

Methodology for active search of research results with high commercialisation potential

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1. Purpose of the methodology and the basis for its processing

The purpose of the **Methodology for active search of research results with high commercialisation potential (Methodology)** is to create a comprehensive system for searching and identifying research and development results in Jaroslav Heyrovsky Institute of Physical Chemistry of Czech Academy of Sciences (JHIPC). The identification of results with high commercialisation potential takes place throughout the research and development process: the intention of the research project, its implementation and creation of intellectual property (IP), its verification, and commercial application.

In addition to the fact that the methodology sets out the roles of the bodies of JHIPC in the process of searching for and commercialising IP, the Methodology focuses explicitly on the entire process of administering proof-of-concept projects. This commercialisation stage is necessary for a large part of the IP of JHIPC, which arose from fundamental research projects. It is essential to verify this IP in terms of commercial practice.

The starting points of this methodology are mainly internal regulations concerning the field of intellectual property, its protection, technology transfer, and commercialisation. They are in particular:

- Directive SM-09 Management of intellectual ownership and protection and application of industrial property rights
- Directive SM-22 Management of research, development and innovation results
- Directive SM-31 Establishment of the Technology Transfer Office and the Board of the Commercialisation

‘Strategy for the development of cross-sectoral cooperation, management of intellectual property and for the transfer of knowledge from the research environment into practice’ (Strategy) is an important document describing the current situation in the field of intellectual property protection and technology transfer. The strategy identifies the basic barriers to the successful commercialisation of the IP of JHIPC and proposes future systematic measures in this field. The management of JHIPC approved the strategy in August 2020; it was created with the support of the project Rozvoj kapacit ÚFCH JH, v.v.i. pro výzkum a vývoj (reg. No. CZ.02.2.69/0.0/0.0/16_028/0006251) financed by the Ministry of Education, Youth and Sports and the EU – European Structural and Investment Funds in the Operational Program Research, Development and Education.

2. The role of the involved bodies of JHIPC and the procedure for finding research and development results with high potential for commercialisation.

2.1. Bodies involved in the process of searching for and evaluating research and development results and their commercialisation

The JHIPC currently has the necessary infrastructure for technology transfer and commercialisation. It consists of the following:

Technology Transfer Office (TTO), which will perform the following activities:

- Arranging the technology transfer process (TT) and its further development within the JHIPC.
- In cooperation with the Intellectual Property Group and the Board of the Commercialisation, identification of research and development results suitable for commercialisation and search for potential customers of these results.
- In cooperation with the Intellectual Property Group, ensuring the protection and administration of intellectual property within JHIPC
- Submission of management proposals for changes in the internal standards of JHIPC related to commercialisation and TT
- Coordination of educational activities of the employees of JHIPC in the field of commercialisation and TT
- Coordination of PR and marketing activities with the aim of commercialisation and development of TT
- arranging administrative activities related to the process of commercialisation and TT
- Fundraising in the field of TT development and support of commercialisation tools
- Preparation, management, and administration of projects in the field of TT development and support of commercialisation tools

The Intellectual Property Group (hereinafter referred to as "IPG") is responsible for the following activities:

- Overseeing the activities of the TTO and the use and efficient use of the commercialisation fund
- Expert advisory body to the Director of the Institute in relation to the enforcement of intellectual property rights
- Routine agenda related to TT and IP protection activities
- Preparation of documents for the BC

Group – Board of the Commercialisation (hereinafter referred to as "BC") carries out the following activities:

- Evaluation of the commercial potential of research and development results submitted by IPG.
- Acceptance, continuation, and completion of projects verifying the commercial potential of new knowledge submitted by TTO.
- Evaluation of the results of commercialisation projects after their completion on the basis of information submitted by TTO.
- Approval of proposals for updating the internal standards of JHIPC for TT and commercialisation submitted by TTO.
- Approval of the annual reports of TTO regarding its activities, the management of the intellectual property of JHIPC and its use for TT and commercialisation

A network of technological scouts within all departments of JHIPC, whose tasks are the following activities:

- Cooperation with TTO in the evaluation of research and development results from the point of view of their commercial potential and commercial use.

- Participation in the commercialisation of selected research and development results from an expert point of view.
- Consulting in the field of TT for researchers of the Department of Science and Research.
- Evaluation of project intentions of research projects from the point of view of the applicability of their results in practice.
- Monitoring the implementation of research projects, including possible applications of their results in other fields.
- Deepening knowledge of the market and its needs.

2.2. A process for finding results with a high potential for commercialisation

Technology scouts, whose network covers all research departments of JHIPC, will play a key role in finding results with high potential. Thanks to their expertise, these scouts should know both the potential of individual research units and the market requirements in the field. At the same time, they should be able to identify possible applications and apply their results in other areas. They should thus be an important advisory body for both principal investigators and the originators of the results derived in the project.

Technology scouts should play an important role in the stage of preparing research projects and identifying the usability of their future results. They should be able to estimate the future commercial potential of projects. This would significantly contribute to increasing the efficiency of the research activities of JHIPC and, at the same time to increase revenues from the commercialisation of research and development results in the future.

After the completion of research projects and the establishment of the IP of JHIPC, technology scouts, in cooperation with TTO, should participate in finding partners in the commercial sphere and offering intellectual property to these entities through all forms of commercialisation from licensing to the creation of spin-off companies. The best research and development results with high potential would then be forwarded to the Board of the Commercialisation through the TTO and the Intellectual Property Group, which would decide whether and how to commercialise these results most effectively.

Thanks to their expertise and knowledge of the commercial environment, technology scouts should participate in the management of IP in cooperation with TTO and the Intellectual Property Group. IP covers here not only industrial property in the form of protected patents and utility models but also classified know-how in the respective fields of scouts.

Given that a large part of research and development results arose as a result of fundamental research projects and their practical use must be verified in terms of production practice, it is very important to support the most promising research and development results in the so-called proof of concept phase. The TTO should provide the unbiased pre-selection of the results in cooperation with the technology scouts, and their funding should be approved by the Board of the Commercialisation, as detailed in the following chapter.

In order for technology scouts to play their role effectively, it is very important in the future to expand the system of their further education to include technology transfer, commercialisation and intellectual property protection and to create a motivation system for the scouts based on the success of commercialising the results of their department.

2.3. Cooperation within the Czech Academy of Sciences in the commercialisation of research and development results

The Czech Academy of Sciences (CAS) has created and has been developing a comprehensive system of support for knowledge and technology transfer. The system is based on the existence of a professional team of transfer experts. These specialists search for and detect results with application potential and provide funding for their development toward practical application. Transfer specialists negotiate agreements. Based on the deals, the results are licensed, spin-offs are created, and cooperation in application research takes place. Last but not least, they create and develop standards, norms, and methodologies describing good transfer practice.

The system of support for knowledge and technology transfer in the CAS consists of individual departments for technological transfer and individual employees of the institutes charged with the transfer agenda. A central office integrates these components. It also complements the transfer capacities at the CAS institutes. It connects them with external consultants in the field of transfer and financial and strategic partners from the application sector.

The building block for knowledge and technology transfer in the CAS is a unified, coordinated, and managed team. The team implements clearly defined activities to support knowledge and technology at individual institutes, departments, and within scientific teams. It is a combined team consisting of a centrally managed organisation and teams established and functioning at the CAS institutes.

The central team is established as the Technology Transfer Centre of the CAS (from now on also referred to as "TTCCAS"). The TTCCAS operates as part of the Centre of Joint Activities, CAS.

The TTCCAS has the necessary competencies and experience and, at the same time, adequate capacity to guarantee the range of needs of the CAS institutes and the provision of services at the professional level.

The provision of services at a high level of quality and professionalism is based on a catalogue of services clearly defining the transfer support services and their relevant parameters.

An important part is also a robust knowledge base, which is continuously proactively expanded and updated. It includes, among others, a set of documents for methodological support of transfer implementation – instructions, standards, templates, etc. Furthermore, it serves as a central place for recording and sharing the results of research activities that may have the potential for application in practice. The Knowledge and Technology Transfer Portal and the Database of Technologies and Instruments of the CAS are being further developed to make the knowledge base's content accessible.

The basis for applying knowledge and technologies emerging in the CAS in practice is the existence of intellectual property and related protection. Protection takes several forms, the most common being the creation of a patent. However, there are other ways to protect. Examples of other forms of intellectual property include copyright related mainly to computer programs and similar results with application potential, rights of institutes to databases, utility models, or valuable know-how of individuals or entire departments and groups of employees.

The TTCCAS continuously deals with activities related to the emergence of new results of research activities. They facilitate the registration and evaluation of the application potential of inventions. They

propose and implement an appropriate follow-up form and scope of intellectual property protection. The protection method is very closely linked to the assumption of the use and application of the invention in practice.

The CAS provides the institutes with conceptual support in the form of methodological recommendations for registration and intellectual property protection procedures.

Institutes may use the central transfer team's services to manage intellectual property. These services include the entire process of detection and valorising intellectual property. In addition, on-demand, the central transfer team manages the validation of the invention's potential for practical application. Additionally, together with an institute and its relevant representatives, specifies the appropriate intellectual property protection procedure and transfer plan.

An essential part of the knowledge and technology transfer strategy in the CAS is the most powerful possible application of existing knowledge and technologies created at the institutes in the past. For these purposes, TTCCAS, in cooperation with the institutes, collects and analyses data from intellectual property registration systems and the results of scientific research activities at the institutes. The aim is to create the most profound possible knowledge of existing technologies and expertise and their applicability to current socio-economic needs, especially in priority fields and sectors. Activities follow this to find relevant application partners for applying selected knowledge and technologies and establish cooperation for implementation in practice.

Knowledge and technology with potential for practical application require systematic support to maximise the likelihood of success and optimise the time and resources needed for successful transfer. In accordance with the defined objectives, it is about increasing readiness for application in practice, the so-called Technology Readiness Level (TRL).

In this context, the development of critical aspects of knowledge or technology – technical readiness, commercial readiness, and adequacy of the scope of intellectual property protection - is addressed.

We consider it important to maintain close ties with the application sector. In connection with the priorities of the CAS (described, for example, in the AV21 strategy or formulated in cooperation with the Science Council), these activities focus on selected research fields and, in some cases, also territories.

The tool for developing knowledge and technology for practice in the CAS is the internal subsidy Program for the Development of Applications and Commercialisation (PDAC). The Program will allocate funds to selected teams or institutes to develop specific technology. The Program shall have the relevant managing authorities and operational and organisational procedures, including control mechanisms, to guarantee its funds' transparent functioning and use.

The priority of the CAS is also the creation of new companies that assume responsibility for applying knowledge or technology created in the CAS into practice, so-called spin-offs. The CAS creates the conditions for the establishment of such companies. The aim is to simplify and accelerate the process of approval and establishment of a new company by an institute while maintaining a high level of administration and compliance with the applicable legislation and regulations of the CAS.

As already mentioned, from the beginning of 2023, the Program for the Development of Applications and Commercialisation (PDAC) should be launched, providing funds to the institutes for the development of selected results of research activities. The main objective of this Program is to prepare selected technologies from the academic environment at an early stage of development with commercial potential for transfer to the business sector. The Program will have funds that will be allocated to selected teams or workplaces in order to develop specific technology. The Program will allocate funds to selected teams or institutes to develop specific technology.

An essential prerequisite for selecting a project for the Program will be verifying and outlining the existence of a market for applying the technology. In the various phases of the Program, emphasis will be placed on the involvement of industry representatives and other application partners and, if possible, representatives of end customers.

3. The procedure of approval and implementation of commercialisation projects in the proof-of-concept phase

This procedure describes the process of commercialisation of interesting results of the Institute, the know-how of which, however, still needs to be verified in practice before being handed over to a commercial entity. The activities mentioned in this procedure are therefore related to the so-called proof-of-concept (POC) phase. Funds for POC projects are allocated to the Commercialisation Fund in accordance with Directive SM-09. The financial sources are JHIPC's own resources, but it is possible to use many subsidy titles supporting this stage of commercialisation. The provision of support for POC projects from the Commercialisation Fund will be carried out according to the following procedure.

3.1. Procedure for processing documents for the Board of the Commercialisation

The TTO processes the documents for the Board of the Commercialisation (BC). The documents are processed with the maximum degree of objectivity to provide sufficient information for the correct decision-making of BC. The Director of JHIPC has the supreme decision-making power as the statutory representative of the institution. BC is an independent body; a meeting of BC is convened by the chair of BC as needed (e.g. at the request of TTO or the Director of JHIPC). The Director of JHIPC respects the recommendations of BC unless there are particularly serious reasons for changing the decision (threat to the strategic interests of the institution, conflict with good morals, threat to health, etc.). A project involves TTO and project teams led by a project manager (PM). PM fills in the documents for the application for support. The authorised TTO staff member will assess and complete the application and evaluate it. The evaluation will be submitted to BC, and the project will or will not be recommended for funding. If BC recommends the project and the Director of JHIPC confirms the decision, the project is started. Based on the project application, TTO and PM will jointly prepare a Product Transfer Strategy (PTS), a detailed project plan leading to the development of a commercially successful product and its further commercialisation. The PM proceeds according to the plan and submits a report to TTO on the project implementation every three months. TTO will evaluate the compliance of activities and drawing budgets with the plan and submit this evaluation to BC for a decision on the continuation of the project for another 3 months.

TTO manages the PM of the projects, determines the dates of calls, decides disputes and enforces the decisions of BC and the Director of the institution.

3.2. Selection of proof-of-concept projects

The steps for selecting POC projects are described below.

1. TTO announces calls for projects once a year, about two months before the planned meeting of BC. A call contains requirements for projects in terms of their duration and the maximum allocation of funds.
2. Project applicants meeting the requirements of the call fill in an application containing two documents: "Project application" and "Project budget". They have 30 days to prepare these documents. The TTO and the technology scout in the given department are available for consultation at this stage.
3. Applicants forward these documents electronically to the e-mail of a TTO employee or physically in the electronic form to the TTO, where their acceptance will be confirmed.
4. TTO carries out a review within 14 days, alternatively asks the missing information of the application in the field of industrial law and commercialisation (market research and determination of commercial potential, etc.).
5. The revised and supplemented application is evaluated in the next seven days according to the "Evaluation Form". Evaluations are carried out by authorised TTO expert evaluators. Based on this evaluation, a Summary Evaluation of the project will be prepared, and the order of applications from the point of view of quality will be determined. This document will be handed over to the members of BC no later than 5 working days before the meeting of BC.
6. Based on the Summary Project Evaluation, the BC decides on the order of projects for commercialisation and forwards the order to the Director of the institution, who issues a written decision on the selected projects. Projects approved by BC and approved by the Director of the institution in the specified order will be supported until the allocated budget is exhausted.
7. The TTO employee informs PMs about the decision.

Unsuccessful applicants

Following the Director's decision, revised project documents will be handed over to unsuccessful applicants. Applicants will thus be able to implement the recommendations into their projects and register them in the next round of the call.

Successful applicants

A product transfer strategy (PTS) will be developed with successful applicants in cooperation with the TTO within three months of the decision. The PTS also includes a detailed plan of activities, both proof of concept and for subsequent commercialisation. The plan includes:

1. Project team (Project manager, technology scout, researchers)
2. Project output (detailed specification of requirements and technical parameters of the product)
3. Project activity plan (both for the POC phase and for subsequent commercialisation)
4. Project timetable
5. The project financial plan

6. Requirements for the protection of intellectual property so that it is adequately ensured in the POC phase.

The plan will be followed, and the project's progress will be monitored and evaluated. This evaluation will be submitted as a basis for the inspection by BC.

3.3. Inspection of proof-of-concept projects

For the funds to be managed efficiently, regular inspections of the projects are carried out. The inspections are primarily intended to assess the consistency between the PTS and the exact and current status of the projects. The project team consists of researchers and TT experts – technology scouts. TTO processes the part of the plan related to commercial applicability; the expert team processes the technical aspect of the project. The Project Manager (PM) has full responsibility for the course of the project. PM is responsible for adhering to time schedules, meeting project objectives, and proposing changes.

1. Projects are evaluated quarterly.

In the first quarter, the PTS is prepared, and a detailed project plan with regard to the commercialisation and implementation of the project according to the plan begins. The project manager will provide Quarterly Report to TTO. The report contains the fulfilment of project goals and milestones, information on changes in the project, and a drawing of the project budget. The TTO evaluates the compliance between the budget execution and the plan implementation on the Project Progress Evaluation form and will recommend the approval or rejection of the project change. To ensure independent evaluation, the project is evaluated by an authorised TTO expert who is not a project team member. PTS and an Evaluation of the Project progress are submitted to BC.

In the following quarters, the project manager provides the TTO with the Quarterly Report. The TTO evaluates the status of the project and the proposed changes on the Project Progress Evaluation form. To ensure independent evaluation, the project is evaluated by an authorised TTO expert who is not a project team member. Evaluation of the Project progress is submitted to BC.

2. BC decides on the termination of the project/approval of project changes according to the TTO recommendation and submits its opinion to the Director of JHIPC. Projects that take place on the basis of TTO evaluation according to PTS are not evaluated by BC.

3. The Director of JHIPC decides on the termination/changes of the project on the proposal of BC. The Director of JHIPC does not decide on projects that take place according to the PTS.

4. The TTO employee informs the project manager of the decision.

5. In case that TTO or BC recommends the termination of the project in the period between the first day of the new quarter and the decision of the Director of JHIPC, the project manager may not draw any project funds. Drawing is permitted only after notifying the project manager of the JHIPC director's consent to the continuation of the project.

Already at this stage, the expected products, according to PTS, are offered to commercial entities. If a commercial partner is found that wants to buy a product or license under acceptable conditions, this partner finances the course of the project from the moment of the sale of the result (license, etc.).

3.4. Completion of proof-of-concept projects

Projects end either by meeting the objectives, by exhausting the duration of the project, or by recommendation to terminate the project. This recommendation has to be approved by the Director of JHIPC.

Termination of the project by the decision of the Director of JHIPC

1. The TTO employee submits to the project manager the evaluation of the project progress and the decision of the Director of JHIPC.
2. TTO prepares a justification for the termination of the project, which, together with the quarterly report, is considered the final report of the sub-project.
3. As of the decision of the Director of JHIPC, it is no longer possible to draw any funds from the project budget.

Proper completion of the project

1. Upon proper completion of the project, according to PTS, the project manager will deliver a quarterly report to TTO. The report must be supplemented by evaluating product parameters and categorising project results according to the “supported RIV outputs”.
2. TTO evaluates the status of the project on the Project Progress Evaluation form. To ensure independent evaluation, the project is evaluated by an authorised TTO expert who is not a member of the project team. Evaluation of the project progress and evaluation of the achieved product parameters are submitted to BC.
3. BC evaluates the fulfilment of the project objectives and submits the evaluation to the Director of JHIPC. The project is hereby completed.
4. After the completion of the project decided by the Director of JHIPC or after the end of the time frame of the project, it is no longer possible to draw any funds from the budget, even if it has not been used up during implementation.

3.5. Monitoring of projects and their sustainability plan after the end of the POC stage

TTO, in cooperation with the Intellectual Property Group and the project manager, arranges the management of intellectual property (IP) and subsequent monitoring of the project. This is part of the commercialisation of the product according to the product transfer strategy, which is already aimed at specific customers and, therefore, cannot be paid for by public sources.

TTO manages IP and, in cooperation with technology scouts, IP marketing – active (targeted addressing of companies operating in the field, informing investors, organising workshops) and passive marketing (on its website, on technology websites, through databases, etc.).

The IP is, except in justified cases, managed as follows:

1. The submission of the national application is paid for by the resources of the institution. JHIPC usually maintains the patent in force for a period of 5 years.
2. The international application (PCT) is filed in case of interest in the product by a commercial entity, and JHIPC pays 100–0 % of the costs, the remaining share is paid by the commercial applicant. The institute only pays fees before entering the national phases.

3. The entry into the national phases is made in the case of finding a partner for commercialisation and is paid for by this partner. The Institute participates in the payment only if there is another application of the product for licensing to another partner. In this case, JHIPC pays only a reasonable share due to the further use of the (material, local) product.

The maximum duration of financing the protection of the intellectual property of JHIPC is ten years.

Project monitoring consists of the following procedure:

1. TTO assigns an expert for the commercialisation of the output. This expert is usually the technology scout of the department. Technology scout cooperates with the project manager.
2. TTO with the project manager prepare a “Project Monitoring” report at six-monthly intervals. The report includes, inter alia:
 - a. compliance of other activities with PTS, changes of PTS,
 - b. offers to customers,
 - c. closed licenses, established spin-off companies, IP sales,
 - d. income from commercialisation,
 - e. customers’ satisfaction with the product and with subsequent cooperation with JHIPC.

PM processes this report for 5 years after the end of the project or for the period of income from commercialisation.

PM submits this report to TTO. Summaries of the report are part of the TTO’s annual report, which is submitted annually to BC and the Director of JHIPC.