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Overview of Knowledge Transfer in Research Organizations

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1 Introduction to knowledge transfer in the university environment

The role of the university is not limited to teaching and research, but includes a third role and another academic mission, namely to engage with society. In addressing the growing social and economic challenges, research institutions everywhere are facing a growing demand for the integration of their research and teaching expertise related to this so-called third role of universities and the so-called mission. The 'third mission' is not just a phrase but is increasingly important in shaping the relationship between academia and the commercial sphere in its various forms. Being part of Vision 2030 and beyond and supporting the knowledge economy requires a greater emphasis on the links between universities and industries and the products related to their research.

This is a clear challenge for the majority of newly established transfer centres (mostly by 2012) at universities in the Czech Republic. The main impetus to change this relationship comes from the Czech government through the Ministry of Education, Youth and Sports to promote the knowledge economy and link R&D results towards the commercial sphere, as well as to link impulses, current challenges and problems addressed in the corporate sphere towards the university.

1.1 Useful concepts

As in any discipline, knowledge and technology transfer uses a specific language. For the sake of clarity, let us list the basic meanings of the most important terms:

Application sphere - any organisation or entity outside the original research organisation (university) in which the results of research activities can be applied. The application sphere thus includes not only industry and companies, but also, for example, other research and development institutions, non-profit organisations, hospitals, state and public administration.

Applied research according to (OECD, 2015) - original research carried out with the aim of obtaining new knowledge. However, it is primarily directed towards a specific practical aim or objective. Applied research is conducted either to identify possible applications of basic research findings or to establish new methods or ways of achieving specific and predetermined objectives. It also means considering available knowledge and extending it to solve current problems. In the business sector, the distinction between basic and applied research is often marked by the creation of a new project to explore the promising results of a basic research programme (and a shift from a long-term to a medium-term perspective in the in-house exploitation of R&D results. The results of applied research should be primarily aimed at possible applications in products, operations, methods or systems. Applied research gives ideas a form that can be used in operations. These applications of derived knowledge may be protected by intellectual property protection tools,

including confidentiality.

> European definitions (Commission Communication - Framework for State aid for research, development and innovation (2022/C 414/01), 2022) states that it is a collective term for industrial research, experimental development or a combination of both. Czech legislation (Act No. 130/2002 Coll. on support for research and development from public funds, 2002) defines applied research as theoretical and experimental work aimed at acquiring new knowledge and skills for the development of new or substantially improved products, processes or services.

Experimental development according to (OECD, 2015) - systematic work, drawing on research findings and practical experience and producing further knowledge, that is aimed at creating new products or processes or improving existing products or processes. According to (Communication from the Commission - Framework for State aid for research, development and innovation (2022/C 414/01), 2022) experimental development is the acquisition, combination, shaping and application of existing scientific, technological, commercial and other relevant knowledge and skills for the purpose of developing new or improved products, processes or services, including digital products, processes or services, in any field, technology, industry or other sector (including, but not limited to, digital industries and technologies such as supercomputing, quantum technologies, blockchain technologies, artificial intelligence, cybersecurity, big data and cloud or edge computing technologies).

Infrastructure for testing and experimentation - facilities, equipment, capacities and resources such as test benches, pilot lines, demonstration facilities, test facilities or live laboratories, and related support services, which are used predominantly by enterprises, in particular SMEs, applying for support to test and carry out experiments to develop new or improved products, processes and services and to test and disseminate technologies to advance industrial research and experimental development. Access to publicly funded testing and experimentation infrastructures shall be open to multiple users and shall be provided on a transparent and non-discriminatory basis and on market terms. Testing and experimentation infrastructures may also be known as technology infrastructures.

Non-economic activities of research organisations in terms of public support (not tax liability):

a) primary activities of research organisations and research infrastructures, in particular:

   i. training to increase the numbers and improve the skills of human resources. It considers public education organised within the state education system, which is largely or wholly financed by state resources and controlled by the state, to be a non-economic activity.

   ii. Independent R&D to gain new knowledge and better understand the topic, including collaborative R&D where the collaboration involving the research organisation or research infrastructure is effective.

   iii. public dissemination of research results on a non-exclusive and non-discriminatory basis, for example through teaching, open access databases, publicly available publications or open source software.

b) **knowledge transfer** activities, provided that they are carried out either by or on behalf of the research organisation or research infrastructure (including their departments or branches) or jointly with or on behalf of other such entities, and provided that any profits from such activities are reinvested in the primary activities of the research organisation or research infrastructure. The non-economic nature of these activities shall be maintained even if the supply of the corresponding services is entrusted to third parties through an open procurement procedure.

Arm´s length - a situation where the terms of the transaction between the parties do not differ from those that would be agreed between independent undertakings and do not involve an element of collusion. The Arm´s length conditions´ principle is considered to be satisfied in the case of a transaction preceded by an open, transparent and non-discriminatory procedure.

Research and knowledge dissemination organisation or research organisation - an entity (e.g. a university or research institute, a technology transfer agency, an innovation intermediary, a physical or virtual collaborative research entity), regardless of its legal status (established under public or private law) or method of funding, whose main objective is to carry out independently basic research, industrial research or experimental development or to disseminate publicly the results of these activities through teaching, publications or knowledge transfer. If the body also carries out economic activities, separate accounts must be kept for the funding, costs and income of these economic activities. Undertakings which may exercise a decisive influence over such an entity, for example as shareholders or members, must not have preferential access to the results obtained.

Industrial research by (Commission Communication - Framework for State aid for research, development and innovation (2022/C 414/01), 2022) - Planned research or critical investigations aimed at acquiring new knowledge and skills for the development of new products, processes or services or for the substantial improvement of existing products, processes or services, including digital products, processes or services, in any field, technology, industry or other sector (including but not limited to digital industries and technologies such as supercomputing, quantum technologies, blockchain technologies, artificial intelligence, cybersecurity, big data and cloud computing technologies). It includes the creation of sub-assemblies of complex systems and may include the production of prototypes in a laboratory environment or in an environment with simulated interfaces with existing systems, as well as the production of pilot lines where necessary for industrial research and in particular for general technology validation

Knowledge and technology transfer - mutually enriching targeted dissemination of knowledge, skills, know-how and technology from the research organisation to the application sphere and vice versa. European definition (Commission Communication - Framework for State aid for research, development and innovation (2022/C 414/01), 2022) states that: **'knowledge transfer'** is the process of acquiring, collecting and sharing explicit and tacit knowledge, including skills and competences, in economic and non-economic activities such as collaborative research, consultancy, licensing, spin-offs, publications and mobility of researchers and others involved in these activities. In addition to scientific and technical knowledge, it also includes other types of knowledge, such as knowledge relating to the application of standards and the legislation in which these standards are embodied, knowledge of the conditions of the real operating environment and methods of organisational innovation, as well as knowledge management in relation to the identification, acquisition, safeguarding, protection and exploitation of intangible assets. **Commercialisation** is then a subset of knowledge and technology transfer leading to market application and subsequent monetisation.

Effective collaboration - cooperation between at least two independent parties to exchange knowledge or technology or to achieve a common goal on the basis of a division of labour, where the parties concerned jointly define the scope of the cooperative research project, contribute to its implementation and share its risks and results. The costs of the project may be borne in full by one or more of the parties, thereby relieving the other parties of their financial risks. Contract research and the provision of research services are not considered forms of cooperation.

Exclusive development - the procurement of research and development services for which all the benefits obtained accrue exclusively to the contracting authority or contracting entities and which may be used by them in the performance of their activities, provided that they pay for the services in full.

Research and development - according to the Frascati Manual (OECD, 2015) research and experimental development (R&D) consists of creative/creative and systematic work undertaken to increase the level of knowledge, including knowledge of humanity, culture and society, and to devise new ways of applying available knowledge. The goal of research is always new knowledge, based on original concepts (and their interpretation) or on hypotheses. R&D is, by definition, always largely uncertain as to the final outcome (or at least the amount of time and resources needed to achieve it) and is aimed at producing results that could be either freely transferable or traded on the market. R&D must fulfil five basic criteria:

- The activity must contain an element of novelty
- Must be creative/creative
- Contain an element of uncertainty
- Be systematic
- Be transferable and/or reproducible

R&D includes three categories of activities - basic research, applied research and experimental development

Research infrastructure (Commission Communication - Framework for State aid for research, development and innovation (2022/C 414/01), 2022) - Facilities, resources and related services used by the scientific community to carry out research in their respective fields, including scientific equipment or toolkits, knowledge-based resources such as collections, archives and structured scientific information, ICT infrastructures such as Grids, computer and software equipment, communication facilities, as well as any other elements of a unique nature that are necessary to carry out research. These infrastructures may be located in one place or may be 'distributed' within a network (organised network of resources).

Basic research according to (OECD, 2015) - Experimental or theoretical work carried out primarily to gain new insights into the basic principles of phenomena or observable facts and not primarily aimed at any specific application or use in practice.

1.2 Activities of the Technology Transfer Office

The main activities of the Technology Transfer Office include (see Figure 1) above all, the comprehensive protection of intellectual property, which is at the very heart of any such centre. This area requires a specialist who oversees the sub-results of R&D and proactively handles researchers' searches in the required areas.

An equally necessary and important activity is the project activity focused on technology transfer.

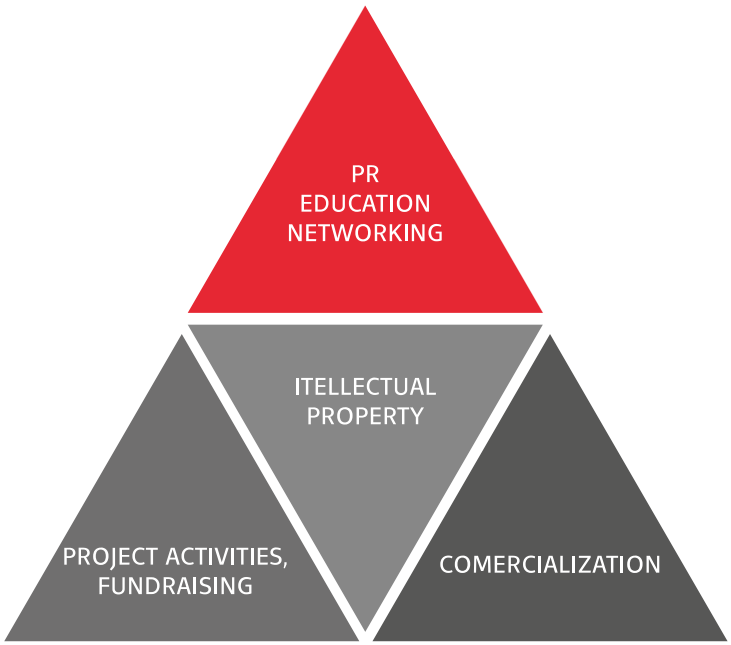


Figure 1 Diagram of the main activities of the Technology Transfer Office

Nowadays, any endeavour cannot be imagined without promotion and marketing, as well as educational activities both towards the university and towards its surroundings.

In terms of commercialisation and specificity of R&D results, an equally important role of each office is its networking within regional, national and international structures with major innovation players.

Knowledge transfer process

The commercialisation process is generally defined as the process of turning an idea into commercial products or services. For most scientific research institutions, this means commercially developing the intellectual property (IP) that has been created as part of the research, with the aim of producing successful commercial outcomes that have a positive impact for wider application in society.This is usually achieved through commercial licensing of intellectual property to an existing business organisation or the creation of a new spin-off company to ensure the distribution of new products or services to the market.

The whole process of protecting the results of industrial property and the subsequent commercial application of scientific knowledge can be divided into several downstream activities, the so-called process. The process starts with the identification of research knowledge that could be used in practice and therefore has the greatest potential to do so. Then, with the help of experts, it is

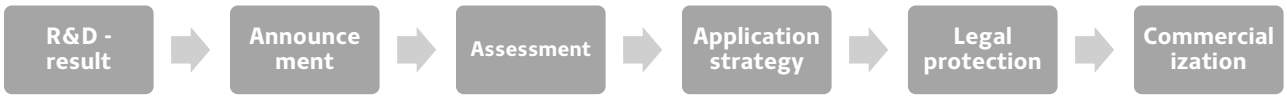


Figure 2 Basic diagram of the technology transfer process

verified whether this knowledge has real commercial potential. This is followed by a decision as to whether the institution, as employer, will exercise the rights to the knowledge or whether these rights can be exercised by the researcher as originator of the knowledge. In the next stage, protection of the industrial property rights is ensured and the appropriate subsequent commercial exploitation is determined. In order to facilitate the transfer of R&D results into practice, specialised offices or departments have been set up at many institutions to deal with this agenda, generally in the form of technology transfer centres, which ensure the step-by-step commercialisation process.

The fundamental contribution and grasp of technology transfer processes lies primarily in the setting of transparent rules that will be or are applied internally for scientific/knowledge workers.

2 Research results as intellectual property

In addition to their core activities, public universities or academic institutions also become a source of information and new knowledge that can be used in the commercial sphere. This knowledge contributes not only to the development of knowledge but also to the development of the social sphere or area. Applied research and development results from commercial entities can also provide funding that will subsequently be used to further the overall development of the institutions concerned.

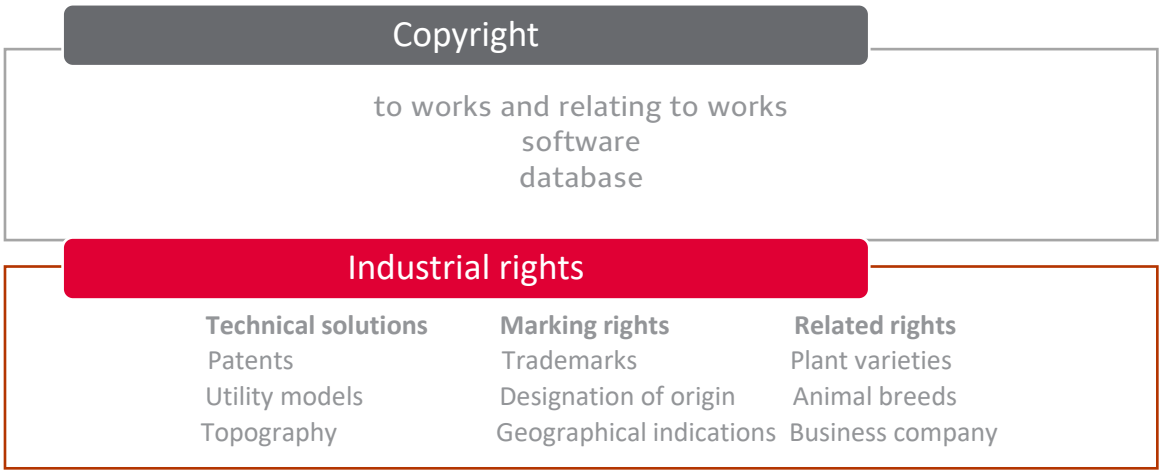
Thus, the creation of intellectual property is an integral part of scientific work, and by definition, it leads directly to it. The goal of research and development work is the acquisition of new knowledge and skills that can then be demonstrated in many physical (tangible) forms.

A number of laws and international conventions deal with the concept of intellectual property. For example, the Convention establishing the World Intellectual Property Organization (WIPO, 1967) defines intellectual property as rights:

- To literary, artistic and scientific works,
- For performances by performers, sound recordings and radio broadcasts,
- Inventions from all fields of human activity,
- On scientific discovery,
- To industrial designs and models,
- To factory, trademark and service marks, as well as to trade names and trade names,
- To protect against unfair competition
- and all other rights relating to intellectual activity in the industrial, scientific, literary and artistic fields.

The different types of results then more or less replicate the individual legal regulations. Their international harmonisation is at a very different level and changes dynamically over time. Therefore, when cooperating in an international environment, it is always necessary to check what the current and locally appropriate legislation is and to clarify the mutual understanding with the partner.

Intellectual property rights in the Czech environment can be divided into two main groups (according to the groups of related laws).



Sometimes these two are joined by a group of so-called competition rights, in particular trade secret protection, consumer protection, protection against unfair competition, protection of personality and a number of others.

To work in knowledge and technology transfer (KTT), it is essential to mentally accept that individual rights can work in synergy and complement each other. It is necessary to work with a package of results and rights that we want to transfer with respect and knowledge of the context.

2.1 Copyright

Copyright primarily served to protect artistic creators, especially literary works. With modern times and the development of thousands of different creative possibilities, copyright has expanded and tries to cover reality, but quite naturally, it always falls a little short. The digital world, then, is a chapter of its own, with lawyers arguing and continually debating how it should be done, and the moment they solve one problem, many more emerge. So let's focus on the principles.

(Act No. 121/2000 Coll., Act on Copyright, on Rights Related to Copyright and on Amendments to Certain Acts) states:

§2 Works of authorship

The subject matter of copyright is a literary work and other artistic and scientific work which is the ***unique result of the creative activity of the author*** *and is* ***expressed in any objectively perceptible form****, including electronic form, permanently or temporarily, regardless of its scope, purpose or meaning (hereinafter referred to as "work"). In particular, a work is a verbal work expressed in speech or writing, a musical work, a dramatic work and a work of music-drama, a choreographic work and a work of pantomime, a photographic work and a work expressed by a process similar to photography, an audiovisual work such as a cinematographic work, an artistic work such as a work of painting, graphic art and sculpture, an architectural work including a work of urban design, a work of applied art and a cartographic work.*

A work is also considered to be a ***computer program****, a photograph and a creation expressed by a process similar to a photograph, which* ***are original in the sense that they are the author's own intellectual creation. A database which is the author's own intellectual creation in the manner of selection or arrangement of its contents*** *and the components of which are systematically or methodically arranged and individually made available electronically or in any other manner is a work in the aggregate. Other criteria for determining the eligibility of a computer program and database for protection shall not apply.*

The copyright shall extend to the completed work, its various stages of development and parts, including the title and the names of the characters, provided that they meet the conditions of paragraph 1 or paragraph 2 in the case of the objects of copyright therein.
The subject matter of copyright is also a work created by the creative processing of another work, including the translation of a work into another language. This is without prejudice to the right of the author of the work processed or translated.

A collection, such as a magazine, encyclopaedia, anthology, tape, exhibition or other collection of independent works or other elements, which, by the manner of selection or arrangement of its contents, satisfies the conditions of paragraph 1, shall be a complete work.
A work under this Act ***shall not include****, in particular****, the subject matter of a work per se****, a daily report or other data per se, an* ***idea, procedure, principle, method, discovery, scientific theory, mathematical or similar formula, statistical graph or similar subject matter per se****.*

§ 3 Exceptions to protection under copyright law in the public interest
Protection under copyright law does not apply to
,
an official work, which is a legal regulation, a decision, a measure of a general nature, a public document, a publicly accessible register and a collection of its documents, as well as an official draft of an official work and other preparatory official documentation, including an official translation of such a work, parliamentary and senate publications, commemorative books of a municipality (municipal chronicles), a state symbol and a symbol of a unit of local self-government, and other such works for which there is a public interest in excluding them from protection,

creations of traditional folk culture, unless the true name of the author is generally known and the work is anonymous or pseudonymous (§ 7); such work may be used only in a manner that does not diminish its value.

The basic rule is that copyright applies in principle to anything that has been created by human creativity (some countries also recognize the creativity of animals, especially elephants, and artificial intelligence is widely debated) and has been expressed in an objectively perceptible form that can be evidenced in some way.

2.1.1 Basic principles of copyright

The emergence of

Copyright arises automatically when the conditions for the creation of a copyright work are fulfilled (see above). They are valid almost worldwide and are enforceable.

Duration

Copyright lasts for the lifetime of the author and for 70 years after his death. In the case of co-authored works, 70 years after the death of the last co-author. This period is determined by Czech law. The international convention says that the period should be at least 50 years from the death of the author, some countries give up to 90 years. Therefore, it is necessary to look at the local regulation of the duration of rights. Copyrights are inherited and heirs often enforce them.

Territoriality

In fact, it can be said to apply throughout the civilized world. Copyright is very well harmonised across different systems. Enforcement of rights is a separate chapter.

Duality of copyright

Personality rights, which are inextricably linked to the author, are non-transferable, cannot be waived by the author and cease upon the death of the author. In principle, it is the right to mention or not mention the author's name in connection with the work. There is also the right to preserve the integrity of the work and the right to decide on the disclosure of the work, but this part of the right is usually significantly limited if the author is employed.

Property rights, i.e. the rights to use the work, to dispose of it for profit, are transferable rights and in most European countries they automatically pass to the author's employer. In principle, these are options that lead to the economic appreciation of the work, the possibility of receiving money for it.

2.1.2 Software, photos, databases, maps

Copyright also includes rights in special works where the question of creativity may be in dispute. It is important to note that legislation is always somewhat behind the technological world and only belatedly responds to problems that arise in practice. For this reason, it is only subsequently that rights in computer programs have been included among copyright. In the case of computer programs and photographs, it is sufficient if they are original, i.e. the author's own intellectual creation. Rights in computer programs are regulated by the Copyright Act in §65 and §66 (Act No. 121/2000 Coll., on Copyright, on Rights Related to Copyright and on Amendments to Certain Acts).

A database can sometimes take on the quality of a work of authorship in that its internal architecture, the way it selects and links content, can be the creative, intellectual creation of the author. Such a database is then viewed as a work of authorship (a body of work).

In addition, however, there are also the rights of the database provider, regardless of whether the database itself is or is not copyrightable. The Copyright Act deals with this topic in the section TITLE III - Special right of the database provider. In a nutshell, this special right provides an advantage to the person who has made the effort and resources to acquire and make the database available. This right lasts for 15 years from the acquisition or making available of the database, counting anew from each new record. The acquirer of the database can thus decide the conditions under which it will allow the exploitation of its database and can offer different types of licences to allow users to exploit the data. Again, there are so-called free legal licenses of free use, see chapter 2.1.4.

2.1.3 Employee and school works

(Act No. 121/2000 Coll., Act on Copyright, on Rights Related to Copyright and on Amendments to Certain Acts) specifies quite clearly what happens to a copyright work created in the course of employment:

§ 58 - Employee work

Unless otherwise agreed, the employer shall exercise in its own name and on its own

account the author's proprietary rights in the work created by the author to fulfil its obligations arising from the employment or service relationship. Such a work is an employee's work. ...

Upon the death or termination of the employer who was entitled to exercise the property rights in the employee's work and who has no legal successor, the author becomes entitled to exercise these rights.

Specific situations arise when the authors are students. The extreme claim by some professors that a student can never create anything must be categorically rejected. Creativity is not determined by education or the wisdom of age; creativity and works of authorship can be produced from early childhood and copyright belongs to them as fully as to the works of more mature and educated individuals.

Students do not usually have an employment relationship with their school. In some cases, however, they are, and then they are covered by the regime in the previous subchapter. The Copyright Act specifically regulates the rights in works of students who are not also employees of the school. Let us look again at how and what is written in this context (Act No. 121/2000 Coll., on Copyright, on Rights Related to Copyright and on Amendments to Certain Acts):

§ 60 - Schoolwork

- *The school or educational establishment has the right to enter into a licence agreement for the use of the school's work under normal conditions (Section 35(3)). If the author of such a work refuses to grant permission without good reason, these persons may seek to replace the lack of his or her consent in court. Section 35(3) remains unaffected.*

- *Unless otherwise agreed, the author of a school work may use or license his/her work to another, provided that this does not conflict with the legitimate interests of the school or school or educational institution.*

- *The school or educational establishment shall be entitled to demand that the author of the school work make a reasonable contribution from the profit made by the author in connection with the use of the work or the granting of a licence pursuant to paragraph 2 to the costs incurred by the author in creating the work, as the case may be, up to the actual amount thereof, taking into account the amount of the profit made by the school or educational establishment from the use of the school work pursuant to paragraph 1.*

There are a number of cases where students have created very interesting and commercially successful works. Their use is in the student's hands, or the profit from the use of the work is realised by licensing it to a third party. There are even cases where a school work has been used to build a huge international business. According to the wording of the law, the school is entitled to demand, the question is whether they will demand and how they will ultimately agree.

2.1.4 Use of a copyright work by another user

In principle, copyright restricts what other users can do with someone else's work. However, it is important to bear in mind that just because someone should not do something, it does not mean that they are not doing it. As in other parts of the law, where there is no plaintiff, there is no judge. Even copyright must be enforced. It is true, however, that copyright protection has improved considerably with the development of the Internet and, thanks to media cases, awareness of copyright in society has also been greatly enhanced. Let's see how to do it so that someone else can legally use your works = what is or can be subject to knowledge transfer.

Proprietary rights allow other users to be granted **consent or licences** in a very wide range of ways. A licence may be limited in territory and time, and may specify only certain activities that the licensee may do with the work. Remuneration from the use of the work is a standard part of the licence agreement.

Creative Commons and FOSS

To make working with licenses easier, a system called Creative Commons was created (Creative Commons, undated), which are basically pre-made licensing arrangements and, like a building block, you can set up rules for foreign users that you want to be respected. They can be used for virtually

all copyright works, in the case of computer programs there is a system called FOSS (Free and open source software), which is even more sophisticated and there are countless variations of accessibility.

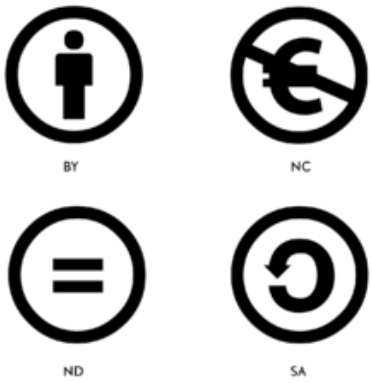
Creative Commons is a tool for the legal implementation of Open Science. By marking a work or publishing it under the CC license you choose, you offer a royalty-free license to an indefinite number of people for the duration of the work's protection. This license can be obtained by implication, i.e. by accepting the offered license. For easy orientation in the offered scope of the license, there is a system of pictograms and abbreviations that are commonly used. The full text of the licence terms is also available in Czech on the Licence CC - Creative Commons Czech Republic website. There are a number of explanatory websites, so here is just a very brief overview of the basic elements that make up the licence:

BY - please indicate the author and origin of the work. You may use the work, but please acknowledge it and credit us.

NC - for non-commercial use only. So if you want to use the work for business, please get in touch and we'll make arrangements.

ND - preserve the original form of the work. You may use it, you may copy it, but you may not modify it in any way. And if you need to modify it, contact us, we will arrange it.

SA - you can modify the work, you can make it new and your own, but you must continue to distribute the new work under the same license. So it acts a bit like a virus. Beware if your work is infected in this way.



The licenses composed of these cornerstones have different levels of openness.

2.1.5 Remuneration of authors

In principle, authors are entitled to remuneration for the use of their work. Whole professions are based on authors' remuneration - programmers, graphic designers, filmmakers, musicians, artists, architects and designers; people who make a living by creating works of authorship and allowing them to be used for remuneration. We assume that if the works are not works of authorship by employees, then the author is responsible for their use and remuneration (or uses a collective manager to do so).

In the case of employee works, generally:

- It is considered that the remuneration for the creation of the work is already part of the wages. Creativity is part of the job and the remuneration should reflect this.
- The law gives authors the right to a **reasonable additional remuneration if the** remuneration already paid to the author becomes manifestly disproportionate to the profit from the exploitation of the rights. This provision does not apply to computer programs, databases and maps - in these cases, significant financial appreciation is expected and they are directly created as such.
- Importantly, the right to additional remuneration continues after the end of the employment relationship and is inherited.

2.2 Industrial rights

The main and fundamental difference between intellectual property falling within the copyright area and the industrial law area is that for rights falling within the copyright area there is no need to register it with the locally competent industrial property office, whereas for rights falling within the industrial law area there is a need to register it with the competent industrial property office. Unlike copyright, an industrial right only comes into existence when the originator or applicant performs the formal act of filing an application or request and pays administrative fees.

The basic effect of registered industrial property is that no one else may use it without the consent of its owner. The right obtained is valid only in the territory for which it was granted. This principle is called the principle of territoriality. The term of protection is limited and the owner of the right must pay maintenance or renewal fees to keep it valid.

Consent to use the patent is granted by a so-called licence agreement. In the event of infringement of industrial law rights, full civil and criminal liability is established.

2.2.1 Patents / inventions

A patent is the best known industrial right that is also used in research practice to assess the quality of research, not always happily, it should be noted. A patent is a monopoly right and is thus, in principle, intended for inventions that are intended to be traded or otherwise marketed. A patent has sharply defined limits to its scope and is often the subject of disputes and cross-definition. Obtaining a patent merely as a monitoring indicator is a waste of money and human time.

The rules for the protection of inventions by patent specify (Act No. 527/1990 Coll. on Inventions, Industrial Designs and Improvements).

After a positive procedure, a patent is granted for such innovations or inventions that meet three insurmountable legal conditions, which are:

- new, (on the date of filing the application with the patent office, the invention must not have been published in any way, by anyone, anywhere in the world)
- the result of inventive activity (an invention is the result of inventive activity that does not follow in an obvious way to the average person skilled in the art from known facts, i.e. from any information that is in the world)
- industrially exploitable (it must be clear how the new invention can be used in industry).

Patent protection is available not only for new products and technologies, but also for chemically produced substances, pharmaceuticals, industrial production microorganisms, as well as biotechnological processes and products obtained by means of them. Excluded from patent protection are discoveries or scientific theories, computer programs, new plant varieties and animal breeds, and methods of treating humans and animals.

The term of registered patent protection lasts for 20 years and must be renewed continuously after the expiry of one year. A more detailed description of the patent procedure, including the international phase, is described in the chapter 4.1.

An important characteristic of a patent is that its content and scope is very carefully examined during the grant procedure. Obtaining a patent (let's talk only about marketable patents) is not entirely easy and if you obtain one in a given territory, it can be assumed that the acquisition itself is of significant value to a possible future licensee.

Logging in abroad

Patent proceedings in different countries are similar to the system in the Czech Republic. The proceedings in individual countries or regions (for joint regional patents) are independent of each other. The applicant has a 12-month priority right from the priority date to file the invention in any country of the Paris EU Convention (i.e. almost anywhere in the world). During this year, by approaching potential commercial partners, he/she will get an idea of which territories he/she will or will not want to enter with the invention.

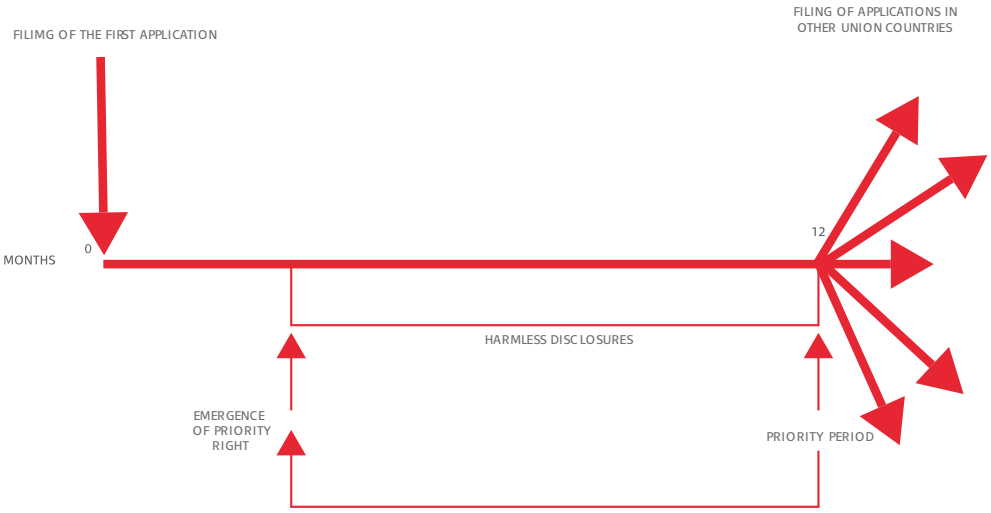


Figure 3 First stage of the patent application procedure

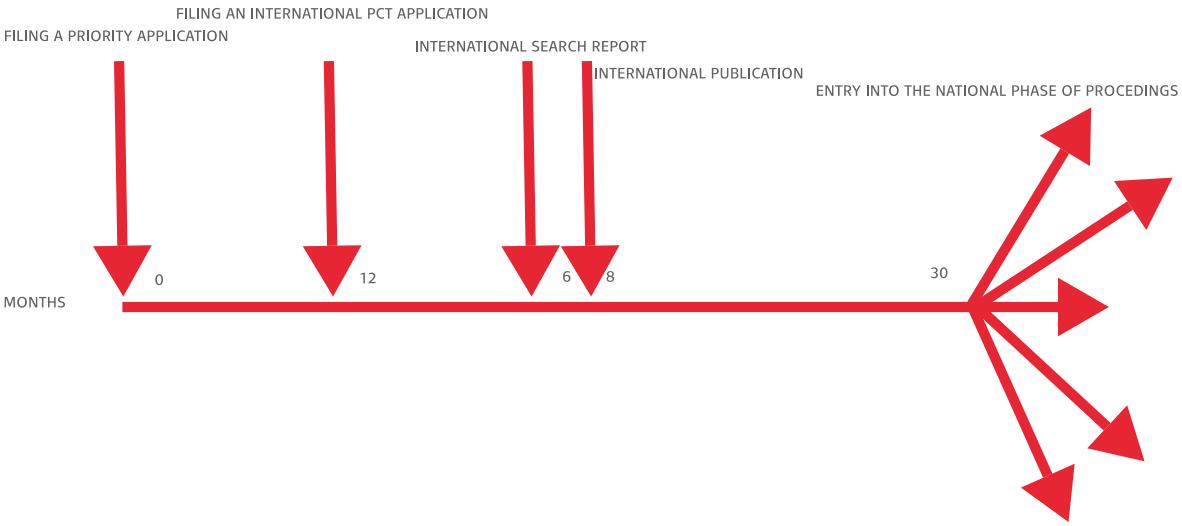


Figure 4 Timeline of international proceedings using priority from the first application filed

The market value of a patent declines sharply over time; once it is published, it is assumed that if it protects something of market interest, it motivates competitors to seek alternatives, technology develops, and the time for monopoly is shortened. For example, in the case of pharmaceuticals, there are companies that specialise in so-called generics - they have production ready and as soon as the patent falls they flood the market with them.

2.2.2 Utility Model

Industrial law determines in our country (Act No. 478/1992 Coll. on utility models).

A utility model may protect innovations and results that meet the following non-negotiable conditions: technical solution

- is new and
- is industrially exploitable and at the same time
- goes beyond mere professional skills.

However, all methods of production or work activities and biological reproductive materials are excluded from utility model protection. The maximum period of utility model protection is possible for a period of 10 years and is extended in the following time periods is 4+3+3.

The utility model is entered in the register without a full examination, the registration period is approximately 3 months, during which only the formalities of the application are examined. Obtaining a registered utility model is thus very easy, quick and cheap, unfortunately the legal protection is weak in view of this fact. In cases where there is a time crunch and it is necessary to obtain at least provisional legal protection quickly, the simultaneous filing of a patent application and a utility model is used. However, this quite rational practice subsequently causes chaos in the evaluation methodologies.

Beware of confusion with industrial design.

Logging in abroad

Not all states that are part of international conventions know the institution of utility model. If it is desirable to extend the validity of legal protection abroad, it is necessary to check under which regime a particular country or region allows it. It is possible to claim priority from a utility model in the same way as from a patent and to extend and strengthen the legal protection by a patent with all the requisites that go with it. The question to consider will be the quality and scope of the original utility model.

Difference PATENT x UTILITY MODEL

- Proceeding for an invention and obtaining a patent is more time-consuming than the utility model procedure itself, which is based on the registration principle. (in the order of months).
- The administrative fees for utility model protection are lower than those for invention protection.
- The two industrial rights differ in the actual length of protection. The maximum duration of a utility model, subject to payment of renewal fees, is half that of a patent, i.e. 10 years in total. Maintenance fees for a patent are usually paid annually, while a utility model is renewed after longer periods.
- In terms of eligibility for protection, neither methods of production nor work activities can be protected through a utility model (but they can be protected through a patent)
- From a formal point of view, an annotation is required for a patent, but not for a utility model application.
- In terms of protection against third parties, this is effective for a patent from the publication of the application, but damages are enforceable only after the patent is granted. In the case of a utility model, the protection is effective and thus the damage is enforceable from the date of registration in the Register of Utility Models.
- Far from all countries work with the institute of utility model, the international environment is not harmonized, unlike the patent.

2.2.3 Industrial design

The method of protection by industrial design is regulated in our country (Act No. 207/2000 Coll. on the Protection of Industrial Designs). This Act simultaneously repealed the corresponding part of the Patent Act (Act No. 527/1990 Coll. on Inventions, Industrial Designs and Improvements), but industrial designs remained in its title.

Design protection is intended for design solutions. Industrial design means the protection of the appearance of a product (external design), consisting in particular in the markings of lines, contours, colours, shape, structure or materials of the product itself, or its decoration, but not its technical or structural function. It is the result of creative artistic activity.

In order to be registered, a design must meet the following criteria:

- be new

- have an individual character, i.e. give a different overall impression from the already known industrial designs.

An industrial design may not be registered for the appearance of a product which is contrary to the principles of public policy or good morals.

The total term of protection for the ongoing payment of administrative fees is 25 years, payable in increments over a five-year cycle.

Design protection makes sense wherever the appearance of the product is determining or decisive. It can be in parallel with other rights.

2.2.4 Trademark

The trademark phenomenon can play a very interesting role in the research environment. For legal regulations, see (Act No. 441/2003 Coll., on Trademarks).

A trademark may protect any sign consisting in particular of words, including personal names, colour, drawing, letters, numerals or the shape of a product or its packaging or sounds, provided that it is capable of distinguishing the goods or services of one person from those of another and is capable of being expressed in the trade mark register in a manner which enables the competent authorities and the public to determine clearly and precisely the subject-matter of the protection afforded to the proprietor of the trade mark. This characteristic is referred to as distinctiveness and is a key factor in the enforcement of rights.

It is also important when dealing with trademarks to list the goods and services to which the right applies.

By entering the mark in the register, the owner of the mark acquires the exclusive right to use it. The validity of the trademark is 10 years from the date of filing the trademark application. The validity itself may be extended indefinitely for a further 10 years on the basis of an application for renewal of the trade mark filed within the statutory period.

Possible types of trademarks:

- **Word trademark** - protects and restricts the use of a word (name) in any shape or form. It is the broadest form of protection. In this case, commonly used words or phrases cannot be protected; distinctiveness is the most important consideration here.
- **Figurative trademark** - protects and restricts the specific form and design of a mark, typically a logo. It can thus be applied, for example, to commonly used words that cannot be protected by a word mark.
- **Spatial trade mark** - very often applied for in parallel with an industrial design. A typical spatial trademark is the traditional Coca-Cola bottle.
- **Positional trademark** - used when it is important for the recognition of your brand where the recognition element is located. Skechers, for example, holds a positional mark to protect the placement of the wave on the side of the sole of its shoes.
- **With pattern** - usually in combination with an industrial pattern, often in the fashion industry. Try to remember what Louis Vuitton handbags look like.
- **Colour** - this can be one particular colour or a characteristic combination of colours, for example the magenta colour used by T-mobile or the grey-bronze combination used by Duracell.
- **Audio** - typically various jingles for example of radio programmes, at one time Nokia used to have audio trademarks for ringtones.
- **Multimedia** - you will think of the characteristic opening parts of films produced by major film studios, which are made up of image and sound together. The opening sequence of James Bond films is also protected by the trademark
- **Hologram** - technologically relatively new, in principle it is a picture stamp, but in a hologram design that adds additional parameters to the image. It can also be a surface

treatment of a part of a product (so not necessarily an image), and the colours can vary with different viewing angles or tilt.

- **Motion** - usually recorded by video or animation, it characterizes the way the logo is unfolded or drawn in sequence, some motion artists use it to protect their own figures.
- Other

The proprietor of a trade mark has a duty to take care to preserve its distinctive character. This means that he must monitor its use and enforce his rights to prevent, for example, its dehumanisation. Competitors can also challenge a trademark that has not been used for more than five years. The burden of proving its use is then on the right holder and if he fails to prove its use, the right may be revoked.

The trade mark proprietor is also obliged to monitor newly filed trade marks in its territory for infringement of its rights. If he allows a competing mark to be registered that is confusing, then he may get into trouble.

When used correctly, the value of a trademark grows over time and can take on enormous proportions. A significant part of our market civilization is based on "brands".

2.2.5 Designations of origin and geographical indications

This part of industrial rights is governed by (Act No. 452/2001 Coll., on the protection of designations of origin and geographical indications).

A protected designation of origin is a name which identifies a product originating in a particular place, region or country, the quality or characteristics of which are mainly or exclusively due to a specific geographical environment with its own natural and human factors, and for which all the stages of production, i.e. production, processing and preparation, take place in a defined geographical area. A close link to the area of origin is therefore required for such products.

A geographical indication is a name which identifies a product originating in a particular place, region or country and having a given quality, reputation or other characteristic attributable primarily to that geographical origin and for which at least one stage of production, i.e. production, processing or preparation, takes place in a defined geographical area.

The difference between a designation of origin and a geographical indication therefore lies mainly in the required intensity of the link between the product and its geographical environment.

While a very strong link is required for a designation of origin, for a geographical indication it is sufficient that at least one stage of production takes place in the place, region or country concerned, and at least the reputation of the product must be attributable to its geographical origin.

2.2.6 Topography of semiconductor products

The details are regulated by (Act No. 529/1991 Coll., on the protection of topographies of semiconductor products).

In the industry, the production of an integrated circuit with the required function is one of the basic solutions for the placement of circuit elements in the integrated circuit volume and their interconnection. It is therefore certainly a creative work. The registration of certain topographies of semiconductor products in the State Register serves to protect such results.

The registration of the topography of a semiconductor product in the State Register can only take place on the basis of an application filed with the Office. However, the right to protection is exclusively for citizens of the Czech Republic or persons residing or having their registered office in the Czech Republic.

At present, this industrial right is hardly used.

2.3 Other special cases

There are a number of situations where information is handled under regimes other than copyright or industrial rights. The list of these could be very extensive, let's just list the most common ones:

2.3.1 Classified information and information security

There are basically three reasons for keeping information secret:

1) We have committed ourselves to a contract - typically an NDA (Non-disclosure agreement, sometimes also used as a CDA Confidential disclosure agreement) or MTA (Material transfer agreement). These contracts and the details of this situation will be discussed in more detail in the chapter 5.1.
2) We are obliged to do so by law and it also determines the rules on how to proceed - for example, Act No. 412/2005 Coll. on the Protection of Classified Information and Security Clearance (Act No. 412/2005 Coll. on the Protection of Classified Information and Security Clearance).; Act on Cyber Security No. 181/2014 Coll. (Act No. 181/2014 Coll. on Cyber Security), the Civil Code (Act No. 89/2012 Coll., the Civil Code) (protection of trade secrets) etc.
3) We fall under so-called professional secrecy - this includes well-known professions such as doctors, patent attorneys, lawyers, notaries, auditors, government employees (legal obligation) and others.

Marking of classified information

In all cases, protected information must be marked**.** If information is not marked for protection, it can hardly be assumed that it will remain protected. Designated information must be clearly identifiable and limited. The "everything we've been told is secret" practice is untenable and unenforceable because it is ambiguous.

In most cases, secrecy is a temporary matter. Most often you will encounter secrecy prior to filing a patent application, reasonably until publication, for the duration of the project, or for a defined period of time after the end of the project. It is a good idea to include the date or designation until when the information is classified as part of the designation.

Persons with access and personnel security

Every classified information needs to have someone who has access to it and is authorized to work with it. A list of such persons shall be an integral part of and supplement to the file containing the information in question. Different persons may have different levels of access, as the particular situation requires.

Handling of sensitive and classified information

Any conduct that may compromise trade secrets is prohibited:

- Making copies and reproductions outside the records - each reproduction must have a registration number including the identification of the authorised person, forgetting a copy at the printer is a serious offence.
- Placing it on a carrier in an unprotected form and then carrying it out of the designated area.
- disclosure to an unauthorised person (being left alone in a designated area).
- Leaving information without adequate security.
- Working with information outside the designated area.

Safety and environmental security

The aim is to prevent unauthorised access, damage and interference to information and information processing equipment

Physical security

- Designated areas with the appropriate type of security.
- Controlled entries and accesses with a record, ideally with a time stamp.

IT security (cryptography, cyber security)

– Proper and effective use of cryptography to protect the confidentiality, authenticity and/or integrity of information - you may be familiar with the various uses of hardware keys

– Network security against unauthorized access - a common restriction abroad according to the unique identification number of each device.

Administrative security

– appropriate administrative procedures for the creation, receipt, recording, processing, dispatch, transportation, transfer, storage, shredding, archiving, or other handling of classified information.

2.3.2 Know-how and trade secrets

In addition to copyright, industrial and competition rights, which each have their own set of laws, there is a huge body of human knowledge and skills that are created on an individual basis, often as a cumulative combination of knowledge, skills and the ability to use them creatively. Intuitively, the term know-how is used to describe this potential.

However, the legal code of the Czech Republic does not know the concept of know-how. For the practical handling of know-how, it is therefore necessary to rely on the term trade secret, which gives us a relatively clear framework for the practical use of know-how. § Section 504 of the Civil Code identifies the features that must all be fulfilled simultaneously in order for something to be proven to be a trade secret.

Let's take a look at the individual points (Dolecek, 2022):

- **Competitively important facts** - these are information, knowledge, skills, equipment and other resources that create a competitive advantage
- **Determinable** - in order to work with know-how, we need to express and capture it in some way. This can be seen as an analogy to copyright - for a work to become subject to copyright, it must be expressed in an objectively perceptible form.
- **Awardable** - if the two previous conditions are met, then this condition is automatically met. Intellectual property valuation is a separate discipline and profession, which can be alternated to some small extent by its own calculations.
- **Facts not commonly available in the relevant business circles** - very closely related to the very first condition of competitive relevance. Commonly unavailable resources are those for which some effort (financial, administrative, analytical, creative, etc.) had to be made to obtain them.
- **Connection to the plant -** trade secrets are transferable, transferable between different entities. It is not necessarily integrally linked to the whole firm, enterprise or institution.
- **The owner ensures their secrecy** - practically the most important condition of trade secrecy. If you don't treat it as a secret, you probably can't defend it as a secret.

3 Proof-of-concept

Proof-of-concept (PoC) is a phase in which it is verified that a concept/idea or theory has the potential to be applied and established in the real world. PoC is evidence that a project or product is feasible and sufficiently proven to justify to some extent the costs required to support and develop it.

To some extent, PoC can be seen as a prototype that is intended to determine feasibility. It is mostly required by investors, who use this step to verify tangible proof that the launch of their subsequent business proposal can guarantee a healthy return on investment. Project managers use PoC to identify gaps in processes that could prevent the product from succeeding. It is therefore a very important intermediate step in the commercialisation process itself, to ensure that any subsequent contractual transaction is successful, providing both partners with significant certainty in the functionality, feasibility and applicability of the R&D result.

What does the internal system of approval of partial projects look like at a Czech University? As an example, let us take the system anchored at the University of South Bohemia in České Budějovice.

The whole process is covered and administered by the Office of Technology Transfer of the University of South Bohemia (KTT JU), which is responsible for this area, among others. KTT JU provides comprehensive administration of the entire sub-project (order handling, invoices, advice and consultation, etc.).

The Commercialization Council continuously approves quarterly reports, changes to sub-projects, and evaluates the implementation of verified R&D results during the course of the sub-project.

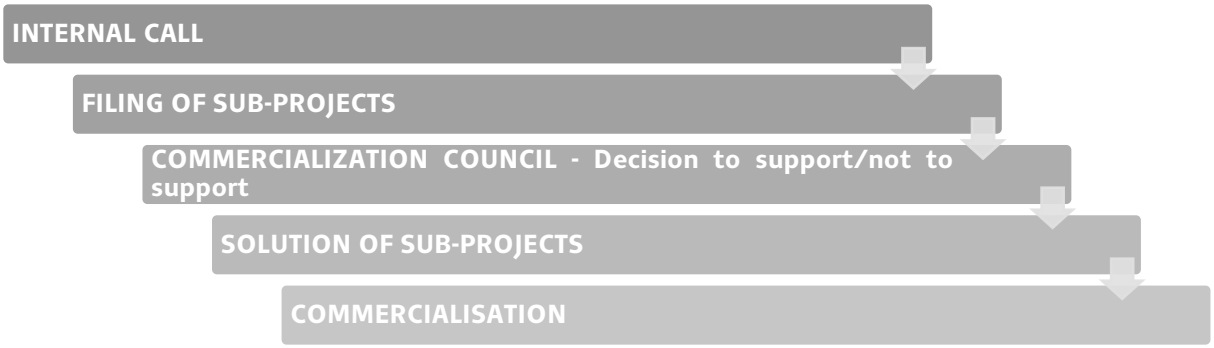


Figure 5 Approval of proof-of-concept (PoC) sub-projects

Within the implementation period, the Technology Transfer Office of JU provides the following activities: costs including marketing and promotion of research and development results, targeted contacts and negotiations with companies (licensing negotiations, etc.); presentations at exhibitions, trade fairs; operating material; fees - access to databases, clusters, platforms; professional services - external experts if needed; P.R. - on web platforms Jctt.cz, IPI Singapore, HKTD, Transfera.cz, DEIP, etc.

3.1 Identification and recording of results

In addition to their core activities, public universities or academic institutions also become a source of information and new knowledge that can be used in the commercial sphere. This knowledge contributes not only to the development of knowledge but also to development in the social sphere. Applied research and development results from commercial entities can also provide funding that will subsequently be used to further the overall development of the institutions concerned.

In the event that a research and development result is identified that could be protected as an industrial property object, it is necessary to understand that its industrial legal protection must first be secured. The staff of the technology transfer office will advise you on the possibilities, including its complete provision. You will then fill in an originator/co-inventor notification and this starts the whole process.

Once the employer has been duly informed, a period of 3 months begins within which the employer must decide whether or not to exercise the right to the result. In most cases, only those results that have been assessed as commercially interesting and whose further development and implementation carry a lower risk of failure than those that have not progressed to the next stages are selected for industrial law protection.

However, it should be noted that the protection of intellectual property alone is not the end of the process, as outlined in Section 1.2.Subsequent commercialisation is also crucial, with the TT office handling follow-up communication and actions outwards from the university. There should therefore be an effort to pass explicit knowledge on.

4 Patents as law and source of information

In the chapter on intellectual property (2.2) describes the system of protection of industrial rights, in particular patents, which is harmonised almost worldwide under international treaties. In this chapter we will discuss how to use this system not only to protect one's own rights, but especially to obtain extremely useful information for one's own work.

It is essential to realise that a patent is a monopoly right. At its core, a patent is designed to trade and restrict the rights of others in the market. A patent has some fundamental differences from copyright:

- **Creation of rights** - unlike copyright, which arises automatically when a work is created, industrial rights arise only when they are registered.
- **Territorial restrictions** - only apply where you pay for this right.
- **Time limit** - only valid for as long as you pay for the right and the price increases over time. In addition, it is limited in international treaties to a maximum of 20 years from the date of first application. In some cases up to 25 years (SPCs for pharmaceuticals).
- **Enforceability of rights** - just because you have the right to a monopoly does not mean that someone will not infringe your right.

In order to understand the patent system and its enormous information potential, it is necessary to take a brief look at the process and basic concepts of patent proceedings.

4.1 Patent proceedings

Unlike copyright, industrial rights do not arise automatically, but require considerable effort and resources to obtain. The initiation of patent proceedings should be preceded by a detailed strategic analysis covering many aspects, such as:

A patent is legal protection for an invention that is new, the result of inventive activity and capable of industrial application (Act No. 527/1990 Coll. on Inventions, Industrial Designs and Improvements). However, a patent is primarily a monopoly right bought by the obligation to publish a very specific description of the protected solution so that anyone can find it and either agree with the rights holder on a licence to use it, or be inspired and invent for their own use another, better solution that does not interfere with the scope of protection.

Novelty is a basic condition for an invention to be protected by a patent. This means that on the date of filing the patent application, the so-called state of the art is fixed, on which it will be assessed whether the claimed solution is novel (§5 in (Act No. 527/1990 Coll. on Inventions, Industrial Designs and Improvements)). In practice, this means that the patent examiner will search the available technical and patent literature, regardless of country or author, and if he finds a document where the claimed solution is described, he will reject the application. It follows that self-publications or lectures by the originators may be a bar to novelty, while student papers, conference papers, or popularization and promotional articles in journals may be a bar to novelty. The unpleasant news is that even papers that may not have been published at the time of application will be considered (the 18-month deadline for publication).

In addition to novelty, **inventive activity** also determines whether creative activity was necessary to find the claimed solution, and thus whether the claimed solution is not obvious to a person skilled in the art (§6 in (Act No 527/1990 Coll. on inventions, industrial designs and improvement proposals)). This criterion is much less objective than the novelty criterion. The examiner should be sufficiently skilled in the fields he or she is assessing and then search the documents for solutions from which the claimed solution could be pieced together. In this case, fortunately, he is working only with those that have already been published at the date of application. Even so, some proceedings can be fun, especially if you are in a completely new field, opening up new areas, touching on controversial topics.

Meaningful markets and usability is a key parameter for territorial scope, which has a direct impact on financial and process requirements. Research organisations are usually not able to put an

invention into practice and deliver it to the market on their own, they need a partner or several partners to do so. Licensing agreements will need to be concluded with partners, which may not be easy to negotiate. The motivation for filing a patent application affects the whole process in a fundamental way.

Law enforcement is a huge weakness of Czech research organisations. They usually do not have the capacity to monitor what is happening on the market and whether someone is violating their rights. They do not want to get into legal disputes, even though in some foreign countries patent disputes are the most important part of the patent procedure.

4.1.1 Phase 1 - before filing a patent application

This is a preparatory phase in which a number of activities should take place. It is the time for:

- Preparation of quality documents for strategic assessment and decision making = not only description of the solution, but also research in patent and technical literature, market research, verification of the context of creation and limitation of use (contractual relations), clarification of motivations and intentions and many others
- Strategic reflection on the possibilities and potential for exploitation
- Exercising employer's rights and related administration
- Preparation of the actual content of the patent application

All the necessary steps can take a considerable amount of time and the total duration of this phase is highly variable and dependent on many factors. With some degree of generalisation, it can be said that the greater the pressure to reduce the time required for this phase, the less chance there is for practical application afterwards.

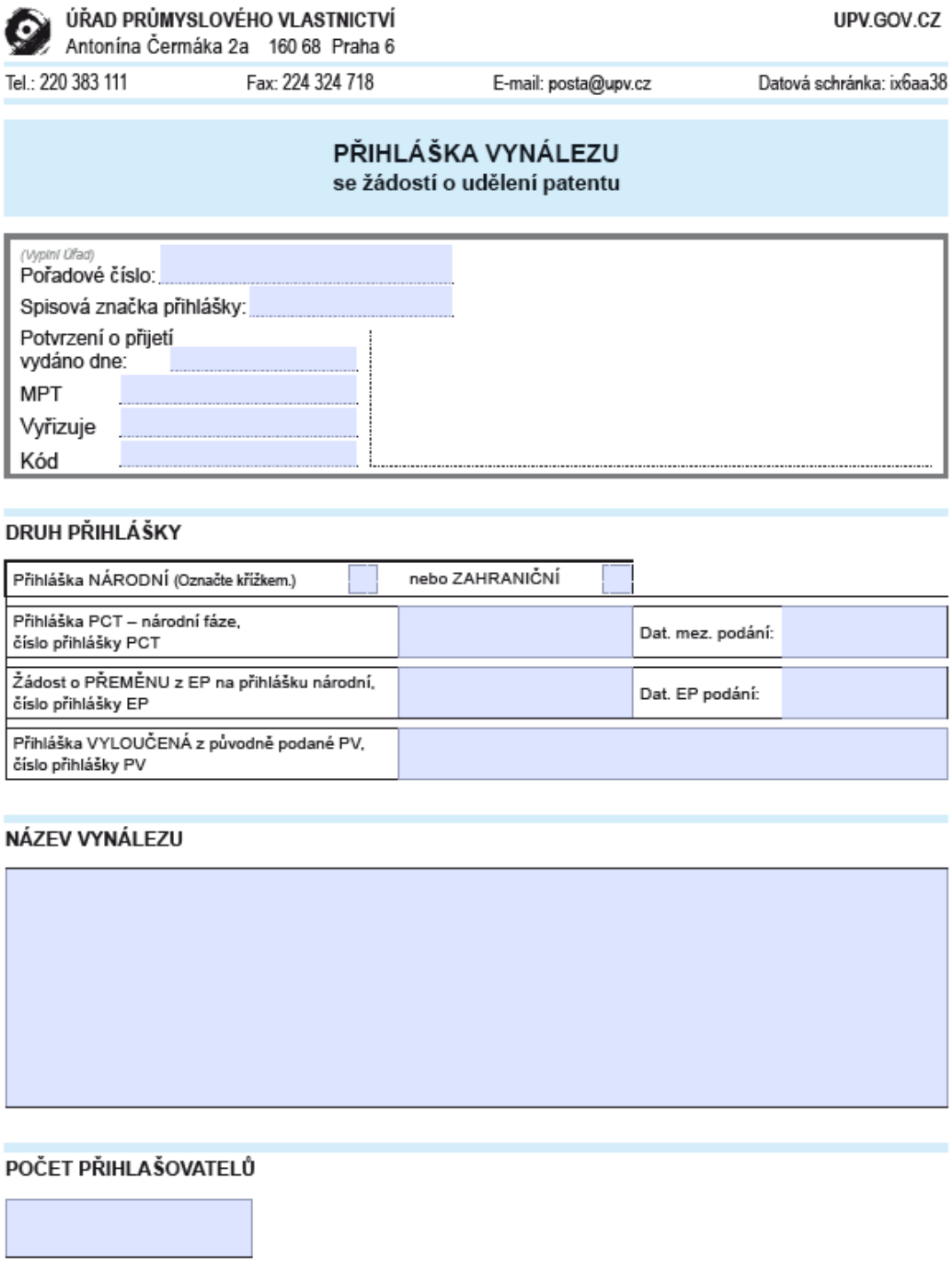
Throughout the duration of Phase 1, the maximum amount of information on the subject of the technical solution under consideration must be kept confidential. This phase is also the latest time to critically consider whether the technical solution is subject to special treatment (see chapter 2.3.1).

If it is decided that the solution will be protected by a patent (or other form of industrial property), intensive cooperation is established with a patent attorney who will help prepare the patent application itself. However, he/she is not responsible for its content in terms of other than formalities. The requirements for the various parts of the patent document are described in the chapter 4.2.2, for those interested, it may be advisable to consult the Instructions of the President of the Industrial Property Office for the Standards of the Application for an Invention (Kratochvíl, 2022).

In addition to all the possible strategic decisions such as: where and when to file the priority application, where to expand, who will be the partners, who will pay for it, what are the motivations and needs of the applicants, we also need to prepare the application text itself in close cooperation with the patent attorney.

The patent attorney will help determine the **categories of the invention**, which then influence the complete formulation of the entire text. One technical solution may fall into several categories in its complexity, but it is necessary to keep the categories strictly separate. The categories of invention must not be mixed, each requiring specific language of description:

- **Thing, device, apparatus, chemical, product** - it is a concrete graspable object. It is described at rest. The text uses phrases such as "consists of", "contains", "are arranged in a direction".
- **Procedure, method, way of execution** - it is described in the dynamic state of the ongoing processes regardless of what is performing them (marginal information).
- **Application** - a specific category for completely unexpected effects or possibilities of using previously known things or processes to do something completely new.



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PŘIHLÁŠKA VYNÁLEZU
se žádostí o udělení patentu

(Vyplní Úřad)
Pořadové číslo:
Spisová značka přihlášky:
Potvrzení o přijetí vydáno dne:
MPT
Vyřizuje
Kód

DRUH PŘIHLÁŠKY

Přihláška NÁRODNÍ (Označte křížkem.)		nebo ZAHRANIČNÍ	
Přihláška PCT – národní fáze, číslo přihlášky PCT		Dat. mez. podání:	
Žádost o PŘEMĚNU z EP na přihlášku národní, číslo přihlášky EP		Dat. EP podání:	
Přihláška VYLOUČENÁ z původně podané PV, číslo přihlášky PV			

NÁZEV VYNÁLEZU

POČET PŘIHLAŠOVATELŮ

Figure 6 Example of part of the Czech patent application form for an invention (Industrial Property Office - Invention Application, 2022)

4.1.2 Phase 2 - after filing the patent application

A priority application for an invention may be filed in any country or in certain regional systems. The system may be slightly different in each country, the format of the application, the fees involved, the time limits for the Office's response and yours vary. The number and form of interactions may be limited. A good patent attorney should be able to help you deal with all of this.

In principle, however, you will go through the basic milestones in all countries in a similar way:

1) **Filing a** complete patent application on the prescribed form and in the prescribed manner. The date of filing is absolutely crucial, it is the so-called **priority date from which** all time limits in the course of the proceedings are subsequently calculated.

   This date also fixes the state of the prior art, i.e. the so-called **prior art** = anything disclosed before this date may interfere with the grant of a patent. Whatever has been disclosed will be judged by the conditions of patentability.

   From this date, the so-called **priority period of 12 months** runs for extending the application abroad. This period is not exceedable. If the patent has not been extended within 12 months, it cannot be valid anywhere else than in the country where it was filed.

2) **Formalities** - the patent attorney should take care of their correctness. There are quite detailed Instructions available from the Czech Industrial Property Office (Kratochvíl, 2022)which should be followed.

3) **The preliminary examination** automatically follows the formalities check and aims to verify that the statutory requirements for the grant of a patent are met (Kačírek, 2018)i.e. that it does not fall within the excluded areas or infringe good morals §3, §4, §26, etc. (Act No. 527/1990 Coll. on Inventions, Industrial Designs and Improvements).

4) **Publication** after 18 months from the priority date. If something prevents publication, the Office may stop the procedure even before publication. Publication is a condition for the grant of a patent, so it can occur earlier at the request of the applicant.

   Full survey - only initiated on application and subject to a fee. The maximum time limit for applying for a full survey is 36 months from priority. The full examination examines the conditions for patentability, in particular novelty, inventive step and industrial applicability. The output of the full examination is a search report (see also 4.2.3).

   You can define your views on the search report and communication and clarification with the authority and clarification of the scope of protection is ongoing. At this time, the scope of protection may be narrowed by agreement, for example by merging claims (dependent claims become part of independent claims) or limiting categories.

5) **Opposition, comment and other proceedings** may occur after publication or grant of a patent, this is the first stage of litigation where third parties may interfere with the scope of protection of your solution.

6) **The granting and maintenance of a patent** involves the payment of fees. Different in each country and at different times. Sometimes it is paid during the proceedings, sometimes it is paid after the grant. Usually the fees increase with the length of maintenance, but in each country at a different rate. The Technology Transfer Centre of the Czech Academy of Sciences published an interesting comparison of fees in the most common filing countries in 2022 (Scholzová & Hruška, "Transfer Agent Quick and Easy" series, part 3. rights to results, 2022).

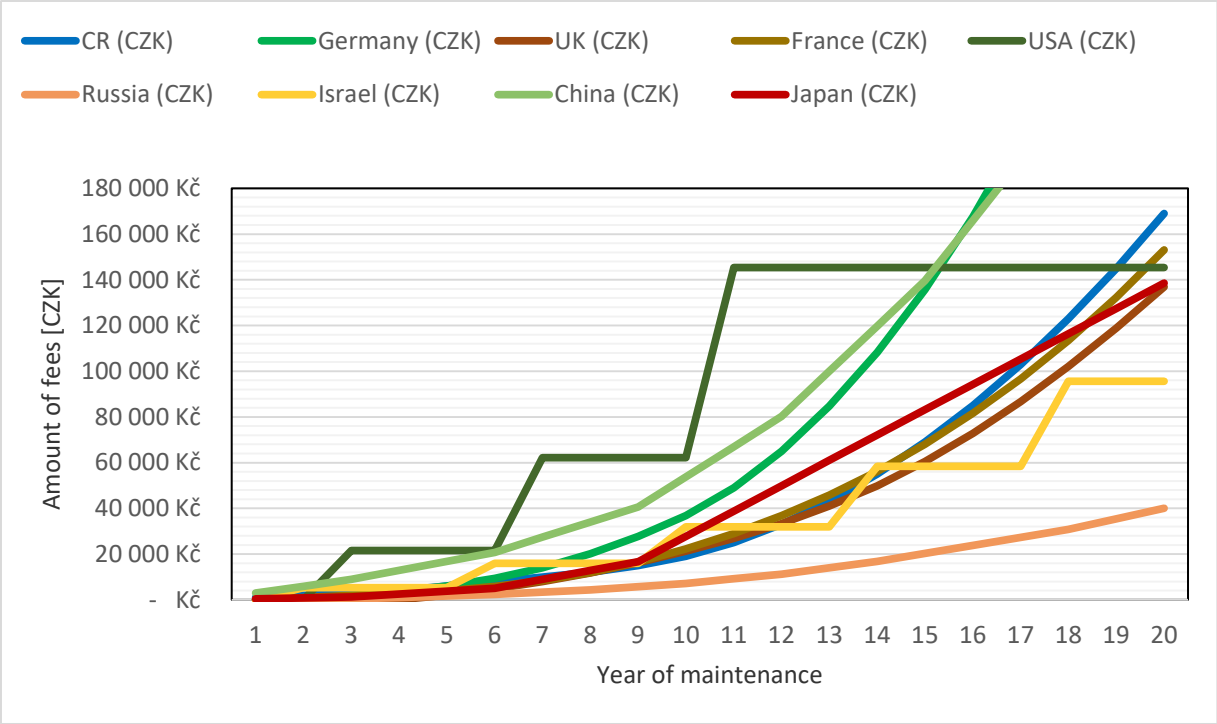

Figure 7 Illustration of the increase in maintenance fees in different countries

4.1.3 Phase 3 - International Expansion

In order to extend the territorial scope of the monopoly right provided by the patent, it is necessary to join other countries or a regional or international system within **12 months** of priority. This time limit is not to be exceeded.

There are several ways to secure international protection:

- **National route** - is particularly suitable if the future markets or areas of interest consist of only a few selected countries (up to about 4) or if the countries in question are not part of one of the larger systems. In this case, you will use the national patent representation in the selected country and follow the local standard process in each country individually and according to local legislation. You will almost certainly need a local patent attorney and you will also need a translation into the national language.

  You must also continue to the national stages using the PCT system, but usually the local authority will no longer carry out the search itself, but will accept the international one.

- **PCT system** - the most commonly used international application system, which significantly increases the time for deciding on specific markets, covers a significant number of countries and simplifies the subsequent national proceedings. **WARNING** however, this is only an application and after successful proceedings you only have a certificate of patentability not a granted patent. You must necessarily enter one of the national phases within **30 months** (longer in some cases) of priority.

- **Regional systems** - there are a number of regions that have agreed on a common procedure and simplification for applicants who want to hold monopoly rights in their territory. For us the closest is probably the European Patent System (EPO), but there are others such as Eurasian (EAPO), African Francophone (OAPI), African Anglophone (ARIPO), Gulf Cooperation Council (GCC) and others. In order to use them, it is necessary to look at the current terms, rules and context in close cooperation with a good patent attorney.

  The European patent is currently (2023) in a phase of dynamic transformation from a single application system validated in individual countries to a Unitary European Patent system. Negotiations are still ongoing, there are several options to enter and exit the system, the rules are not settled. We therefore strongly recommend consulting with a quality patent attorney who keeps up to date with current developments.

4.1.4 Phase 4 - Enforcement

Basic types of intellectual property disputes (source (Chloupek, 2021)) are:

- **Cancellation of the licence agreement** = many situations can be dealt with already within the agreed licence agreement, for example the risk of damage caused by the implementation of the subject of the licence or its insufficient quality. Here we refer to situations where the agreed terms and conditions are violated by our business partner. For example, they may not pay the license fees or deliberately reduce them, they may not respect the scope of the license, they may not respect the quality of the process and thus abuse the reputation of the provider, they may not respect other obligations arising from the license agreement.
- **Infringement of the rights we hold**, which is when someone infringes your rights, for example, by using your technology without having a licence agreement to do so.
- **Infringement of others' rights**, where we are accused of abusing the rights of third parties ourselves. Separate business, where there may be so-called patent trolling, but also real situations that our licensing partners may find themselves in.
- **Revocation and restraint efforts** are discussed more fully in the chapter on patent prosecution (4.1.2), where someone tries to limit the scope of protection in order to avoid needing a licence to use their own technology or to fit in with their own protection.
- **Disputes over authorship or authorship**, ugly disputes that also occur in the research environment, especially when the result of the research is well commercialized.
- **Exercise of rights to reasonable remuneration of** originators, in particular where rights are sold or the originator has terminated employment with the institution using the rights.

Types of legal proceedings in intellectual property disputes:

- Civil
- Criminal
- Administrative

What can be claimed, for example:

- Abstention and removal of consequences
- Monetary compensation - compensation for damages, fine, additional compensation, reasonable satisfaction
- Withdrawal from the contract, change of the terms of the contract
- Revocation or limitation of a foreign patent

We recommend consulting an experienced law firm to resolve these unpleasant situations.

4.2 Patent documents

The form of patent documents is fairly well harmonised in a significant part of the world. Thanks to international conventions, standard categories and their designations have been introduced and internationally recognised classifiers are used. So let's take a look at what makes up such a patent document and what can be read from it.

4.2.1 Bibliographic overview

Usually the first page, which is just bursting with information. The individual sections are marked with numbers to help you find your way around, even in a document written in a foreign language and in a different font. The number code indicates the type of specific information, for example:

INID	Item	Importance and benefit
(10/11)	Document number	An unambiguous document identifier that makes it easy to find. Usually includes the country code and document type (Handbook on industrial property information and documentation, 1997). In some countries, the code includes the year of filing or grant.
(21)	Application number	Usable in the same way as the document number. A patent in the sense of the law is usually a set of documents at different stages of the proceedings, based on one or more applications. You can tell by the application number that they are the same patent family.
(30)	Priority date	Extremely important date from which all time limits during the patent proceedings are calculated.
(51/52)	MPT/IPC/CPC	The classification of patent subject matter into so-called patent classes is carried out by the Patent Office. Essential for the creation of a field map.
(54)	Solution name	The name of the technical solution being applied for. Different countries have different approaches to naming. It is used for basic orientation and can be searched by keywords.
(57)	Annotation/abstract	A short and concise description of the invention, searchable by keywords. The first section you read to evaluate whether it makes sense to study the entire document.
(71/73)	Applicant/Owner	The person who has asserted the right to the patent is usually the employer of the people who invented the solution. Sometimes the applicant may be the same as the originator, but this is uncommon in today's world. Used to map important innovative players in the field - perhaps a competitor or a partner for collaborative research.
(72/75)	Originator	List of persons who have contributed to the creation of the invention by their own creative activity. The number of originators and their credibility in the field may be an indicator of quality for some, but also of the risks associated with the application of the technology.

PATENTOVÝ SPIS

(11) Číslo dokumentu:

309 224

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(Věstník č. 22/2022)

(56) Relevantní dokumenty:
(Salvetr P, Nový Z, Gokhman A, Kotous J, Zmeko J, Motyčka P, Dlouhý J." Influence of Si and Cu content on tempering and properties of 54SiCr6 steel. Manufacturing Technology. 2020;20(4): ISSN: 1213-2489; doi: 10.21062/mft.2020.079; https://journalmt.com/pdfs/mft/2020/04/16.pdf) 08.12.2020; (Nicky Kisku: Strengthening of High-Alloy Steel through Innovative Heat Treatment Routes; Welding - Modern Topics;
Edited by Sadek Crisóstomo Absi Alfaro, Wojciech Borek and Błażej Tomiczek; DOI: 10.5772/intechopen.91874; https://www.intechopen.com/books/welding-modern-topics/strengthening-of-high-alloy-steel-through-innovative-heat-treatment-routes) 20.04.2020.
RU 2287592 C1; US 3930907 A; RU 2422541 C1; CN 109128708 A; EP 2562271 A1; CZ 302917 B6.

(73) Majitel patentu:
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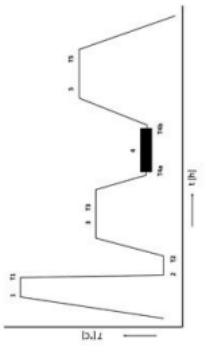
Langrova, s.r.o., Skrétova 1011/48, 301 00 Plzeň, Jižní Předměstí

(54) Název vynálezu:
Způsob tepelného a deformačního zpracování kovového polotovaru

(57) Anotace:
Způsob tepelného a deformačního zpracování kovového polotovaru zahrnuje kalení (1) a na něj přímo nebo s prodlevou navazující první popouštění (3). Dále se nejméně jednou provede na první popouštění (3) navazující sekvence sestávající z plastické deformace (4) pro ovlivnění materiálových vlastností polotovaru a na ni navazujícího dalšího popouštění (5). Teplota (T4a) zpracovávaného polotovaru na počátku plastické deformace (4) může být nižší, rovna, nebo vyšší než teplota (T4b) na konci řečené plastické deformace (4). Teplota (T4a) zpracovávaného polotovaru se může zvýšit deformačním teplem bez dodání tepla z vnějšku. Teplota (T4a) zpracovávaného polotovaru na počátku plastické deformace (4) může být obecně rozdílná od teploty (T2) polotovaru na počátku prvního popouštění (3). Teplota (T2) zpracovávaného polotovaru na počátku prvního popouštění (3) je nižší než teplota konce martenzitické přeměny (Mf) materiálu daného polotovaru. Teplota (T3) prvního popouštění (3) může být odlišná od teploty (T5) dalšího popouštění (5).



CZ 309224 B6

Figure 8 Title bibliographic page of the Czech patent

4.2.2 Patent documents

Understanding the meaning and purpose of the different parts of the patent documents is important not only for the creation of the patent application itself, but also for reading foreign patents that are found during the search. They can be divided into three main parts:

- Description of the invention - including several descriptive chapters, more or less useful
- Patent claims - clearly defining the scope of protection of the technology - after the abstract/annotation, this is the second part to read in detail.
- Drawings - an optional section that can help with quick understanding and evaluation of relevance.

In greater detail then:

Name of the invention - as mentioned above, national practices vary widely. In some places they will allow a nondescript name like R2D2, in others (e.g. in the Czech Republic) they will force you to create a completely descriptive and long name which is then unusable for any other purpose. To prepare the application, something simple is usually used, a quick acronym so that everyone on the team knows immediately what you are talking about, but preferably so that no one uninitiated can tell.

Field of technology - here you will read a brief description of the field of technology. It is used by the examiner for proper classification. It can help in evaluating relevance for deeper study.

State of the art - there should be a detailed delineation here against the state of the art, this is a strategic area where the applicant is trying to maneuver the examiner into a particular position, it can sometimes be confusing. Competing solutions are cited here, here is the source for the field map.

The essence of the invention - essentially rewritten claims in multiple sentences with more detail, this is a strategic area for litigation and future patent limitations. Here are possible escape routes if you want to circumvent the patent.

Clarification of drawings/drawings - an optional section that helps readers a lot but does not affect the scope of protection.

Examples of implementation - a mandatory and very strategically important part. Here, various and hypothetical implementations are presented and inspiration for verification, improvement, workarounds, but also technical limits and constraints lie here. The examples serve to define the scope of protection in the context of legal disputes.

Industrial applicability - a condition of patentability directly from the law. A short summary of what the invention could be used for.

Claims - the most important part of all. They have a clearly defined structure, and independent claims define the broadest possible class that is protected by the patent. You can tell from the wording of the first claim (and other independent claims) what category it covers (subject matter, method, use) and how much it defines itself against competition.

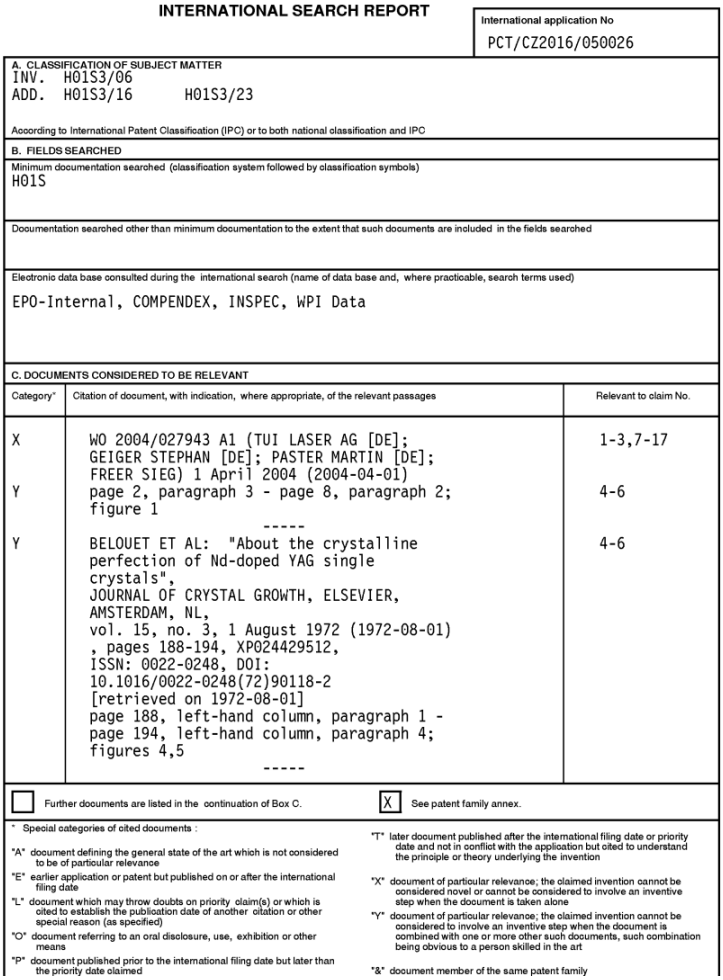
4.2.3 Search report

At the end of the patent document there is usually a search report. Sometimes it is published separately, sometimes the patent application is published without the search report.

The search report is a carrier of very valuable information, both for the applicant on the further course of the patent proceedings and for the reader.

A section - a restatement of the patent classification, to which field it relates and to which it is relevant. It indicates in which fields the examiner has searched and against which the application has been compared.

C section - Documents found that are relevant to the application under consideration. They can be in several categories (see explanations in the sample), but three of them are essential:



INTERNATIONAL SEARCH REPORT

International application No
PCT/CZ2016/050026

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01S3/06
ADD. H01S3/16 H01S3/23

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H01S

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, COMPENDEX, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2004/027943 A1 (TUI LASER AG [DE]; GEIGER STEPHAN [DE]; PASTER MARTIN [DE]; FREER SIEG) 1 April 2004 (2004-04-01)	1-3,7-17
Y	page 2, paragraph 3 - page 8, paragraph 2; figure 1	4-6

Y	BELOUET ET AL: "About the crystalline perfection of Nd-doped YAG single crystals", JOURNAL OF CRYSTAL GROWTH, ELSEVIER, AMSTERDAM, NL, vol. 15, no. 3, 1 August 1972 (1972-08-01) , pages 188-194, XP024429512, ISSN: 0022-0248, DOI: 10.1016/0022-0248(72)90118-2 [retrieved on 1972-08-01] page 188, left-hand column, paragraph 1 - page 194, left-hand column, paragraph 4; figures 4,5	4-6

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Figure 9 Example of the first page of a search report for a PCT application

- **X** - indicates documents that prove that the invention is not new. This means that each document marked in this way contains, according to the examiner, a complete description of the claimed solution. The more X's found, the worse the situation for defending.
- **Y** - indicates documents from which, according to the examiner, the submitted invention can be assembled with some expertise and thus that it does not meet the requirement of inventive step.
- **A** - indicates documents that you should have correctly listed in the prior art section of the patent documents. They do not compromise the subject matter and scope of protection, but they do illustrate the context.

4.3 Patent searches

It is important to note that the research academic world is used to publishing in the professional or popular literature. There is a very sophisticated system for doing this, with evaluation methodologies attached to it, not only for individuals but also for institutions. Conducting a literature search is a standard part of scholarly work.

In addition, it is important to note that research and development of technical solutions is not only carried out in the academic environment, but also very often (and sometimes dominantly) in the industrial sphere. Industry is not forced to publish in the scientific literature and would probably not be interested in doing so. It has no ambition to be evaluated by scientists, it is all about

business. So it only publishes when it wants to secure its monopoly rights, and therefore through the patent literature. It is estimated that up to 4/5 of all technical knowledge of mankind is described in patent documents. Therefore, if the scientific world does not use patents to evaluate the state of knowledge, it ignores most of the information. As a result, this then means that much research is useless, examining what has already been tried (I don't mean those used for verification) and as a result many patent applications are then rejected because they hit novelty.

The third thing to remember is that patent literature has its own specific language and style, it is designed to define rights, and thus must be very to extremely specific even at the cost of low clarity. Moreover, in cases that are of market interest, they are deliberately written to be difficult to find so that competitors do not have easy access to solutions and incentives to circumvent the scope of the patent. Standard terms and phrases are often not used, generalized terms common in the literature are not used, and key words fail.

There are many types of patent searches, depending on the reason for which it is performed and the situation in which we find ourselves. The reason why we conduct a patent search has a major impact on its assignment and evaluation. We can search patents for:

- inspiration or solutions for specific problems
- partners for collaboration, business, competition or team additions
- watch for violations of your own rights
- monitor trends and activity in a specific area of technology
- portfolio of sectoral activities of individual companies or institutions;
- data for analyses and comparisons of different markets, industries or segments for strategic decisions and much more

Basic breakdown of patent searches:

- On the state of the art - patentability
- Technological industry survey
- Patent purity, freedom to operate
- Legal status and patent family
- Name search

In some cases, it is necessary to take into account the fact that patents are published with a delay of at least 9, but usually 18, months after filing. Unfortunately, the most up-to-date information is not available through patent searches. Therefore, a combination with other searches, e.g. in the literature, on the Internet, in company presentations, is always advisable.

4.3.1 State of the art searches

The most common search that can be commissioned by the Industrial Property Office and is part of a full examination in patent proceedings. It is carried out in order to find out relevant information to our own solution. It can help us in the initial preparatory stages of new projects, to look around for ready-made solutions that can be used in our own research. Conducting an overview search can be very quick (within hours) and can save quite a lot of time, effort and money.

In a situation where we have in our hands our own research result that we believe deserves patent protection, the result of the search can give us an indication of whether it is patentable at all. That is, whether or not it is new or arises from already published documents. This search is very well done by the Office, so you may sometimes find that it is a waste of work to do it yourself. However, if we want to consider the merits of a solution with all its implications and then decide on patenting, we need to do it earlier. Not to mention the effort and money spent on preparing the patent application. An iterative collaboration between the originator or a well-technologically oriented transfer agent and an experienced searcher is needed for a good evaluation. Together, they gradually refine search queries and follow up on information. Such work can take several days.

4.3.2 Technology Industry Research - Patent Portfolio

A state-of-the-art review can help when we need to solve a less important technical problem for our own research, or a problem in a different field than the subject of the research. Solutions are often available on the market, but if we want something highly specific, we can use a search to check who understands the problem and could help find a solution. The result of the search can then lead to the establishment of a research collaboration or to the development of a bespoke solution according to our specifications. If the result of the search is negative, it may indicate a hitherto insurmountable technological barrier, which, if detected in time, again saves a considerable amount of time, effort and money and leads to an early change of the project plan rather than at later stages. At the same time, it means a challenge and inspiration for the relevant industry, to which you can cheerfully present an interesting problem to be solved.

Thanks to technology research we can get good data for our own presentation and marketing. The patent portfolio map shows very well and objectively how innovative and active we are in the field.

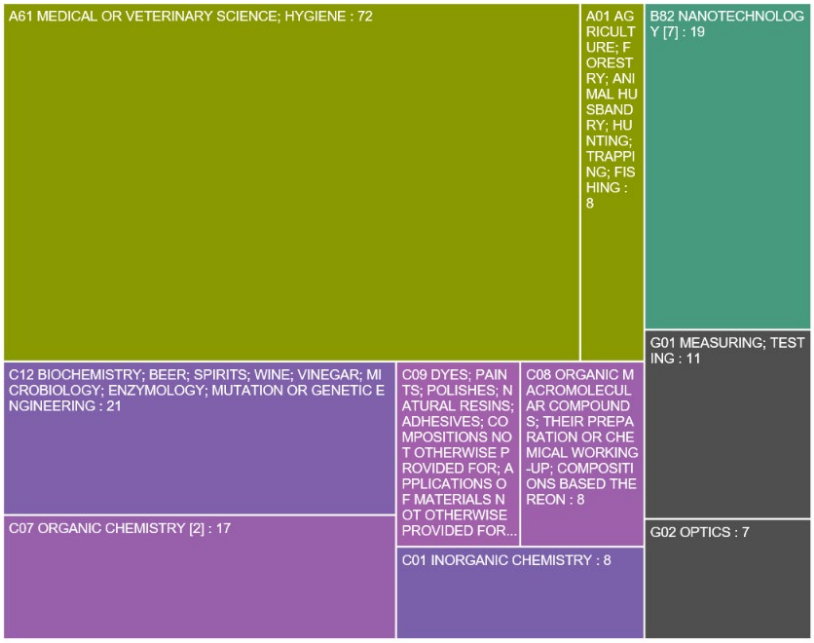


Figure 10 Options for displaying the most used patent classes of a specific research institution [PatSnap]

Industry research can reveal development trends and key players, but also show where the most interesting markets are for a given industry.

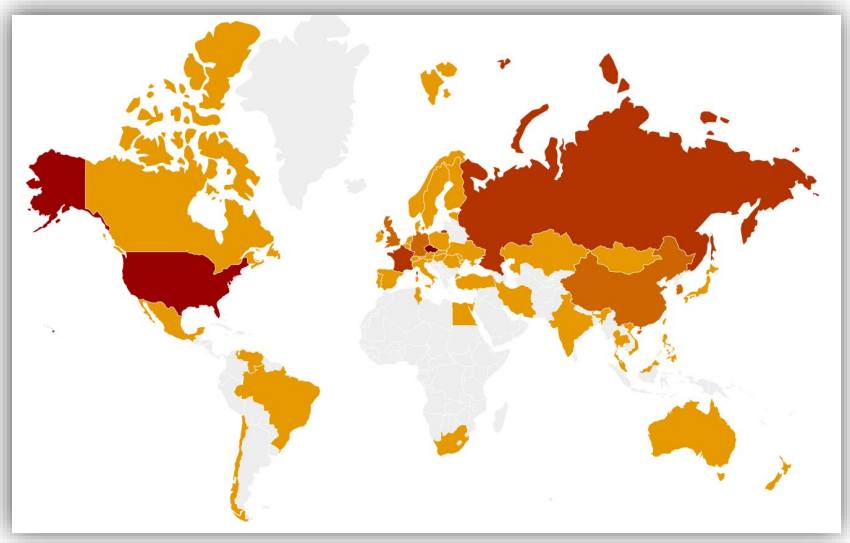


Figure 11 Illustrative sample of countries with the highest number of patent applications in a given field [PatentInspiration]

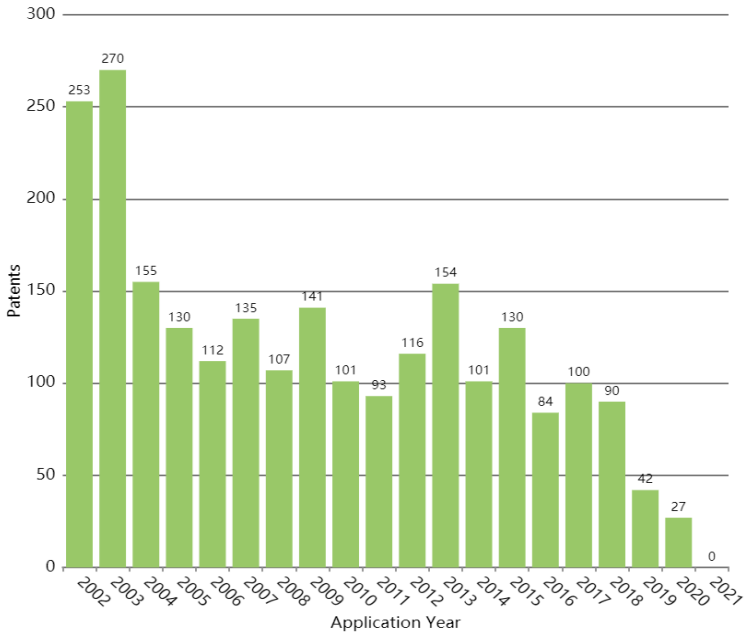


Figure 12 Illustration of the number of applications in the selected IPC class

4.3.3 Search for patent purity, freedom to operate

If we are serious about patents, then we must consider that whoever places a product on the market is responsible for its industrial safety. Companies that have in-house development conduct this type of search on an ongoing basis for all their products, especially those that they export to foreign markets. In this way, they try to minimise the additional costs of litigating new patents or litigating the infringement of foreign rights.

Several million patent applications are filed worldwide every year. Quite logically, and given the volume, it happens that the development of new products unintentionally infringes the rights of third parties. Thus, when rights and product meet in the same market, this means significant litigation costs and large losses.

Not all patent offices can and do perform this type of patent search. It requires a high level of expertise, professional equipment and cannot be done with freely available databases. The risk of

liability for a poor quality search and of recovering additional litigation costs is too high. The assessment of patent purity is never 100%; the legal status of documents changes and evolves over time. However, a well-conducted search significantly minimizes the risks.

Jan Vondras describes what it takes to conduct a quality patent search (Vondras, 2021): "In order to develop a legal opinion on the patent purity of a product, one needs a detailed understanding of the product itself, the competition, the development direction, and the geographic coverage where the product will be manufactured and sold. After thoroughly familiarising oneself with the product or its prototype, research is carried out to identify the relevant patent documents. Such a survey usually involves a search of several thousand documents. Specialised professional databases are used to facilitate this difficult task, but the thoroughness of the patent attorney will determine whether or not a relevant document is identified. Once the most relevant documents have been selected, the next step for valid patents is to compare their claims with the technical solutions of the product. The result of the analysis is a legal opinion on whether the product infringes the industrial rights of third parties and, where appropriate, a proposal of possible solutions"

4.3.4 Research on the legal situation and the patent family

It is obvious from its name that it is used to evaluate the territorial and temporal scope of the legal claims of another entity or to verify the current state of validity of the protection of our own solution.

As can be seen from the preceding chapters, in particular on the patent prosecution process (chapter 4.1), the vast majority of technical solutions are not protected by a single document, but are protected by a collection of national or regional patent documents that have been subject to independent proceedings and may have undergone various changes in the scope of protection. Individual documents have come into force at different times and their effectiveness depends on the payment of proper and timely maintenance fees. In some countries there may be litigation or proceedings to narrow or cancel the validity. Sometimes a patent is on a so-called 'standstill' and whether protection will be released or confirmed is not clear.

This task is an integral part of a patent clearance search, but sometimes it makes sense to perform it separately. It is significantly simpler, faster, and in its most basic and simplest form can be handled with freely available databases. Paid search tools allow you to create maps of patent families in a significantly simpler way.

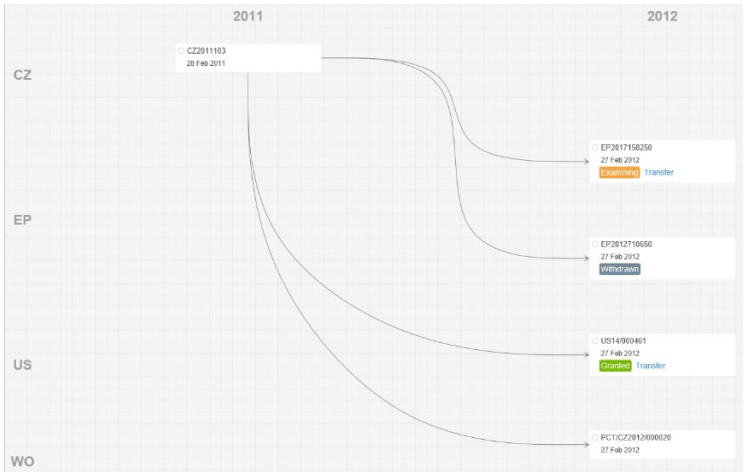


Figure 13 Sample view of patent family and legal status [PatSnap]

4.3.5 Name search

The main search criterion is the name of the originator, applicant or owner of the patent. Sometimes a search by patent attorney may also be useful. The aim may be to check the extent to which the person has industrial rights, their status, how active they are in the field, including the evolution over time, but also whether an employee of the institution is taking technology outside. A name search can also be used to identify key players - competitors or future cooperation partners.

Name searches are usually part of a so-called patent audit, where an institution or company has its patent portfolio analysed. For a good analysis, it is necessary to use paid patent databases, as it is very difficult to create similar maps manually. However, a quick overview for a single name or company can be done easily and quickly in open sources.

Figure 14 Illustrative sample of the most frequent applicants in the selected IPC class

4.3.6 Search tools

Searching the patent literature requires some experience and knowledge and availability of search tools, strategies and search languages. In principle, three approaches can be used:

- **Publicly available sources** - suitable in all cases where a quick and non-binding overview is sufficient. All transfer staff and, in an ideal world, all researchers should have the skills to work with public sources. Modern tools also work with keywords (albeit in a limited way, for the reasons described above) and try to be as intuitive as possible. A huge amount of useful information can be extracted from them, but analytics is difficult to do with them. Examples of freely available databases:
  - **The IPO database** - https://isdv.upv.cz/webapp/!resdb.pta.frm - maintained by the Czech National Industrial Property Office. The database contains patents and utility models valid in the Czech Republic. It allows reasonably sophisticated searching through a combination of filters, access to individual documents and partially to records of proceedings. It does not contain analytical functions.
  - **ESPACENET** - https://worldwide.espacenet.com/patent/search - administered by the European Patent Office EPO. Advanced search, tracking of patent families and legal status of documents. Extensive tutorials. First choice tool.
  - **PatentScope** - https://patentscope.wipo.int/search/en/search.jsf - a database managed by WIPO, an integral part of the PCT system, contains all patents and applications that have passed through the system. Some basic analysis.
  - **USPTO Patent Public Search** - https://ppubs.uspto.gov/pubwebapp/ - USPTO database. The US system is somewhat specific and also works with so-called provisional applications. The search uses specific logic, we recommend to read the help.
  - **National databases in individual countries** - with a bit of effort and using modern translators, it is possible to find a similar database to the Czech IBA in many countries. National offices more or less cooperate with the EPO and WIPO and share some data with them.

- **GooglePatents** - https://patents.google.com/ - based on full-text search, can also integrate non-patent literature. It has improved significantly over the last few years. Most user-friendly and accessible tool for researchers or people unfamiliar with the specifics of patent literature. Fast, clear, allows simple analysis.
- **WIPS Global** - https://global.wipscorp.com/page/s0201.php - focused on Asian patents, administered by the Korean Patent Office.

– **Paid professional databases** - they require a trained person who can work with them and extract their huge added value. In an ideal world, there should be at least one such person in every research organisation. The value-add of paid databases includes error correction, secondary classification by industry category, litigation tracking, license sales and value, trend predictions, deep analytics, and a host of others. They represent a very seductive way of life for the enthusiastic analyst. Examples of paid databases with data published in (Scholz & Hruska, The "Transfer Agent Made Easy and Fast" Series, Part 3. Rights to Results, 2022):

- **PatSnap** - www.patsnap.com - tracks patent prices and litigation. Translations are not machine translations, they correct clerical errors and translations. Daily updated database, many visualizations and analytical tools, makes finished analyses available. Educational materials and training included.
- **PatentInspiration** - https://www.patentinspiration.com/ - Aesthetic and advanced visualizations of more than 55 types of analysis very easily available. Manual bug fixes, very many tutorials, articles and innovation methods. Connection to TRIZ methodology (for example in (TRIZ methodology - creating and solving innovation to invention assignments, 2023)).
- **Derwent Innovation** - https://clarivate.com/products/ip-intelligence/patent-intelligence-software/derwent-innovation/ - integrates dozens of sources of non-patent literature and is used by patent offices for complete research. It uses artificial intelligence tools for searching. Updates daily, manual correction of erroneous data.
- **Questel** - Questel - Intellectual Property, Innovation and Legal Management - updated daily, tracks royalties

– **Commissioned searches** at the office or patent attorney - these are excellent for regular monitoring of the situation in a particular field or with a particular group of applicants or originators. They are key, but specific, when searches for patent clearance are needed. A well-crafted assignment and the quality of the searcher are important in a custom search, ideally if a joint iteration of the search and search query specification can be arranged. Otherwise, you may receive thousands of documents as a result of the search that are not humanly possible to process. Also ask for guarantees when ordering a search.

5 Commercialisation of results

In connection with the currently more and more used term knowledge transfer, we must emphasize that it is not only and exclusively about R&D results subject to industrial legal protection, but it is also more and more about results generated by other fields, mostly in the humanities and social sciences. These results subject to copyright protection can also be licensed or otherwise commercialised on the market (know-how, written studies, etc.).

Change in the statute of universities in connection with the new Higher Education Act - the status of universities as public institutions. Universities become the owners of unique knowledge created on the basis of state and European financial support, and the possibility of their commercialisation (level playing field) has opened up. Increased emphasis on scientific, research and development activities and the development of cooperation with the business sector (Pillar 3). Last but not least, an important milestone in the Czech environment is the Innovation Policy of the Czech Republic, approved and presented in 2019, which until then did not exist in our country. Knowledge transfer thus gained anchorage in three of its nine pillars.

Effective cooperation between research and application depends on the ability to link the interests of the partners. It is essential that both parties involved have a good understanding of what they can offer to the other in a joint collaboration and what they require from the other in the collaboration.

There are several forms of commercialisation of R&D results and it is always necessary to choose the appropriate form for a given situation with discretion.

An overview of the forms that can be chosen for the commercialisation of intellectual property results.

- The sale of rights, such as patents, utility models, industrial designs, trademarks;
- Intellectual Property Licensing Agreement;
- contract for work;
- establishing companies to start up and spin off

The commercialisation process is generally defined as the process of turning an idea into commercial products or services.

5.1 Before the start - NDA, MTA

Confidentiality and protection of information is thoroughly addressed in the chapter 2.3. At this point, let us recall the context when entering into research or project cooperation or business dealings with other entities. It is already quite common that if the other party has interesting know-how or other added value, it will submit a proposal for a non-disclosure agreement (NDA) or a confidential disclosure agreement (CDA) when preparing the cooperation. If the cooperation involves the exchange and handling of material samples, an MTA (Material Transfer Agreement) is appropriate.

5.1.1 NDA - Non Disclosure Agreement

How information can be protected is described above. You will necessarily need to include in the mutual confidentiality agreement a precise definition of what the agreement covers. After all, different parts of a research institution may be talking to the same partner quite independently, and there may be collaboration on several concurrent or follow-on projects with different groups and under very different arrangements.

The second important task will be to clearly define whether and which commitments are unilateral and which are bilateral. It is imperative to ensure that the contract is balanced and protects value on both sides.

Typical elements of an NDA/CDA type contract:

- Precise definition of confidential information
- Definition of how to protect confidential information and the obligation of confidentiality

- Identification of persons to whom confidential information shall be disclosed
- Duration of confidentiality
- Sanctions for breach of confidentiality

5.1.2 MTA - Material transfer agreement

A contract that should always accompany any collaboration in which samples or tangible research results are exchanged and can be expected to be the subject of further research. By concluding this contract, future disputes or disillusionment when new potential for exploitation is discovered can be avoided. The MTA may contain provisions towards future licensing.

Very similarly to other contracts, this contract also has typical requirements.

- Object and purpose of MTA protection
- Precise definition of the material to be transferred
- Definition of the uses of the material
- Disclaimer of liability for defects and damage caused by the material
- Protection of information
- Options and background protection

5.2 License Agreement

A licence agreement is a type of contract regulated by the Civil Code 89/2012 Coll., as amended, under which the provider, who is the owner of the intellectual property right in question, grants the right to exercise that right to the acquirer, who undertakes to provide remuneration to the provider.

For intellectual property rights which have a personality basis (the author's right to his copyright work and the performer's right to his artistic performance) and which for this reason cannot be validly transferred, the option of a licence is the only permissible way.

A licence agreement is essentially a fee-based contract type, which means that the provider is entitled to a fee upon entering into the agreement. The remuneration may also be non-monetary, the contract is then in the nature of a barter contract.

The licence can be divided into two basic groups: exclusive (exclusive) and non-exclusive (non-exclusive). An exclusive licence means that the subject matter subject to the contract can no longer be provided by the provider to another person. A non-exclusive licence means that the provider can enter into more than one contractual relationship. In practice, the business strategy of the provider or the economic strength of the contracting parties is often decisive. At the same time, the scope of the licence itself may be limited or unlimited and may be expressed in particular in terms of time, place or quantity.

Sublicensing Agreement

A sub-licence means that it is possible to grant the authorisation forming part of the concluded licence relationship in whole or in part to a third party, but only if this has been agreed in the licence agreement! Similarly, under (Act No. 89/2012 Coll., Civil Code) § 2364, the assignee may assign the licence in whole or in part to a third party only with the consent of the licensor. However, this consent requires a written form. In the case of sublicensing, it is important to note that the so-called Roman law principle applies that no one can transfer more rights to another than he himself has. That is, no more rights can be transferred than have been obtained from the provider.

5.3 Spin-off

By spin-off we generally mean a business entity that is established to commercialise intellectual property created at a research institution. The intention is therefore primarily to commercialise R&D results and transfer them into practice. Typically, the research institution puts its own intellectual

property into the start-up and thus acquires a stake in it. One other option is to insert the intellectual property into the enterprise in the form of a licence or transfer of property rights to the results. The licensed or transferred rights are either contributed to the share capital of the spin-off company or are granted outside the share capital.

Spin-offs have become an economic phenomenon in recent years and a tool that seeks to establish the R&D result and monetize it in the early stages (Bjornali & Aspelund, 2012), (Abarbanell, Bushee, & Smith Raedy, 2003).

(Kliman, 2020) defines the concept of spin-off for the academic environment as a legal entity (usually a legal person or organisational entity regardless of the legal form and designation - spin-off, spin-out, start-up) established for the purpose of commercialisation of the results of scientific work by a public research organisation or for the purpose of other forms of transfer of the result of the research organisation into practice.

(Kliman, 2020) further states that companies established directly by a research organisation or by its employees (with the knowledge of the research organisation) for the purpose of providing research services, especially if the know-how of the research organisation or the specific skills of its employees acquired during research and development activities are used for these services, can also be described as a special form of spin-off.

Figure 15 General reasons for setting up spin-off companies

It can be concluded that it is usually advisable to establish a spin-off company at an early stage of intellectual property development, most often in the following cases:

- relatively easy entry into the existing market,
- the technology has several applications,
- there is a portfolio of patents,
- to achieve relevant market entry, further investment is needed, the technology still needs to be adapted into a marketable product,
- there is a high probability of getting an investor for the project,
- the motivation of the originator/group of originators to set up the spin-off company is clear,
- the method of return of capital (exit) for investors and the research organisation can be defined,
- the technology is of such a nature that there is no existing market for it and no takers can be found to grant a licence,
- The spin-off company is a tool to overcome market obstacles.

In summary, the university gains the background and resources to develop the project, while the risk of business failure is transferred to the newly formed company. In the event of success, the

research organisation itself also gains in prestige. If commercialisation is successful, the research organisation also benefits financially.

The types of academic spin-off companies are distinguished according to the purpose for which they were established - i.e. primarily the use of technology or knowledge created at the academic institution (production, operation, service), including the necessary retrofitting. Another purpose may be to provide a service for the academic institution or to buy the products of the academic institution. Last but not least, an important purpose is to find a partner for application projects.

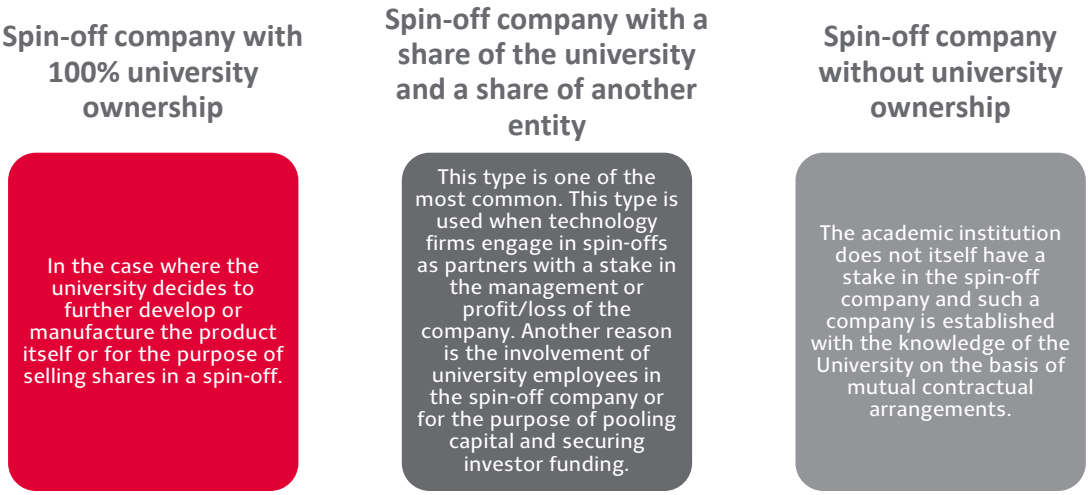


Figure 16 Basic types of spin-off companies

The general financing structure of spin-off companies usually consists of the following sources:

- Cash or in-kind contribution (share capital of the spin-off company)
- From own resources of the emerging company (venture capital, grant or project funds, equity, etc.)
- By making a cash or non-cash contribution outside the company's share capital
- By raising capital for a spin-off company
- By providing a financial loan
- By drawing on a consideration, e.g. a service

In terms of the assessment and subsequent implementation of the project, the expected benefits for the academic institution such as the financial return, the verification and subsequent implementation of the technology into practice, the possible subsequent impact on research and development and the increase in prestige not only of the R&D result but also of the academic institution itself should be particularly reflected. Motivation of employees is also a non-negligible aspect.

Certain pitfalls and risks certainly include transaction costs, risks arising from applicable legislative norms, e.g. public support, certain pitfalls of conflict of interest of employees operating in both entities or lack of awareness of the potential and benefits of commercialisation through the establishment of spin-off companies and the associated general confidence in the results of academic institutions.

It is evident that support for the creation of (academic) spin-off companies is a trend within Europe and foreign experience shows that this is a really effective and functional tool (HTGF, bpiFrance - Deeptech programme, AWS). Even very prestigious grants like EIC Accelerator already include a combination of grant and investment (in a share in a spin-off) and this will probably be transferred to us sooner or later (the question of implementation to make it functional for academic spin-offs will be crucial).

5.3.1 Tips and tricks for spin-off considerations

Weigh your options, choose a domain that doesn't have sky-high initial development costs, such as online websites and smartphone apps. Leave the world of new computer chips and new drugs to big companies and people with deep pockets. For the rest of us, the following suggestions will help us survive the valley of death:

Before you start, gather some resources. Planning your business always reduces risk. This includes estimating the money needed to get to the income stage and saving up money to cover expenses before you jump off the cliff. Self-funding or bootstrapping is still the most common and safest approach for startups.

Keep your day job until the income starts flowing. A common alternative is to work nights and weekends at a startup and survive the valley of death through another job or the support of a working spouse. Of course, we all recognize that this approach will take longer and could jeopardize both roles if not managed effectively. Set expectations accordingly.

Ask friends and family for funding. After bootstrapping, friends and family are the most common source of funding for start-ups. As a rule, this is a necessary step anyway, because outside investors usually won't consider providing any funding until they see the "skin in the game" from the inside.

Use crowdfunding. The hottest new way to fund startups is to use websites like Kickstarter, where you can ask for donations, pre-orders, get rewards or even provide equity (coming soon). If your offer is interesting enough, you can raise millions in small amounts from other people online to help you soar high above the valley of death.

Apply for competitions and business grants. This resource is getting a lot of attention these days thanks to government initiatives to encourage research and development in alternative energy and other technologies. The upside is that they don't give up any equity, and they apply to the early stages of a startup, but they take time and a lot of effort to obtain.

Get a loan or credit. This alternative is only realistic if you have personal property or a house that you are willing to provide as collateral to secure the loan or line of credit. Banks will generally not give you a loan until the business is cash-flow positive, regardless of future potential. However, this is an option that does not cost you equity.

Join the incubator for budding entrepreneurs. A startup incubator is a company, university or other organization that provides equity funding to nurture young companies and help them survive and grow during the start-up period when they are most vulnerable. These resources often include a monetary investment as well as office space and mentoring.

Exchange your services for theirs. Barter technically means the exchange of goods or services in exchange for money. An example would be getting free office space by agreeing to be the property manager for the owner. Bartering your services for services is possible with legal consultants, accountants, engineers, and even salespeople.

Joint venture with a distributor or recipient. A related or strategically interested company may consider the value of your product to be complementary to theirs and may be willing to provide a very early funding advance that can be repaid later when you develop your revenue stream. Consider licensing your product or intellectual property and "white labeling."

Make a commitment to an important customer. Find a customer who would benefit greatly from getting your product first and is willing to advance you development costs based on their past experience with you. The advantage to the customer is that they will have sufficient control over whether the product meets their requirements and will receive dedicated support.

The good news is that the cost of new startups is at an all-time low. In the early days (20 years ago), most new ecommerce stores cost a million dollars to set up. Now the cost is closer to $100 if you're willing.

6 Cooperation in research

If we acknowledge that research and creative activity is a flowing continuum, which over a long period of time focuses on themes rather than specific tasks, then we must also acknowledge that the results of research and creative activity emerge and are refined to varying degrees of maturity and readiness. Especially in the case of interdisciplinary applications, the author is not one person or one team, but the involvement of different experts is needed. Thanks to project funding, research consortia are often formed, often involving not only universities but also non-profit bodies or companies of a very wide range of different types.

The regulation of the relationships between these collaborating entities has a major impact on the usability of the results of this collaboration and if it is not also handled from the perspective of future or potential knowledge and technology transfer, it can easily happen (and historically, unfortunately, often happens) that the results are subsequently handled strangely and incorrectly.

Some sources indicate that it is important for the success of technology transfer that academic institutions offer collaborations with the application sector, such as contract research, collaboration with enterprises, contract services and infrastructure rental, and that the procedures and rules regarding these forms of collaboration are clearly defined. This interaction is key to building a long-term relationship of trust, knowledge of both types of environment and respect for its needs. Without these cornerstones, final success in the form of licensing or successful spin-offs cannot be expected.

Unfortunately, it is too often the case that the terms are not set correctly and fairly; the corporate partner manages most of the activities of the transfer process in its own interest. Perhaps in every Czech research organisation there is an example where the result of the cooperation has been very well applied on the market, but all the benefits associated with it go only to the cooperating company. The institution of co-ownership of results is an unfortunate standard in such cases.

However, a huge and common intersection of the two topics is contractual relationships securing the rights of partners, valuation, negotiation, knowledge base identification, and risk management. Thus, it can definitely be recommended that these agendas work closely together.

6.1 Types of interactions with the application sphere

The overview of possible activities of a research organisation in terms of knowledge and technology transfer can be divided according to three basic criteria:

1) Use of existing assets, including intellectual property rights
    a. Interaction uses the tangible assets of the research organisation
    b. Interaction uses the intangible assets of the research organisation
    c. The interaction consumes the actual resources of the research organization - people's time, energy, consumables, etc.
2) Origination and subsequent rights to results
    a. No new outcome is expected to be created in the interaction (so what is created?)
    b. Within the interaction, only the creation of a new material result is assumed
    c. A new intangible result is expected to be created in the interaction
3) Types of partners involved
    a. State or public administration
    b. Non-profit sector
    c. Other research organisations
    d. Private entities
4) Sources of funding
    a. Institutional money
    b. Earmarked and project subsidies
    c. Private sources

All these criteria have an impact on the setting of the terms of the interaction, its cost and the complexity of the negotiation. The individual parameters can be freely combined with each other. Even if there is an almost complete intellectual property subject matter that is sufficiently well specified and legally protected, a co-development arrangement may be part of the licence agreement. In foreign countries, this is often taken as part of the royalty, even though it is a payment for collaborative research.

Interactions with the application sphere can be imagined as a never-ending spiral of mutual inspiration and relationship development.

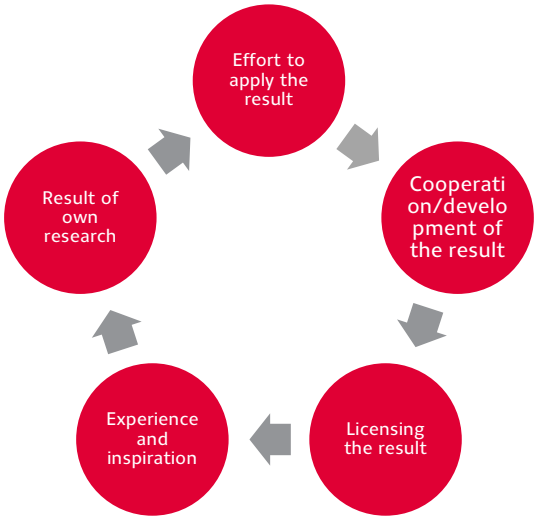


Figure 17 Cycle of interaction and inspiration with the application domain

6.2 Results in cooperation

Parties may make various non-financial contributions to a joint research project:

- Infrastructure and specific equipment
- Knowledge and people skills
- Intellectual property

A completely analogous consideration needs to be made about what will emerge in the context of cooperation:

- New or improved equipment
- New technologies, methods, procedures
- Intellectual property

The treatment of rights to "background IP" needs to be addressed in the contract, both during the project (e.g. gratuitous mutual disclosure for the purpose of joint research and achieving a common goal, but with limited dissemination or prohibition of use for other purposes) and after the end of the project (mutual obligation to disclose for the benefit of the use of the results for an agreed consideration or gratuitously).

Specify the rules for the use of "foreground IP" at least in basic terms. It is understandable that it is difficult to agree on the details of something that does not yet exist. However, there should be agreement in principle and, in view of reality and experience, do not be afraid to put in the contract even quite obvious and trivial positions (for example, that the rights primarily belong to the party who created the result). Adjust the rules for ownership and future use of the results, including mutual financial compensation. Agree on rules to ensure protection, maintenance and funding. Clarify the rules for publication and use for teaching and further research.

ATTENTION on co-ownership

Some providers (TAČR) encourage partners to enter into co-ownership agreements as part of their efforts to meet the conditions for effective cooperation. It should be handled with great care and be aware of the significant risk of asymmetry between the research organisation and the company!

- *Each of the co-owners has the right to use the result for their own needs without the consent of the other co-owners. Thus, a company can use it for its business and profits and a research organisation for teaching and research. Is this fair?*

- *On the other hand, the granting of a licence to a third party or the transfer of rights requires the consent of the other co-owners. Thus, a research organisation cannot even license a result to another company unless the co-owner gives its permission.*

Always negotiate the royalty analogy and terms of use on both sides in the contract!

6.3 Price per interaction

Note that research collaborations typically combine operating costs, depreciation, human remuneration, overheads and the value of intangible assets. Calculating the cost of any type of interaction should be done in collaboration with the accountants and economists of the research organisation as they have a thorough knowledge of the related regulations.

When calculating the price, it is a good idea to compare different considerations and set limits for negotiation. It is very important to realise that lowering the price puts the research organisation (and with it the undertaking) at risk of unlawful public aid.

European Commission (Communication from the Commission - Framework for State aid for research, development and innovation (2022/C 414/01), 2022) recommends that the price for contract research and research services be set at market prices, less the cost of the intellectual property rights that remain with the research organisation. If the situation arises that a market price cannot be determined, then it is the responsibility of the research organisation to take into account the **full costs** (direct and indirect) and a **normal margin**.

If the price set in this way would be too high for the partner and the collaboration is still important for the research organisation and has other significant benefits, then the partner can reduce the price by covering its marginal (direct) costs and seek to achieve maximum economic benefit in the negotiations and negotiate the contract at arm's length. This situation may arise in particular where the cooperation is a first-time, trial cooperation and is valid only for a clearly defined period.

For effective cooperation projects, the conditions are set slightly differently in paragraphs 29 and 30 (Commission Communication - Framework for State aid for research, development and innovation (2022/C 414/01), 2022).

7 Socio-economic impact on society

Socio-economic factors are among the significant factors affecting the life of every individual. In sum, these are the experiences, social relationships, attachments and experiences that lead to the improvement of individuals and also help to change the attitude towards lifestyle. Globally, they also influence sub-regions' (Chase, 2016).

These factors are not just a matter for individuals, they also play a role in business. Especially in terms of employees, their number or gender, whether or not they are family members, etc. (Delmelle, Hagenlocher, Kienberger, & Casas, 2016)

Socioeconomic factors are generally defined as each individual's relationship to financial, social, cultural and human capital resources. These factors primarily include education, employment, household status, family composition and family income (National Centre for Education Statistics, 2013). The law of social influence (social impact theory), which is based on the social influence model, identifies three most important factors namely: power, number and proximity. Power alone determines how important a given thing, a given group, is to an individual within a society.

In general, socio-economic factors from the perspective of the individual can be divided into individual and environmental factors:

- Individual factors - in this group we include in particular the achieved standard of living, education, acquired employment, attitude to health, lifestyle habits, nutrition, physical activity, etc.
- Environmental factors - political system, availability and quality of health care, economic situation of the country, infrastructure development.

Technology transfer and knowledge transfer are among the unique areas that scientific and research institutions use to connect academia with the application sphere, i.e. to develop the so-called third role of universities. The development of relationship building with the application sphere and the model of functioning of effective technology transfer or knowledge transfer involves and requires unique technology development, special data management systems and highly qualified personnel for successful implementation of the whole commercialization process. Thus, the science and research sphere offers scope for product innovation and market development, can be attractive for investment and contribute to broad socio-economic development i.e. social impact in general.

8 Technology transfer in Norway Universities

8.1 Definitions

Commercialization – the whole process from an idea arises, through for example a research result, and until the idea is launched as a business, solution, product or production method in a market and revenue is created" (Meld, 2018-2019)

Technology Transfer Offices (TTO) – are owned, and is governed, by the research institutions they represent and have a service or collaboration agreement with, usually the largest universities, institutes, regional health authorities and health authorities. They have agreements with the owner institutions that regulate their activities, financial responsibility and decision-making authority.

The task portfolios in the various TTOs vary. This is partly related to type research carried out at the owner institutions and whether the offices also have incubation activities. Regional variations are due, among other things, to historical conditions around establishment and business composition in the region in question.

The TTOs are organized as joint stock companies where any profits generated by public grants will be used for activities that are authorized in co-ownership with research organizations (for example, research, education, dissemination, and innovation). TTOs cannot pay dividends.

About half of the revenue of the TTOs comes from the Research Council's FORNY2020 program. Other income comes from licensing (patents), sales of shares and sale of services to publicly funded research institutions, where the university and college sector and the hospitals are key customers. They also have investments from the parent institutions." (Meld, 2018-2019)

Intellectual Property Rights – "An intellectual property right gives an exclusive right to exploit an innovation commercially, at the same time as the innovation is made public. Copyright and registration of a patent, design or trademark thus help to secure the return and reduce the risk of the investment by developing an innovation. " (Ministry of Trade, Industry and Fisheries Norway, 2013)

Types of intellectual property rights:

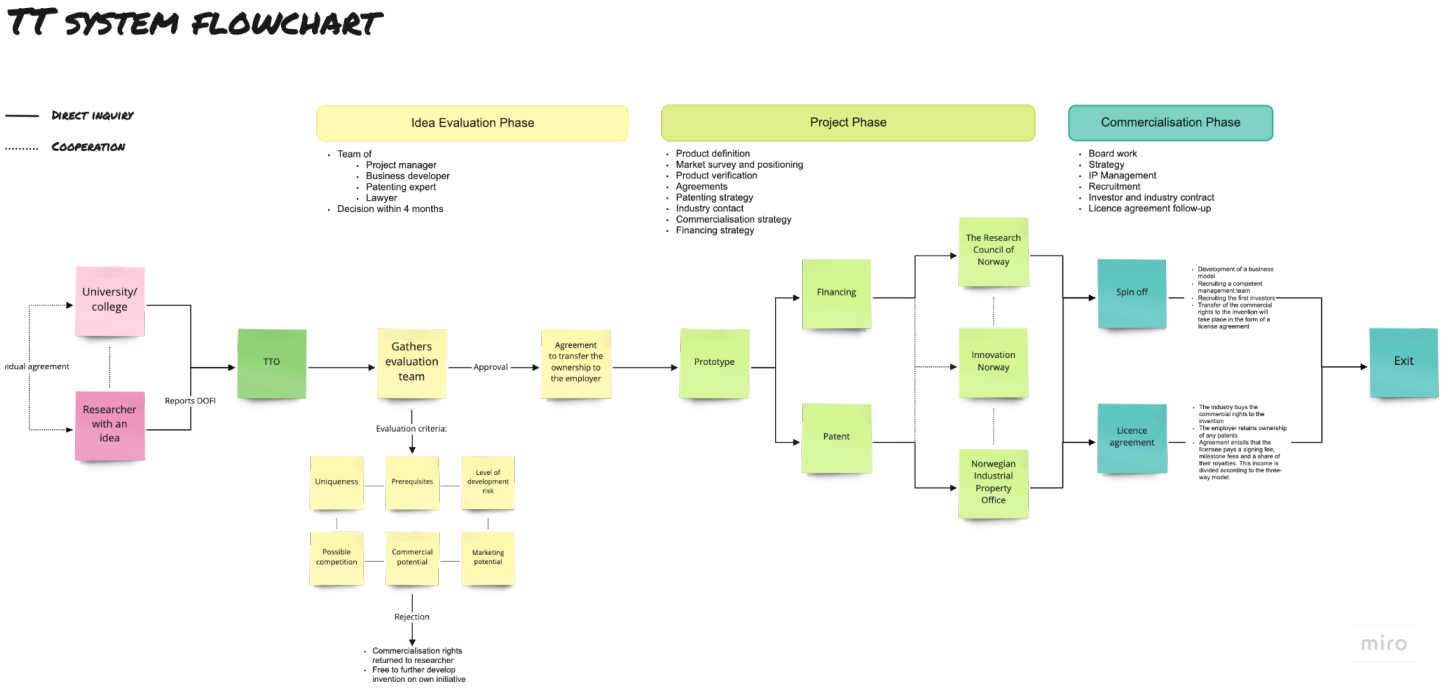
- Industrial properties:
  - *Patent.* Protects new inventions that represent concrete solutions to a technical problem, and where the solution is also of a technical nature. The deductible is valid for 20 years. Medicines and herbal pharmaceutical products can be extended to 25 years). Legally regulated by the Patent Act.
  - *Trademark*. Features of goods and services. All kinds of characters but must be able to be given graphically. Valid for 10 years, can be renewed indefinitely. Legally regulated by the Trademark Act.
  - *Design rights.* Protects the visible design of a product for up to 25 years. Legally regulated by the Design Act.
- *Copyright.* Literary, scientific, or artistic works, associated with the author and last 70 years after his death. Legally regulated by the Copyright Act.

FoU = Research and Development (R&D)

8.2 Process

Step 1: Idea registration

We receive an idea and review it in the first instance with the idea holder / researcher. We make an initial assessment of the idea and possibly agree that a message is delivered in the form of a DOFI (Disclosure of Invention). You get a DOFI form from us, and we give advice on filling it out. DOFI is delivered to Nord innovasjon AS, and is valid when it is approved and signed by both parties.



Step 2: Clarification of ideas

Delivered DOFI is the starting point for formal work with the idea, and for assessing the role of Nord innovation further in the project, on behalf of Nord University. A closer assessment is made of the technology's maturity and potential, needs, market, opportunity for intellectual protection (patents, etc.), competing solutions / patents ("freedom to operate"), development processes and costs. If we decide to take the idea further, an agreement will be established between the inventor and Nord innovasjon AS.

Step 3: Concept clarification

The further development involves completing a theoretical evaluation of the idea / technology, developing a strategy for protection (IPR) and possibly implementing this (e.g. patenting), assessing different business models and organizing the further work. We are seeking funding for further development of the idea, including funds for intellectual protection of the invention (patents, etc.).

Step 4: Verification

The idea is made ready for commercialization. This is done by verifying technology on a larger scale together with the team and any external partners. Furthermore, the market and willingness to pay are verified, and a strategy is developed for sales, market, financing, and any external ownership / investors.

Step 5: Commercialization

A plan for the actual commercialization is developed and realized, e.g. in the form of a new establishment (spin-off), licensing, or sale of the technology (exceptional). We develop models that ensure that researchers and the research environment receive their share of future income from the invention.

Step 6: Exit

8.3 Regulatory Frameworks in NO

8.3.1 Laws and legal frameworks

Employees' Inventions Act[1]

- The Act was amended in 2003 to allow universities and university colleges to transfer the rights to commercialize research results from their research employees.
- Relevant sections:

  § 4. If the invention is a direct result from a task assigned by the employer, the employer is entitled to demand part of or all rights to be transferred if exploitation of the invention falls under the employer's area of business.

  If the invention does not have a connection to the employment relationship but falls under the employer's area of business, the employer shall seek an agreement with the employee over rights within 4 months after notification of the invention.

  § 5. An employee who makes an invention that is covered by the provisions of Section 4 shall, without undue delay, notify the employer in writing about it, specifying the nature of the invention.

  § 12. Any dispute arising from matters covered by this Act may be referred to a mediation board by either of the parties.

The Norwegian Patents Act[2]

- To obtain a patent the invention must solve a technical problem in one new way, which differs significantly from what is known from before. A patent can last for up to 20 years from the day the application was sent, and the holder must pay annual fees to keep the patent at bay.
- Relevant sections:

  § 1. Inventions are considered to be:
    - discoveries, scientific theories and mathematical methods,
    - artistic creations,
    - plans, rules or methods for the exercise of intellectual activity, for games or business activities, or programs for computers.
    - presentation of information.

  Inventions can also be patented in relation to a product which consists of or contains biological material, or a method for producing, treating or using biological material.

  § 1 b. Patents are not granted if commercial exploitation of the invention would be contrary to public policy or morality.

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[1] Employees Inventions Act [Arbeidstakeroppfinnelsesloven]. (1970). Lov om retten til oppfinnelser som er gjort av arbeidstakere (LOV-1970-04-17-21). Lovdata. ENG:https://www.patentstyret.no/en/services/patents/Rules-and-regulations-patents/employees-inventions-act/

[2] Patentforskriften. (2007). Forskrift til patentloven (FOR-2007-12-14-1417). Lovdata. ENG: https://www.patentstyret.no/en/services/patents/Rules-and-regulations-patents/patent-regulations/

The Norwegian Patents Act [Patentloven]. (1967). Lov om patenter (LOV-1967-12-15-9). Lovdata.

ENG: https://www.patentstyret.no/en/norwegian-patents-act

No patent can be granted for

- procedures for cloning humans,
- methods for altering the genetic identity of human gametes,
- Use of human embryos for industrial or commercial purposes; and
- methods for altering the genetic identity of animals which may cause them disorders without causing any significant medical benefit to humans or animals, as well as animals produced by such methods.

§ 3. The exclusive right obtained by patent means that others than the patent holder must not, without his consent, utilize the invention by:

1. manufacture, offer, place on the market or use a product which is protected by the patent or to import or possess the product for such purpose,
2. apply or offer to apply a method which is protected by the patent or, if he knows or it is obvious from the circumstances that the method must not be used without the consent of the patent holder, offer it for use in this realm,
3. offer, market or use a product manufactured through a patent-protected process, or introduce or possess the product for such purposes.

§ 6. An application for a patent for an invention which, at the earliest twelve months before the date of application, is specified in an application for a patent in this country or for a patent, inventor's certificate or use pattern protection in a foreign state acceding to the Paris Convention of 20 March 1883 for industrial property protection to § 2 first, second and fourth paragraphs as well as § 4, is considered submitted at the same time as the previous application, if the applicant so requests.

§ 8. An application for a patent is submitted in writing to the Norwegian Industrial Property Office or, in the case referred to in Chapter 3, to the patent authority or international organization as specified in section 28.

§ 22. From the day on which the patent is granted, all documents in the case must be kept available to everyone.

When eighteen months have elapsed from the filing date of the application, or, if priority according to § 6 has been requested, from the day from which the priority has been requested, the documents shall be kept available to anyone even if a patent has not been granted.

§ 28. An international patent application is an application filed in accordance with the Convention on Patent Cooperation adopted in Washington on 19 June 1970 (the Cooperation Convention).

§ 43. If the patent holder has granted another right to exploit the invention (license) for business or operational purposes, he may not transfer his right to others unless otherwise is or must be considered to have been agreed.

The Norwegian Trademark Act

The Norwegian Design Act

- Legislates the visible design of a product for up to 25 years

The Norwegian Copyright Act[3]

- A literary or artistic work that is an expression of original and individual creative effort, receives protection under copyright (including scientific publications and teaching materials).
- Under the jurisdiction of the Ministry of Culture and Equality. No application,
- Creative rights generally fall under the Copyright Act rather than the Employees Inventions Act, particularly teaching materials with a personal connotation.

The Norwegian University and University Colleges Act[4]

- Legislating the University's assignment and responsibility to facilitate innovation
- Relevant sections: § 1-3.

The EEA Agreement – Annex XVII on Intellectual Property[5]

- Directive 2009/24/EC on the legal protection of computer programs[6]
- Directive 96/9/EC on the legal protection of databases[7]
- Directive 2001/84/EC on the resale right for the benefit of the author of an original work of art[8]
- Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society[9]
- Directive 2006/116/EC on the term of protection of copyright and certain related rights[10]

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[3] The Norwegian Copyright Act [Åndsverkloven]. (2018). Lov om opphavsrett til åndsverk (LOV-2018-06-15-40). Lovdata. https://lovdata.no/dokument/NL/lov/2018-06-15-40/

** No ENG version available. Refer to EEA Agreement Annex XVII.

[4] The Norwegian University and University Colleges Act [Universitets- og høyskoleloven]. (2005). Lov om universiteter og høyskoler (LOV-2005-04-01-15). Lovdata. ENG: https://lovdata.no/dokument/NLE/lov/2005-04-01-15

[5] Annex in Council of the European Communities., & Commission of the European Communities. (1992). Agreement on the European Economic Area. Luxembourg: Office for Official Publications of the European Communities. https://www.efta.int/media/documents/legal-texts/eea/the-eea-agreement/Annexes%20to%20the%20Agreement/annex17.pdf

[6] Directive 2009/24/EC. *The legal protection of computer programs*. European Parliament, Council of the European Union. https://eur-lex.europa.eu/eli/dir/2009/24/oj

[7] Directive 96/9/EC. *The legal protection of databases*. European Parliament, Council of the European Union. https://eur-lex.europa.eu/eli/dir/1996/9/oj

[8] Directive 2001/84/EC. *The resale right for the benefit of the author of an original work of art*.

European Parliament, Council of the European Union. https://eur-lex.europa.eu/eli/dir/2001/84/oj

[9] Directive 2001/29/EC. *The harmonisation of certain aspects of copyright and related rights in the information society*. European Parliament, Council of the European Union. https://eur-lex.europa.eu/eli/dir/2001/29/oj

[10] Directive 2006/116/EC. The term of protection of copyright and certain related rights (codified version). European Parliament, Council of the European Union. https://eur-lex.europa.eu/eli/dir/2006/116/oj

- Directive 2006/115/EC on rental right and lending right and on certain rights related to copyright in the field of intellectual property[11]
- Directive 2012/28/EU on certain permitted uses of orphan works Text with EEA relevance[12]

- General influential frameworks:
    - World Intellectual Property Organization (WIPO) administered treaties:
        - Berne Convention for the Protection of Literary and Artistic Works (1886)
            - Universal Copyright Convention revised in the Paris Act (1971)
        - Paris Convention for the Protection of Industrial Property (1883)
    - World Trade Organization (WTO):
        - Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) (1995)

8.3.2 Policy frameworks

Ministry of Education and Research - "Long-Term Plan for Research and Higher Education 2015-2024"13

Government strategy document:

- 6 long-term priority areas (ten-year perspective):
    - Seas and oceans
    - Climate, environment and clean energy
    - Public sector renewal, better and more effective welfare, health and care services
    - Enabling technologies
    - Innovative and adaptable industry
    - World-leading academic groups

"Effects on horizontal co-ordination, including the high-level meetings chaired by the prime minister, Cabinet discussions on STI issues, the establishment of some interdepartmental steering groups at administrative and political level, alignment work in RCN and other soft co-ordination questions" (OECD, 2017, p. 44).

Ministry of Trade, Industry and Fisheries

1. "Unique Ideas, Major Assets" (2012-2013)[14]
   Report to the Storting. Policy framework and future vision for innovation.
    - Government policy for IPR
        - Vision: "One holistic business policy"
        - Government mission to to promote awareness and competence about and increase the strategic use of intellectual property rights in Norwegian business, the public sector and among other relevant actors:
- Join Norway to international agreements and update regulations and schemes

[11] Directive 2006/115/EC. Rental right and lending right and on certain rights related to copyright in the field of intellectual property (codified version). European Parliament, Council of the European Union. https://eur-lex.europa.eu/eli/dir/2006/115/oj

[12] Directive 2012/28/EU. *Certain permitted uses of orphan works Text with EEA relevance.* European Parliament, Council of the European Union. https://eur-lex.europa.eu/eli/dir/2012/28/oj

[13] Meld. St. 7 (2014-2015). *Long-Term Plan for Research and Higher Education 2015-2024*. Ministry of Education and Research.

[14] Meld. St. 28 (2012-2013). *Unique ideas, major assets.* Ministry of Trade and Industry.

- Joined European Patent Convention (EPC) in 2008, European Patent Office (EPO) (London Agreement), Nordic Patent Institute (NPI), joined the Haag system for design registration in 2010 (Genèva Agreement).
    - Improve training in intellectual property and rights
    - Further develop the Norwegian Industrial Property Office
    - Further develop the overall guidance offer within intellectual property and rights
    - Fight piracy and counterfeiting
    - Improve the knowledge base for further policy development

2. "The health industry: Working together on value creation and better services" (2018-2019)[15]
    - Stating the health innovation ecosystem, focus on clinical trials in assisting research innovation in the public health sector.
    - Norwegian Association of Local and Regional Authorities Innovation Barometer findings:
        i. Innovation in the municipal sector does not depend on experts or enthusiasts alone, the employees have a positive role when it comes to initiating and implementing innovation.
        ii. Companies that allow employees to work innovatively achieve greater employee satisfaction and higher quality and efficiency in service delivery.
        iii. Municipal leaders are a source of inspiration, they are important for prioritizing resources for innovation work and providing space to try out new solutions.
        iv. Organizational culture also plays a very important role; risk-taking, openness, recognition and cooperation provide several new solutions.

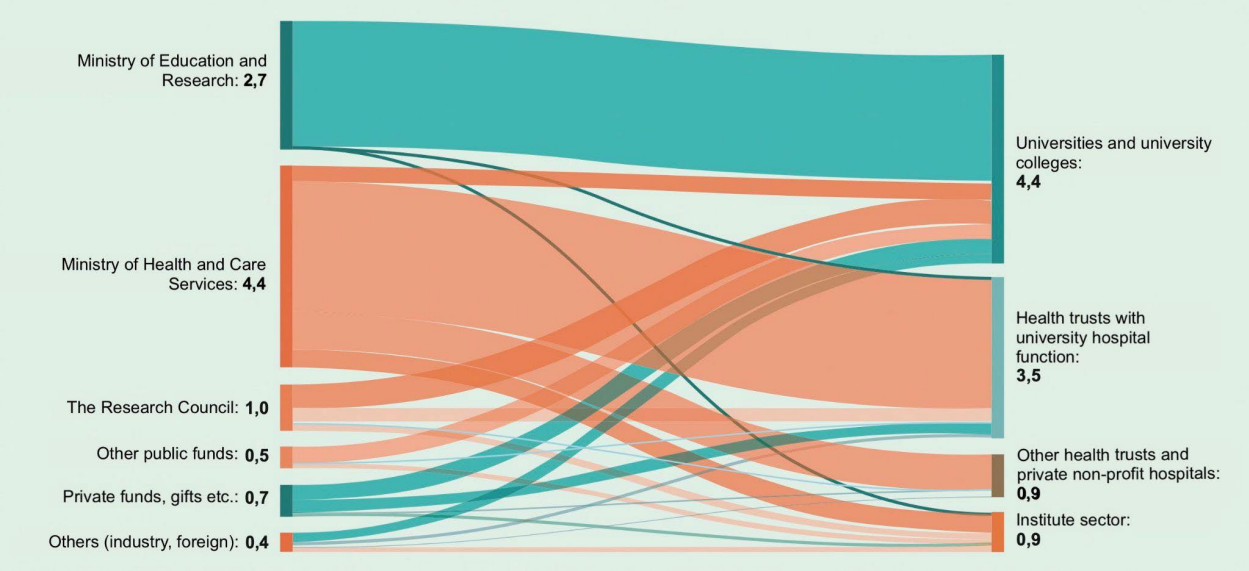

Figure 18 Total expenditure on R&D in medicine and health sciences by source of funding (left side) and recipient (right side). Figures for 2017, in billion NOK.

[15] Meld. St. 18 (2018-2019). *The health industry: Working together on value creation and better services.* Ministry of Trade, Industry and Fisheries.

8.4 Organization in NO

- External model:
  - Operates as an independent company, separate from the university central administration, but all TTOs have varied models of ownership
  - Threefolded system: Institution, Researcher and TTO
    - Future net income from a successful commercialization is normally split in three with 1/3 to the researcher, the University the TTO.
  - Some universities (UiO, UiS) have established internal innovation units to clear up the division of labor between the university and TTO's.
  - Different roles:
    - Some TTO's actively manage the university's IPR (UiO, NTNU, Nord) while some TTO's only have an advisory role.
  - No basic financing of daily operations. The TTO in itself is meant to be self-financed.
    - Services are funded through service purchase or collaboration agreements with the R&D institutions, project funding through FORNY (Research Council) or through own funds.
- Support systems:
  - The Research Council of Norway
    - Subject to the Ministry of Education and Research
      - Supplemented funding by
        Ministry of Trade, Industry and Fisheries,
        Ministry of Health and Care Services,
        Ministry of Finance,
        Ministry of Labour and Social Affairs,
        Ministry of Justice and Public Security,
        Ministry of Climate and Environment,
        Ministry of Local Government and Regional Development,
        Ministry of Agriculture and Food,
        Ministry of Petroleum and Energy,
        Ministry of Transport, and
        Ministry of Foreign Affairs
    - Approve funds to the TTO's through the FORNY program
      - TTO's can on behalf of the researcher apply for individual project funding through the Commercialisation Project (fund pool for 2022 approximately 245 mill NOK)
      - Approval based on the Technology Readiness Level (TRL) scale, approves projects from level 2-7 (see Horizon2020).
      - Criteria for funding:

        1. *Research and innovation.* What has been done ahead of the project? Does it have a good starting point?
        2. *Impact and effects.* What can happen after this project? Is the project commercially interesting and can contribute to value creation?
        3. *Implementation.* What will happen after the project? Will what is to be done in the project help to trigger the next step in the commercialization process?
  - Innovation Norway
    - Provide tools for start-ups and spin offs

        - Councils IPR and license agreements, cooperates with the NIPO
    - Norwegian Industrial Property Office
        - Application for licenses, patents
    - SIVA

- Types of research organizations in NO:
    - Universities, specialised university colleges and university colleges accredited at the institution level by the Norwegian Agency for Quality Assurance in Education (NOKUT).
    - Research organizations encompassed by the Norwegian guidelines for public basic funding of research institutes. Two types:
        - Centres for Research-based Innovation (SFI)
            - An SFI can be hosted at a university, university college, research institute or an enterprise.
            - Aim: supporting business sector innovation through collaboration between research-intensive firms and research institutions.
        - Centre of Excellence (SFF)
            - Innovative and potential for delivering groundbreaking results that move the international research front.
            - As of 2019, there are 23 SFFs in Norway.
    - Health trusts/hospitals with legally mandated research and development tasks and private, nonprofit hospitals that are encompassed by the national system for measuring research activity under the Ministry of Health and Care Services.
    - Other approved research organizations that have research as an objective and have been assessed and approved in accordance with the definition of research organization in the state aid rules.

- Advantages to the system:
    - Regional presence to establish horizontal network
    - “Arms length distance” from university control allows for closer network in business sector
    - Universities are protected against individual lawsuits due to external TTO system
    - TTO mission and tasks free and not limited to public sector
- Challenges:
    - Structural distance to university unclear for TTO
    - No innovation culture in research environments at universities
    - Different measurements of results
    - Lack of formal and informal contact with researchers and innovation units at Universities
    - Lack of cooperation between TTO's due to state aid regulations limiting mutual service purchasing between TTO's

8.5 TTO's in NO

TTO	Public/private ownership	Focus areas	Projects
Inven2	Public	Clinical studies	*Portfolio businesses (55 total):*
		Digitalization and e-health	Nykode Therapeutics
		Life Cycle Management	- development of novel vaccines
		Technology	Nordic Nanovector
			- tumor targeted antibody based nanovector
			Elliptic Labs
			- creating intuitive ways of interacting with computers.
			EPiGuard
			- develops improved patient transport solutions
			Current Eco
			- Smart Urban Mobility Platform for real time information
			Products:
			- EPISHUTTLE – Transport isolator
			- QUEST 5 HMC DNA ELISA KIT Epigenetic kit
			- PROBNP – Heart disease test
			- Medical Thermo Band
			- INNER BEAUTY - Virtual proximity sensor for mobile
			- PROMON SHIELD - Proactive software
SINTEF TTO	Private (foundation)	Safeguard SINTEF's intellectual property rights (IP)	*Portfolio businesses (spin offs):*
			BioEnivison
			- Flame retardants, water-repellent and barrier materials and antifouling solutions.
			Biosergen
			- developing new drugs based on cutting edge biosynthetic engineering of natural products, combined with chemical synthesis.
			SpinChip Diagnostics
			- art platform for in vitro diagnostics point of care analyses
			C-Feed
			- produces copepod eggs and live copepods for early stage feeding of marine fish, crustaceans and other marine organisms.
			Zivid: real-time 3D camera.

			SonoClear®
			- an acoustic coupling fluid for enhanced ultrasound imaging
			sensiBel
			- MEMS-based microphone technology for speech recogniton applications.
			Tellu
			- IOT cloud solution for health- and personnel safety applications.
			Minuendo: lossless earplugs.
			Nisonic
			- ultrasound based measurement of intra-cranial pressure.
			Ocean Space Acoustics
			- provider of PingMe - a semi-active transponder for location transmitting signals subsea to surface.
			NoMono AS
			- audio capture platform for object-oriented audio formats
			Visavi Technology AS
			- software solution - LivePlan; a tool for lean planning and integrated operations for complex organisations.
			KIT AR Ltd
			- Mixed Reality solutions for advanced manufacturing processes in robotics, aerospace and automobile industry.
			HyStar AS
			- electrolyzers for large scale and 100% sustainable green hydrogen production.
			HYDROGEN Mem-tech AS
			- production of hydrogen
			Aidee Health AS
			- deliver medical grade continuous blood pressure monitor.
Kjeller Innovation AS	Public/private	Energy	Eclectic
		Space technology	- cloud-based service for the handling of sensor-derived data for the measurement of air quality in cars
		Bioeconomy	IMIRO
		Smart societies	- measuring hydrocarbons/PAH in water.
		Mobility	Previwo AS
			- Developing vaccines against winter ulcer and other related diseases in salmon.

			Sensilist
			- method for precise detection of Listeria.
			SiliconX
			- new material that can save five times more energy than the material used in today's lithium batteries.
			SuperCap
			- new technology that can store five times more energy than today's state of the art.
			Target
			- development of targeted fish vaccines based on a vaccine platform.
NTNU Technology Transfer AS	Public	Sustainability	Sky Axxel
		Energy	- Magnetic skyrmions as information carriers for high-density, low-power memory devices.
		Sea	Health status measurement in Atlantic salmon parr
		Health	MARC: Multi-purpose optical sensor
			Pelton turbine wear monitoring
			Prediction of migraine attacks with AI
			INSTA-patch & INSTA-app:
			- sensor for monitoring of vital parameters
			Production of uniform populations of gel microbeads
			Novel membrane for blue hydrogen production
			AiBa
			- Real-time, continuous, multimodal detection of sexual predators online
			Dokka Smart Bolt
			- Surveillance of bolts in wind turbines
			SiQua
			- process for recycling of used quartz crucibles
			The Fitness Calculator
			- algorithm to estimate the fitness age of a human body.
			In-Motion
			- AI-based medical tool for prediction of Cerebral Palsy in infants
			Revie
			- novel drug for osteoporosis

			Rock Burst Bolt
			- rock bolt for use in areas prone to rockburst
Norinnova AS	Public/private	Technology	*Startup companies:*
		Energy, climate, environment and society	Keenious
		Sustainable use of resources	- algorithm analyzing the text you write
		Social development and democratization	Pazzing
		Health, welfare and quality of life	- platform where mobile players work together to solve challenges and tasks within a given time limit.
			Probotic
			- autonomous, environmentally friendly solution in the field of washing farmed snow
			Medsensio
			- smart algorithm based on machine learning that automatically detects and interprets noises in the lungs.
			Chip NanoImaging
			- photonic chip-based microscopy solution with super-resolution (nanoscopy)
			Recogni
			- Using data sources such as ocean currents, wave height, engine use and ballast, provides a tool for making the crew of ships operate as efficiently as possible and reduce fuel consumption.
			Eupnea
			- sensor for measuring respiratory frequency.
			Unifractal
			- tool that recognizes technical equipment using the camera on your smartphone.
			Sonomatrix
			- new technology for use in ultrasonic systems.
			The Health Book
			- app developed by Norwegian doctors aims to make everyday life easier for both patients and healthcare professionals.
VIS Vestlandets Innovasjonsselskap AS	Public	Marine	Development of a novel natural product platform for unmet medical needs.
		Life Science/Health	Deciphering molecular mechanisms in CNS disease.
		Society	Pill-like device for collecting intestinal fluid samples.
		Deep tech	ETEC Vaccine for Traveler's Diarrhea.

			Canine-assisted profiling of lung cancer from human breath.
			SmoltVision
			- analytical tool to make it easier for the fish farmer to time smolt release.
			XSENS
			- Fuel meter helps reduce CO2 and SOx emissions
			Fiber Optic Tunnel Surveillance
			Industrial diamond reactor
			- Producing lab-grown diamond jewellery and diamond semiconductors.
			4-day treatment of OCD.
			Continuous Laryngoscopy Exercise Test (CLE).
			eMeistring – Online supervision of mental illnesses.
			Psychological First Aid Kit – Conceptualising feelings.
Validé AS	Public/private	Agriculture	HuddleStock, Shoreline, Factiverse, Saferock, Typhonix, Scale Protection AS, SurplusHub International, Foodback AS, From victim to warrior AS, Factiverse
		Aquaculture Biotechnology Construction	
		Food	
		Energy	
		Health	
		Technology	
		Life Sciences	
		Materials science Medical products and software.	
Ard Innovation AS	Public	Environment Sustainable development	IsDeCa- Industrial Mixer
		Better public and animal health	CystLab
		Climate challenges Renewable energy sources	- remove parasitic potato cyst nematodes (PCN)
		Food production and land and resource management.	Microboost
			- delivery of environmentally friendly alternatives to chemical pesticides, probiotics and sustainable alternatives
			CIOL® wood
			- wooden material with protection and durability based on an environmentally friendly process with inexpensive ingredients.
			BacPress
			- packaging technology against Listeria
			EpiWHey
			- method for value creation from by-products in the dairy industry

			Urban Living Laboratory
			InSacco
			- system for environmental monitoring of the aqueous environment.
			SmartForest
			- SFI for forest technology sector
			Marine innovation arena
			Food Inspector
			- tools for the effects storage has on meat quality
Innoventus Sør AS	Public/private	*NA*	Aersea AS
			- Air and underwater drone services.
			Aliva AS
			- Apparatus for automatic treatment of dry mouth.
			Bitmesh AS
			- IoT platform for Smart Builds.
			Bon Vivant AS
			By Bente
			- Professional hair color for home use.
			Cleanfish equipment
			Oripatch AS
			- Focused pain relief
			Uveil
			- Airbnb-inspired platform for locations to the photography and film industry.
Nord Innovation AS	Public	Blue and green growth	*NA*
		Sustainable innovation and entrepreneurship	
		Health, welfare and upbringing	
		Social security	

8.6 Case Study of UiO

8.6.1 IPR policy[16]

- 2.2 Overview of legal bases for rights to results
  - Under the Norwegian Copyright Act, the University of Oslo has rights to catalogues, databases, etc., the development of which the University of Oslo has invested in, and to software created by employees during performance of tasks assigned as part of their employment or according to the employer's instructions.

[16] University of Oslo. (2011). *Policy for intellectual property rights at the University of Oslo*.

    - For results other than those mentioned above, the general rule is that the employee owns the results of their work, for example, articles or books that under the provisions of the Copyright Act the author owns the rights to.
- 2.3 Overview of results covered by the University of Oslo's IPR policy
    - When notifying Inven2 AS of an invention, an employee may point out that he or she will exercise his or her right to publish the invention without awaiting the University of Oslo's assessments, but notification of the invention must be submitted anyway.
    - The following categories of results are covered by the University of Oslo's IPR policy, but are not subject to an obligation to notify Inven2 AS:
        - Scholarly articles
        - Teaching materials
    - As only physical persons can create intellectual property, it will almost always, with a few exceptions, be the employee who is entitled to the copyright to results created as part of the University's activities.
- 2.3.1 Patentable inventions
    - Pursuant to Section 6 of the Employee Invention Act, employees at the University of Oslo may nevertheless choose to publish their results rather than patenting. In such cases, at the time of notification, the employee must state explicitly that he or she will go ahead with publication regardless. Otherwise, manuscripts must not be offered for publication until a patent application has been filed, unless this has been approved beforehand by the University of Oslo through Inven2 AS. Once a patent application has been submitted, the employee is free to publish the invention, e.g., as a lecture or as part of a scholarly publication, as described in the patent application and in consultation with Inven2 AS.
- 3.2 Special rules for research funded by the EU or the Research Council of Norway
    - The standard conditions of contract for projects funded by the Research Council of Norway and the EU go even farther than the law; these contracts state that all research results, and the rights connected to them, are the property of the University of Oslo.
- 6.1 Distribution of net earnings using the tripartite principle
    - i) After deduction of Inven2 AS's documented costs for commercialisation, the net earnings are split three ways, with a third going to the inventor (employee), a third going to the University of Oslo and a third going to Inven2 AS.

8.6.2 Inven2

Responsibilities (according to IPR policy of UiO):

1) Assist the University of Oslo in its efforts to strengthen the culture for innovation and contact with industry at the University of Oslo and help promote the University in the field of innovation and commercialisation of research findings.
2) Process reported ideas (Disclosure of Invention; DOFI) by means of identification, registration, assessment of commercial potential and choice of IPR strategy, and obtain copyright protection in cases where this has been deemed appropriate. This work also includes a duty to provide written feedback to inventors concerning whether Inven2 AS is going to set up a project based on the submitted DOFI. This feedback should normally be given within two months of receipt of the DOFI.
3) Perform innovation and commercialisation tasks, including copyright protection and business development in accordance with the University of Oslo's IPR policy.
4) Commercialise the results of work and research that the University of Oslo has rights to and that has commercial potential, including negotiating, entering into and following up agreements with third parties in innovation and commercialisation projects. Once written feedback as specified in item b above has been given, Inven2 AS shall prepare a project

plan that will normally include a summary of milestones related to technical development, copyright protection and commercialisation.

5) Be responsible for the project with regard to applying for funding from appropriate sources of funding for development of innovation and commercialisation projects.
    - On behalf of the University of Oslo, Inven2 AS makes decisions concerning patenting, licensing and setting up companies, and negotiates and signs agreements with third parties on matters relating to the University of Oslo's rights to results obtained at the University. Inven2 AS manages the University of Oslo's ownership and rights once agreements have been entered into and is the University of Oslo's point of contact with external parties in matters linked to the management of the University's rights, for example in connection with due diligence, unless the contract indicates otherwise.

- Articles of Association for Inven2 AS of 21 April 2010 and the Management Agreement between the University of Oslo and Inven2 AS of 8 June 2010.

Inven2 Ecosystem:

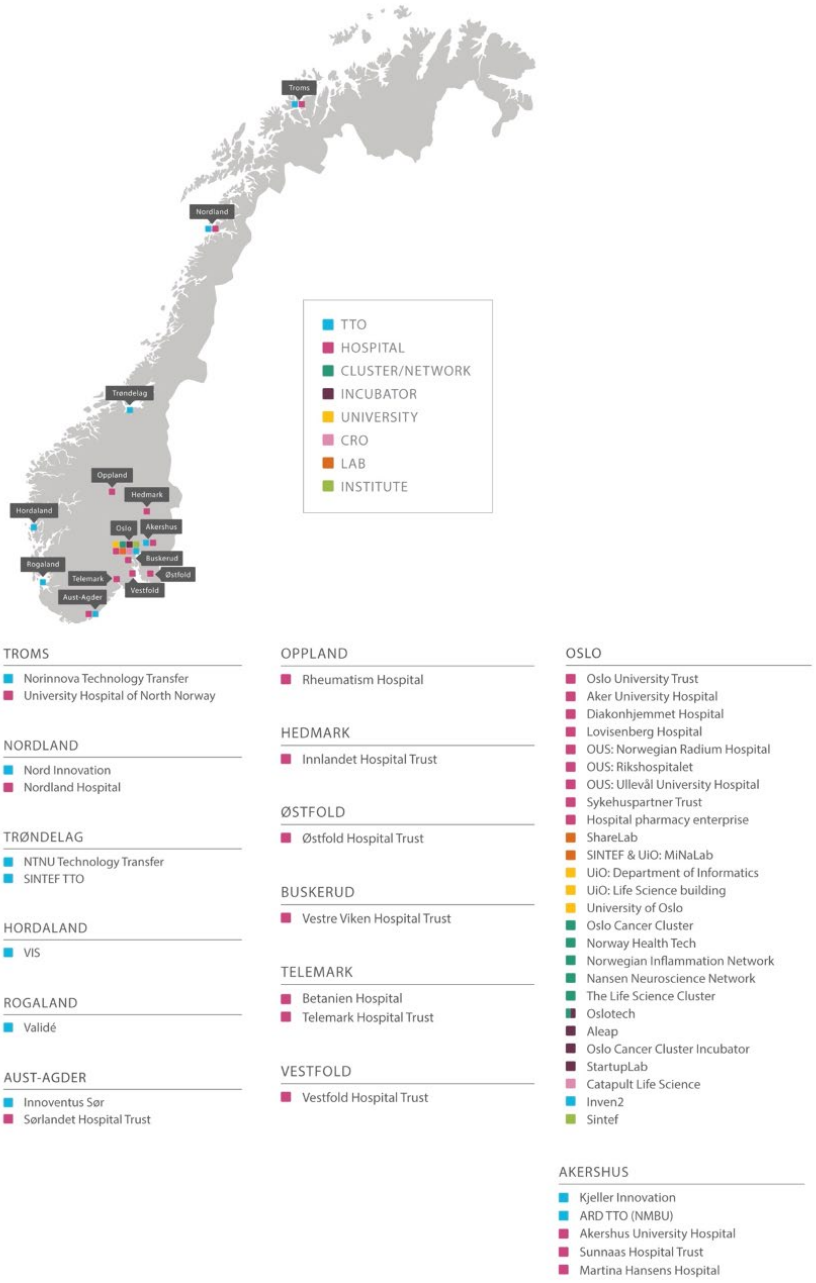

Figure 19 Norway Innovation Ecosystem (Inven2)

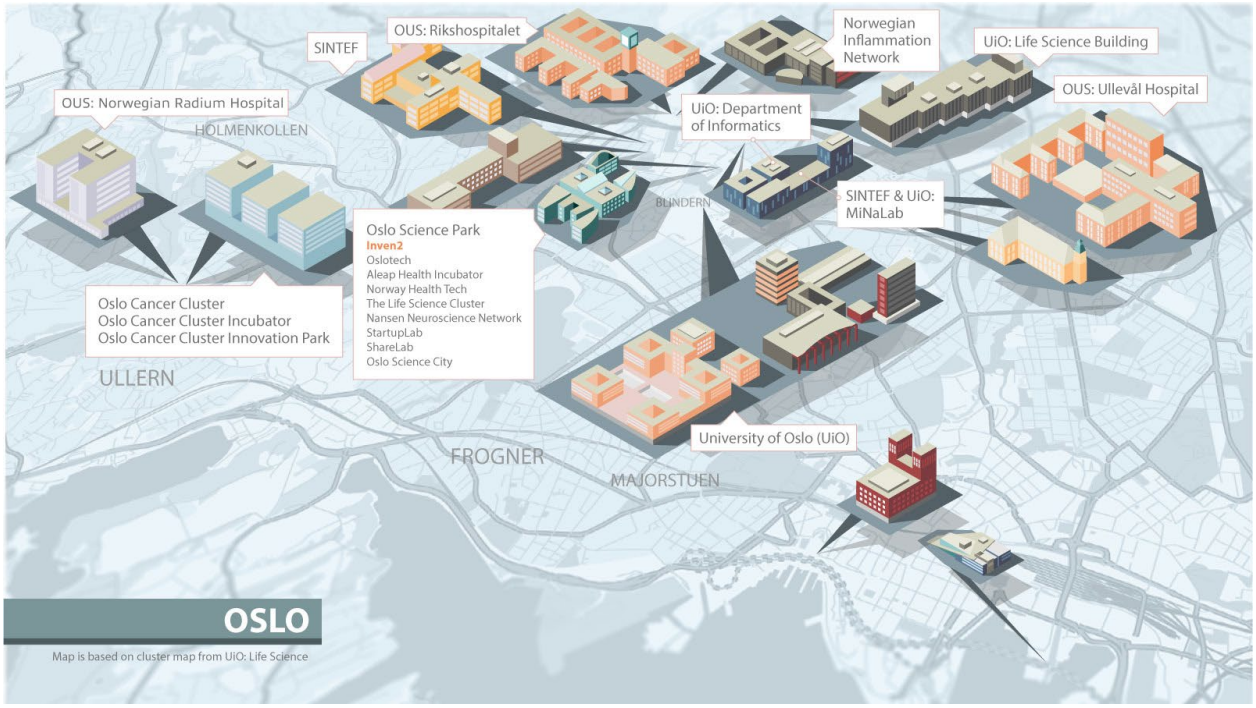

Figure 20 Map of Oslo Science Center

8.6.3 Oslo Science Park

- Houses clusters, networks and research environments (also houses Inven2)
- Academic focal points: ICT, mobility, media knowledge, life science, health, climate, environment, energy and nanotechnology.
- Main initiatives:
    - Incubator StartupLab
    - Healthincubator Aleap
    - Biotechincubator ShareLab
    - The Life Science Cluster
    - Norway Health Tech
    - Life Science Growth House
        - Will help researchers and students in life sciences to mature early-stage ideas to facilitate that research results to a greater extent benefit society.
        - Will eventually move into the Life Science Building. Now the unit is located in Oslo Science Park.
        - Is an equal collaboration between the Faculty of Mathematics and Natural Sciences and the Faculty of Medicine.
        - Support from: UiO and UiO:Life Science.
        -

8.6.4 UiO Interdisciplinary Strategic Priority Areas

UiO:Life Science

Develops knowledge in the life sciences by combining medicine and biology with methods of analysis from disciplines such as mathematics, chemistry, pharmacology, physics and computer science. Life Sciences represent a platform for new industry in Norway and transition to a greener economy with new jobs, products and services for the benefit of society, particularly in the health sector.

Projects:

- SPARK Norway:
    - Two year program for researchers in Life Sciences. Recieve guidance from mentors from academia, hospitals, industry and venture companies, milestone-based

funding, counseling and training. Led by UiO:Life Sciences, partnering with Inven2, Oslo University Hospital and clusters.

UiO:Energy

Main research fields:

- Energy Transition and Sustainable Societies
- Carbon Capture and Storage
- Energy Systems
- Materials for energy

Projects:

- SPARK Social Innovation Norway: Two year program developed with inspiration from SPARK Norway for social sciences.

UiO:Democracy

Previously UiO:Nordic. Five focus areas:

1. Institutions of democracy
2. Citizenship
3. The role of knowledge
4. Crisis management
5. Democracy in everyday life

The perspectives of sustainability, globalization and digitalisation will characterize the investment as a whole.

- *Aim:* To strengthen the democratic culture through interdisciplinary research and teaching, but also by seeking comprehensive social participation.
- coming in 2023. Replaces UiO:Norden

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