more likely focus on a single addition to its existing product line.

• There is no existing industry for the technology concerned or no licensee available with the necessary interest, expertise and infrastructure to take up the technology. This may be the case where the new technology is of a disruptive nature.
• The market is large enough to justify the risk and financial projections indicate a positive, realistic view of break-even point and return on investment. This is particularly true for technology requiring substantial investment in development. Since the failure rate of start-ups is often high, investors expect a large return on their investments from the winners and a small market will not provide adequate incentive to invest.

• Strong IP protection exists. Patents serve as the primary source of protection for small companies against larger companies entering a market once a technology is proven successful. Without patents, the market dominance of a large company as a second entrant can overpower an innovating small company.

• Mechanisms to transfer know-how and skills exist. Involvement of the inventors and technical specialists can play a critical role in this regard: if these individuals do not have an interest in participating actively in a new startup, the chances of success for the company will be diminished.

• There is an opportunity to promote regional economic development. The formation of new, successful, high-tech companies is seen as a route to local economic development through the creation of highly-paid skilled jobs as well as lower-skilled jobs.

• One wants to prove the new technology or innovation in order to be able to extract more value from the next stage of exploitation by a third party or establish a firmer basis for a commercial joint venture.
**Market research**

Strong market research is important to generate a thorough understanding of the potential market for a technology. Information on market needs, size, structure, players and barriers to entry can be used to target technology marketing efforts optimally, ensuring that the applications of highest potential can be pursued and the most suitable licensees, partners and investors can be identified and attracted, at the appropriate stages along the value chain. Market research can lead to decisions to move one’s R&D efforts or commercialisation strategy in a different direction, where it can be shown that this will improve the prospects for adoption of the technology. It can be incorporated into a professional business plan to strengthen the marketability of the technology.

A variety of sources and methods are employed to perform market research. Desktop research makes use of reports available for purchase, public domain information and subscription databases. Interviews with and surveys of key role-players can lend unique insight. Custom reports can be commissioned for a particular technology or market, aimed at providing information and filling gaps specific to the opportunity at hand.

**Some available resources to assist the technology transfer process**

**CSIR Seed Fund**

A CSIR Seed Fund has been established to support pre-seed and seed activities aimed at transforming CSIR technologies into licence-ready or investment-ready opportunities. It is not uncommon for technology development to languish once proof-of-concept is complete, due to lack of resources for non-R&D activities which are necessary for technology transfer, such as market research, business development, business plan writing, prototyping or piloting. The Seed Fund is intended to provide resources for some of these activities (including paying for technology inventors’ time to enable their involvement where appropriate) in order to optimise the chances of successful technology transfer.
Some available resources to assist the technology transfer process (cont.)

Entrepreneurs-in-Residence programme

From time to time, the CSIR engages entrepreneurs-in-residence (EIRs) to assist in identifying CSIR technologies which hold promise for technology transfer, developing a suitable business case, and packaging them into marketable opportunities. EIRs will typically be experienced business people with an established track record of identifying early stage high-tech opportunities and translating them into viable businesses, products or services. They will embed themselves in the work of particular units/centres or research groups in order to understand the R&D being carried out, usually on a limited term basis. In some cases, an EIR may be directly involved in starting up and managing a new venture established to commercialise CSIR technology.

What is the best way to identify and approach potential licensees?

Researchers are often acquainted with the main players in their fields and can tap into their industry contacts to identify potential licensees. CSIR Licensing & Ventures and R&D Outcomes staff also cultivate diverse personal and professional networks of potential licensees and investors.

Appropriate due diligence is carried out on potential licensees to ensure that they qualify as suitable parties with whom to conduct business. Due diligence covers a range of factors relating to a company’s eligibility as a licensee, including legal and financial standing, technical and business capabilities, and experience. This is governed by the CSIR Licensee Due Diligence Guidelines.

Where a new venture is created for the purpose of exploiting a CSIR technology, one or more entrepreneurs are required to start up and manage the company. Such entrepreneurs may be CSIR researchers or managers who were involved in the technology development and commercialisation process, EIRs or third parties with the relevant credentials, experience and interest. An Entrepreneur Selection Framework is in place which sets out the necessary criteria sought by the CSIR for its entrepreneurs, as well as the process in terms of which entrepreneurs are approved.
What is a licence?

A licence is an agreement in terms of which a holder of a right allows a third party to use that right, usually in return for some form of remuneration. Technology transfer from the CSIR is usually facilitated via licensing, which involves the granting of permission to a licensee to use CSIR IP for a stated purpose, under defined conditions. The CSIR retains ownership over the IP concerned. The licensee may be an existing company or a new venture created for the purpose of exploiting the technology. In the latter situation, the CSIR may establish a new wholly-owned company, enter into a joint venture with one or more partners or play a role in facilitating the start up of a new company by other parties (including CSIR staff, especially those who might have been involved in developing the technology which the company plans to exploit). The licensing consideration may include licence fees or an equity stake for the CSIR in the company concerned, or a combination of both.

What does assignment of IP entail?

Assignment is an alternative mechanism to licensing which may be used for technology transfer. This involves the selling of IP (i.e. ceding ownership). The CSIR engages in licensing as a preferred option, as this allows the CSIR to play a more active role in ensuring effective exploitation of the IP.
**Should a technology be licensed exclusively or non-exclusively?**

<table>
<thead>
<tr>
<th>Licence Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Exclusive licence:</td>
<td>Only a single licensee may use the technology</td>
</tr>
<tr>
<td>Sole licence:</td>
<td>Only the licensor and a single licensee may use the technology</td>
</tr>
<tr>
<td>Non-exclusive licence:</td>
<td>Multiple licensees may use the technology</td>
</tr>
</tbody>
</table>

Where technology is licensed at an early stage, requiring further investment from a licensee to develop a market-ready product (which is frequently the case with CSIR technologies), exclusive rights might be required to induce the licensee to make the necessary investment in the technology, ensuring that it has some protection from competitors.

Nonetheless, where feasible, non-exclusive licensing is promoted as a preferred option (which might typically be in the case of a ‘ready-to-use’ or ‘off-the-shelf’ technology), as this can facilitate wider use of the technology.

At the CSIR, we assess which mechanism is likely to be most effective in bringing the technology to market and which will best promote the use of the technology in the public interest, on a case-by-case basis. Requirements of the IPRPFRD Act are also taken into account. Where exclusive licences are granted, this is generally on the condition that the licensee undertakes to practise the licensed invention diligently, encouraged through the inclusion of contractual performance obligations dealing, for example, with minimum payments, loss of exclusivity and/or achievement of milestones. By delineating specific fields of use or territories in an exclusive licence agreement, the opportunities for exploitation can be optimised.
Equity stakes and investment in new ventures

Where a new venture is established to commercialise a technology, the CSIR will make a considered decision on the merits of the case as to whether or not to take equity and/or make a direct financial investment.

On the one hand, an equity stake is likely to bring the highest returns in the event that the company becomes very successful. Investors and shareholders often welcome this, as equity in lieu of licence fees or in exchange for reduced fees improves cash flow, allowing profits to be reinvested in the company instead, especially during early development.

However, realising value from equity holdings can be difficult and can take a long time. Equity stakes are often diluted when the company raises new capital. Administration of equity positions and financial investment can be time-consuming and labour-intensive, detracting from CSIR core business. In some cases, representation on company boards by CSIR employees can present a conflict of interest. Certain transactions also require complex regulatory approval processes to be followed.

In cases where the CSIR might choose to follow the equity route, it would generally take up a non-controlling interest with a clear exit plan.

CSIR licence negotiations

Prior to embarking on licence negotiations, a term sheet is drawn up, setting out the proposed licence terms and parameters, which are approved by the Executive Management Committee. Typically, CSIR Licensing & Ventures or the relevant R&D Outcomes function will take the lead in the licence negotiations. Researchers are expected to provide support on technical issues and share their insights into the relevant industry and applications of the technology. They are encouraged to participate actively in the technology transfer process, and their views and preferences are considered by the CSIR in reaching a licence deal.
SOME KEY TERMS OF A LICENCE AGREEMENT

• **Licensed technology** – must be properly defined in terms of relevant patents/patent applications, know-how and tangible property (e.g. software, datapack, etc.)

• **Scope of licensed rights** – what the licensee is entitled to do with the licensed technology (e.g. make, sell, use, import, etc.), and whether this is on an exclusive or non-exclusive basis

• **Field of use** – which field/s or sector/s the licensee may operate in, or which applications the licensee may use

• **Territory** – which countries the licensee may operate in

• **Licence term** – how long the licensed rights will remain in force (in the case of patented technology, this is typically for the life of any relevant patents)

• **Consideration/payments** – licence fees to be paid by the licensee in exchange for the licensed rights

• **Diligence/performance provisions** – to ensure performance on the part of the licensee (especially important in the case of exclusive licensing)

• **Sub-licensing** – is it permitted and under what conditions?

• **Prosecution and maintenance of IPRs** – whether the licensor or licensee is responsible for decision-making and payment

• **Infringement and enforcement of IPRs** – who is entitled to take action against infringers and how will any proceeds realised be shared?

• **Improvements** – who owns the rights to improvements made by the licensee? Does the licensee have access to improvements made by the CSIR (and if so, on what terms)?
How long does the technology transfer process take?

There is no rule of thumb to predict how quickly a technology will be licensed, and even once licensed, it is difficult to determine how quickly it will be successfully commercialised and begin generating revenue. Factors such as the stage of development of the technology and the resources available to the CSIR for commercialisation and to the licensee for development and marketing will influence this. Technology transfer is rarely a quick process and will usually take several months at the least and in many cases even years.

External partners and investors

The CSIR actively pursues relationships with external parties who can invest in or otherwise support its technology transfer activities. These include public funding and investment agencies like the Technology Innovation Agency (TIA) and the Industrial Development Corporation (IDC), private venture capital companies and associations, angel investors, accelerators and incubators.
OPEN INNOVATION, OPEN SOURCE, OPEN ACCESS AND OPEN CONTENT

An R&D organisation like the CSIR thrives and survives on the basis of productive collaborations. **Open Innovation** is one mechanism for facilitating collaboration, by recognising that innovative capacity can be harnessed more effectively by bringing into the organisation ideas developed elsewhere, while at the same time sharing one’s own ideas with external partners. The Open Innovation paradigm does not replace conventional IP management and technology transfer and can operate in parallel with more proprietary approaches to R&D. It can be a useful mechanism when adopted as part of a deliberate and holistic technology development strategy.

**Open source** refers to computer software whose source code is made available to the public to use, modify and improve the software under terms stipulated in a selected open source licence agreement, and to make such modifications and improvements available to others on the same terms. The CSIR uses open source software as a research tool, and also utilises open source licences for release of CSIR-developed software as a mode of technology transfer as and when appropriate. Enabling guidelines for the use and production of Free and Open Source Software (FOSS) in CSIR projects have been developed to aid researchers in making prudent and effective use of open source software.

**Open access** refers to unrestricted online access to academic articles and certain other materials. Authors can choose to publish in open access journals, where content is automatically freely accessible or when publishing in subscription journals, to make their works available online via a public or institutional repository, like CSIR ResearchSpace.

**Open content** also involves making content available to others, but will typically grant others the right to modify the content (which is not usually the case with open access). Conditions of use may be specified in licences such as the Creative Commons licences.
What factors influence the revenue that may be generated from a particular technology?

Factors which affect the licence fees a technology might attract include the type of technology, the R&D investment to date, its stage of development, potential market size, expected profit margin, level of risk, strength of patent protection and projected cost of bringing a product to market, industry standards for similar technologies and the scope of the licence (in respect of territories, fields of use and degree of exclusivity).

The fact that technologies from an organisation like the CSIR are usually licensed at a relatively early stage, requiring substantial investment from the licensee to develop a product to a market-ready stage (and an associated appetite for risk), means that licence fees often represent only a small percentage of the income ultimately generated by the technology for the licensee. The CSIR’s main priority is to see technologies effectively transferred and taken up in the market and the CSIR will not seek to maximise financial returns to the organisation where this would jeopardise exploitation.
LICENCE FEES

There are various types of licence fees. A licence agreement will typically include some combination of these, payable at different stages of the licence’s duration, in response to defined timelines or events. Fees may be paid as:

- Initial/upfront payments
- Phased/staged payments
- Running royalties, usually calculated as a percentage of a stipulated base (e.g. net sales)
- Milestone payments, paid out when agreed milestones are reached
- Annual licence maintenance fees, paid to keep the licence in force (may include some support from the licensor)
- Minimum royalties, payable whether or not the sales threshold is reached
- An equity stake in the licensee company may be taken as all or part of the licence consideration.
Socially Responsible Licensing

Socially Responsible Licensing (SRL) provides a means of addressing market failures which might otherwise prevent technologies reaching people who can benefit from them due to insufficient commercial incentive. Where a technology offers a potential solution to address a problem in underserved markets (typically in fields such as health care, food security, sanitation, energy, education, technology accessibility, etc.), the technology transfer agreement should, where feasible and appropriate, include terms to promote access to the technology concerned in the relevant market/s. SRL is generally not an alternative approach to commercial licensing, but rather a parallel mechanism involving the inclusion of SRL terms complementary to commercial terms in a single licence agreement. The commercial terms govern exploitation of the technology in more profitable markets, providing sufficient incentive to licensees or assignees to further develop and market the technology, while the SRL terms promote access in markets which the licensee may not otherwise have been incentivised to enter. SRL therefore serves to increase the reach and the impact of the technologies concerned.

Instant Access licensing

The CSIR offers the option for certain technologies available for licensing to be licensed under an Instant Access licence. This is a simplified contractual process aimed at increasing uptake and dissemination of CSIR technology and IP, in order to ensure greater impact of the CSIR in South Africa. Essentially, this approach makes use of a 3-page template agreement which grants a non-exclusive licence for a limited duration, subject to the payment of a nominal royalty. A more comprehensive, longer-term licence may subsequently be negotiated. Instant Access licensing is considered particularly beneficial for technologies which are not currently being actively marketed and which do not have obvious licensees willing to take up the technologies concerned. It is also useful where a short evaluation period might be required by the licensee, for example to test possible business models, assess commercial viability or scale.
Benefit-sharing

When CSIR technologies generate **passive income**, inventors/key creators stand to share in these according to the CSIR Benefit-Sharing Framework. ‘Passive income’ refers to payments such as licence fees, milestone payments and royalties, but excludes direct sales made by the CSIR and income from contract R&D.

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**BENEFIT-SHARING FORMULA**

For the first one million rand generated by a particular technology:

- 30% of gross revenues earned by the CSIR (i.e. prior to deduction of tracked costs)\(^3\) go to the IP Creator/s
- Tracked costs are deducted from the balance
- 75% of the remaining funds go to the unit/centre
- The remaining 25% of the funds go to CSIR Licensing & Ventures for the purpose of supporting technology transfer activity.

Thereafter:

- 30% of net revenues earned by the CSIR (i.e. after deduction of tracked costs) go to the IP Creator/s
- 50% of net revenues go to the unit/centre
- 20% of net revenues go to the Licensing & Ventures function for the purpose of supporting technology transfer activity.

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3 Tracked costs may be incurred in the prosecution, maintenance and defence of patents, and in the course of the technology transfer process (e.g. for market research or business development).
Notes
### Abbreviations and acronyms

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<td>IDC</td>
<td>Industrial Development Corporation</td>
</tr>
<tr>
<td>IP</td>
<td>Intellectual Property</td>
</tr>
<tr>
<td>IP&amp;TT Policy</td>
<td>CSIR Intellectual Property and Technology Transfer Policy</td>
</tr>
<tr>
<td>IPR</td>
<td>Intellectual Property Right</td>
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<tr>
<td>IPRPFRD Act</td>
<td>Intellectual Property Rights from Publicly Financed Research and Development Act (No 51 of 2008)</td>
</tr>
<tr>
<td>MoA</td>
<td>Memorandum of Agreement</td>
</tr>
<tr>
<td>MoU</td>
<td>Memorandum of Understanding</td>
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<td>MTA</td>
<td>Material Transfer Agreement</td>
</tr>
<tr>
<td>NDA</td>
<td>Non-Disclosure Agreement</td>
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<td>NIPMO</td>
<td>National Intellectual Property Management Office</td>
</tr>
<tr>
<td>PCT</td>
<td>Patent Co-operation Treaty</td>
</tr>
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<td>R&amp;D</td>
<td>Research and Development</td>
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<td>SRL</td>
<td>Socially Responsible Licensing</td>
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<td>TIA</td>
<td>Technology Innovation Agency</td>
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<td>TRL</td>
<td>Technology Readiness Level</td>
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### Further information:

Further information on the topics discussed here can be found on the CSIR Licensing & Ventures Technology Transfer Portal

http://techtransfer.csir.co.za