Evaluating scientific contributions in relation to transfer / Methodological guide (approved by the EC on 18 June 2018)

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1 Introduction

Inria is under the joint supervision of the Ministry for Higher Education and Research and the Ministry for Industry. Article 2 of Decree n°85-831 of 2 August 1985 governing the organisation and functioning of the national institute for research into computer science and automation stipulates that:

> *In the field of computer science, automation and applied mathematics, the institution's missions are as follows:*
> *1. To undertake fundamental and applied research*
> *2. To devise technological developments and experimental systems*
> *3. To organise international scientific exchanges*
> ***4. To transfer and disseminate knowledge and expertise***
> ***5. To contribute to promoting research results***
> *6. To contribute towards programmes for international cooperation and development, notably through training*
> ***7. To develop the capacity to advise and support public policies introduced to address specific societal, educational and industrial challenges within the digital sector***
> ***8. To contribute towards standardisation***

Transfer, in the broad sense of the term and as used in this document, refers to points 4, 5, 7 and 8. This document was compiled by a working group (please refer to 3.4 for details on the members of this group), brought together under the aegis of the Evaluation Committee (EC). Its priority goal is to assist researchers and research teams, helping them to share and present their contributions in terms of transfer, based on their research, within a wider context of assessments and competitions, including hiring campaigns. It also aims to assist assessors and panel members in the process of evaluating these contributions.

This document completes and updates the work previously carried out by ECs within this field (please refer to appendix 3.3). This work includes the Ledinot Report on evaluating transfers, which was published by the Evaluation Committee on 12 September 2007 and which had been drawn up based on two main observations:

- when it comes to assessing technological achievements and transfers, there is no equivalent to the journal peer-reviewing committees and conference program committees whose repute lends credibility to the process of assessing a given researcher's publications and scientific contributions; as a result, it is difficult to assert these two other types of contributions with the same level of confidence and to have the same amount of recognition on the part of panels
- as an industrialist who has on a number of occasions seen files citing transfers towards the company employing him, Emmanuel Ledinot "had observed a tendency sometimes towards *overestimation*, and sometimes towards *underestimation*".

It is now clear that, although significant progress has been made in evaluating *software*, thanks notably to the publication of self-evaluation guides (ref. "Evaluating software and Other Developments" in 2007 and "Proposal of Criteria for Software Self-Assessment" in 2011), the process applied to actions relating to *transfers* (in the broad sense of the term, not only those towards companies) remains ill-defined.

This document outlines a scope for transfer actions, with examples provided. The goal is to make it easier to present scientific contributions pertaining to transfers within evaluation and application dossiers. It also includes a template description sheet for transfers. This sheet can be used in place of Section 3 of Form 7 for application files for researchers and/or inserted into team evaluation files.

1.1 Definition and scope of transfer actions

We employ the following definition for transfers:

> *"The transfer process involves taking results from research (technological assets, knowledge, competencies or personnel), bringing them out of the laboratory and ensuring that the socio-economic sphere is able to reap the benefits."*

Companies[1] are not the only **beneficiaries** of transfers dealt with in this document, which also covers **local authorities, NGOs, associations, foundations and political bodies. It also looks at research laboratories (including academic ones) operating in other disciplines** in cases where the purpose of the partnership does not fall within the bracket of multidisciplinary research.

The scope of transfer actions explored in this document includes:

1) **Technology** transfer (involving the existence of at least one technological asset, piece of software or patent), which takes the following main forms:
    - setting up a company or a non-profit organisation
    - setting up a shared laboratory geared towards technology transfer
    - transferring an asset or granting licenses to beneficiaries
    - setting up consortia for the purposes of distributing free software to communities of users and developers or identifying bugs or flaws in widely distributed software programs
    - taking part in standardisation initiatives

2) Transferring and sharing **knowledge** via R&D partnerships between public research (research partnerships) and beneficiaries (including wider society), which covers:
    - bilateral R&D partnerships between public research and beneficiaries (this may include doctoral students funded by industry and shared knowledge creation)
    - collaborative R&D projects between public research and beneficiaries, in joint responses to calls for projects
    - drafting a white paper

3) Transferring **personnel**, which includes:
    - Appraisals conducted by researchers for companies and other beneficiaries, as well as mobility towards the socio-economic sphere, including business start-ups or for the purposes of informing policy decisions

[1]Any entity, irrespective of its legal status, engaged in economic activity. Economic activity is understood to mean any activity involving goods and/or services provided within a given market. This includes craft businesses or other individual or family-run businesses, partnerships or associations engaged in regular economic activity.

- Training and consulting for beneficiaries.

1.2 What is not included within the scope of transfer actions

- Actions already covered in the other sections of the researcher evaluation, particularly donations and grants from companies that fall within the realm of scientific patronage and are not related to specific transfer actions. These types of funding are often indicative of high-level research in fields that are of interest to the company, but these are not transfer actions in the strictest sense of the term.
- Scientific mediation aimed at the wider public.

2 Qualification of transfer-related contributions

The Ledinot report introduced a range of criteria, the purpose of which was to measure the impact of transfers. They include:

> *"Evaluating the 'benefits' of the transfer for the beneficiary, the scope of the beneficiaries (measured or estimated, qualitatively or quantitatively), the visibility of the transfer and the impact it might have in terms of the laboratory's reputation. These benefits may come in different forms and may be difficult to evaluate, particularly for researchers operating outside of the organisation to which the transfer has been made. However, the level of investment on the part of the beneficiary of the transfer in terms of time, personnel or finances will generally give a good indication of the benefits they are expecting."*

The following sections illustrate each type of transfer action using examples. The examples are given in descending order of their estimated impact and/or level of maturity. This method of qualifying actions gives researchers a tool for objectively assessing their transfer-related contributions, while providing assessors with a guide for evaluating these as objectively as possible.

This qualification is given for illustrative purposes. Each transfer action is specific and it is the responsibility of researchers to put forward the most convincing aspects in order to describe and promote the transfer action, as is the case for their other activities. Please refer to the description sheet included in appendix 3.1 (the type of transfer, the method of transfer, the contribution made by the applicant, a description of the impact the transfer had).

2.1 Technology transfer (software code, components, systems, platforms, patents)

2.1.1 Set-up of an entity in order to create value from research work

- Companies - or non-profit organisations - actually created, with assets transferred.
- Companies that have yet to be founded, but for which projects have been formalised (e.g. dossiers for the Bpifrance competition or hosted within an accelerator). The Bpifrance Ilab prize is a bonus.

2.1.2 Joint transfer laboratory

- Incorporating assets (software, patents and even expertise) within a **beneficiary** for the purposes of industrialising or rolling out a product or service, within the framework of a joint

laboratory (the ANR LabCom, for example, or the Inria Innovation Lab) with a shared scientific roadmap on a medium- to long-term basis (2-3 years and beyond). This activity must be of strategic interest to the **beneficiary**.

- Setting up a joint laboratory with a beneficiary (e.g. the Inria Innovation Lab or the ANR LabCom), with a shared scientific roadmap on a medium- to long-term basis (2-3 years and beyond) in relation to activity of strategic interest to the **beneficiary**, stipulating that the technology developed will be transferred before being either integrated or deployed in the **beneficiary**'s products or services (patent or software).

2.1.3 Transfer of software or patents

- Integration of a software / use of a patent by the **beneficiary** resulting in gains for the beneficiary (e.g. commercial profits, job creation, cost reductions, new services or improvements made to existing services).
- **Beneficiaries** being granted commercial licenses or receiving patents or software.
- Test licenses or free licenses for software given to **beneficiaries**.
- Patents jointly filed with **beneficiaries** that have yet to be used, or patents filed individually with a proven transfer strategy and clearly identified prospects.
- Generally speaking, technology maturation where there is a clear transfer strategy in place and clearly identified prospects.

Note: What we refer to here as "technology maturation" is a development such as use case, proof of concept, technology demonstration or industrial scripting, in advance of the technology transfer. Ideally, this process of maturation will be carried out in conjunction with an industrial partner, but it will not always be possible to identify the ideal prospect ahead of time. In cases where there is a clear transfer objective, maturation will sometimes be carried out by the laboratory or the research team alone. Maturation requires a different approach from pure research and does not fall within any other part of the evaluation. A distinction must be made between this and purely technical maturation, this falling within the bracket of technological development.

2.1.4 Free (or open source) software: building and coordinating a consortium or a community of contributors and users of software / platforms / systems

Contributions made towards software development, including free software, fall within the bracket of contributions made towards technological developments, drawing on the "Criteria for Software Self-Assessment" document (see Section 3.1 in the appendix).

Furthermore, contributions made towards software development may be accompanied by contributions that fall within the bracket of technology transfer as outlined in this section. In the specific case of free software, this includes in particular contributions relating to building and coordinating consortia.

- Setting up a consortium centred on free software, a formalised governance structure, coordination of the community and **beneficiary** investment in personnel (community of contributors) or financial resources (e.g. annual membership in the consortium), influencing the development roadmap and the functional design brief.
- Setting up a consortium centred on free software and coordination of the community or communities of users by the researcher, the existence of a formalised governance structure and a plan of action for software upgrades while taking into account user feedback in order to enhance its impact.

- Setting up a consortium centred on free software recognised by a community of users and the existence of a formalised governance structure.
- Exhibiting flaws or bugs in software that is widely used (applicable both in cases where the beneficiary - the software publisher - has been identified and where this is not the case).

2.1.5 Standardisation

Standardisation actions can be broken down into two different categories:

1) Active participation in a standardisation organisation.
2) Standardisation of a technology in order to ensure that it is adopted for use by the relevant actors within the sector.

In the first instance, (active participation in a standardisation organisation), the following can be classified as transfer actions, for example:

- Holding the position of chair in a work group within a standardisation organisation.
- Making a number of RFC (Request for Comment) contributions for standardisation organisations.[2]
- Playing an active role at meetings held by standardisation organisation work groups. For the IETF, for example, ensuring that a *"Work group document"* is adopted for use or obtaining more than 3 revisions, this demonstrating that the researcher has continued to work on the draft text and has incorporated comments left by the group.

The second case (standardisation of a technology) covers the following:

- Tools adopted for use in reference software certified by a standardisation organisation (ISO, RTCA, EUROCAE, etc.), particularly in cases where there is a supporting patent strategy.
- Tool submitted for integration in reference software certified by a standardisation organisation (ISO, RTCA, EUROCAE, etc.), which generally requires a significant amount of technical and engineering work in order for the reference software to be integrated and for the tool to be incorporated into the reference software.

Cases such as these sometimes fall within the bracket of software evaluation. In such cases, it is desirable for applicants to indicate that they have also written a self-evaluation paragraph for this software.

2.2 Knowledge transfer (research partnerships)

2.2.1 Bilateral research partnerships

Bilateral research partnerships cover a wide range of aspects that it is not possible for this document to list in their entirety. Generally speaking, this type of transfer can be broken down into the following categories:

- Prior study on the formalisation and understanding of the problem faced by the **beneficiary** partner; technology monitoring; adapting technology derived from research to the data and business constraints, including co-maturation, in anticipation of technology transfer either ongoing or at the end of a research contract.

[2] See Inria statistics http://www.arkko.com/tools/allstats/c_inria.html

- Bilateral research contracts with a beneficiary (this may include supervising an industry-funded PhD thesis).

2.2.2 Multilateral industrial research partnerships linked to calls for projects (H2020, FUI, PIA, ANR or other)

This refers exclusively to partnerships with socio-economic stakeholders other than academic laboratories. We feel that research partnerships between academics are evaluated and promoted based on research criteria. Multidisciplinary research may throw up exceptions, however, and these are to be assessed on a case by case basis. As such, it will be up to the researcher to decide whether or not to draw attention to the contribution in question within the section on transfer / innovation.

Transfer actions within the framework of collaborative projects involving a number of partners emerge in cases where partners are working together to develop a product / prototype / technology / software program and where its maturity in relation to how compatible it is with the targeted usage requirements has increased as a result of the collaboration. The transfer impact of these results must be proven and argued for.

Note: project coordination (including European projects) does not strictly speaking fall within the bracket of evaluating "transfers", but should feature within the section on management and accountability and be given the appropriate level of promotion.

2.3 Skills transfer (researcher mobility, consulting, expertise, technology monitoring, training)

2.3.1 Researcher mobility

- Articles L531-1 to L531-7: secondment or assignment of a researcher to a company with the capacity to promote their research work, including spin-offs (the existence of a specific contract and approval by the ethics committee).
- Articles L531-8 to L531-11: contribution of scientific expertise (up to 20% of working hours) to an existing company (including spin-offs) with the capacity to promote their research work (the existence of a specific contract and approval by the ethics committee) / Assignment to a private company, in a sector linked to the researcher's field of research.

2.3.2 Consulting, technical assistance, monitoring, etc.

- Consulting, technical assistance or technology monitoring services which are not covered by a scientific consulting contract as defined by Articles L431-8 to L413-11 of the Education Code, but which have been formalised as part of a contract in place between the laboratory and the beneficiary.
- Articles L531-12 to L531-14: inclusion of research personnel on the board of directors or the supervisory board of a public limited company, the goal being to promote the dissemination of public research findings.

2.3.3 Training

- Training sessions aimed at industrial firms or other socio-economic actors in the use of software, platforms, systems and components derived from research (e.g. Scicos, CAML, Coq, etc.) The purpose of this action is to assist the beneficiary in the process of adopting these tools for use, whether commercial or open source.

- Training aimed at industrial firms or other socio-economic actors where the added value of the researcher is recognised, for example on a technologically complex subject.
- Training aimed at industrial firms or other socio-economic actors, in keeping with the state of the art.

3 Appendices

3.1 Transfer action description sheet

The purpose of this sheet is to assist researchers and personnel with a view to evaluating their transfer actions. It has been designed for use as part of the "full list of contributions" form for researcher application files or in section 3.3 "Technology transfer and socio-economic impact" of the evaluation files for research teams.

The aim of this sheet is to describe contributions made to transfer actions (no more than four[3]), providing details of the most significant among them following the framework given below. Letters of recommendation can also be included in support of these actions and their impact.

[3] By way of an example, for software, there is to be a limit of 4 programs, including 2 detail sheets, for CRHC and CRCN promotions and competitions. There is to be a limit of 8, including 4 detail sheets, for the DR2 competition and DR1 and DR0 promotions.

Heading: name of the contribution

1 - Transfer description: Provide a brief description of the transfer action, • its type: technology transfer, knowledge transfer (research partnerships), skills transfer • the beneficiary organisation, please give the contact details the general purpose of the transfer: creating a new product or service, improving a tool-supported process, experimenting within an operational context, etc.
2 – Transfer methods • Describe the methods used: one-off or continuous over time, contractual framework, funding, etc. • Describe the different stages of the transfer process (difficulties encountered, strengths, etc.)
3 - Personal contribution made by the candidate: • Include here anything that may be used in support of the personal contribution made across all the work carried out, whether in relation to collaboration, creating the transferred object (if not previously discussed in the "major contributions" sheets), or in relation to the transfer itself (negotiation for the transfer of a patent or a license, adapting software in order for it to be used by a community, etc.). • Please list any other parties involved in this process, as well as the level and scope of their involvement.
4 – Transfer impact and knock-on effects: • Describe the scope of the beneficiaries (measured or estimated, qualitatively or quantitatively; mention the users of the transfer, for example) • The visibility of the transfer, its impact in terms of the reputation of the laboratory, the team, the researcher and any other relevant parties • Evaluate the benefits of the transfer for the beneficiary • Specify the influence of the transfer on the work of the researcher and/or the work of the team and/or any other relevant project parties.

3.2 Lexicon

Beneficiary: *individual or organisation benefiting from a transferred product or service. Beneficiaries can be any entity within the socio-economic sphere: companies, local authority bodies, foundations, associations, NGOs, political entities, communities, etc. The definition is not limited to industrial firms.*

Impact: *Impact relates to the benefits of the transfer for users - which can be assessed in terms of time, personnel and finances - as well as the number of beneficiaries.*

The Ledinot report: *report on transfer evaluation, published by the Evaluation Committee on 12 September 2007*

Knock-on effects: *actions and benefits of the transfer*

Transfer: *Transfer means the socio-economic sphere benefiting from results and knowledge derived from laboratory research. (see Section 1.1).*

3.3 Reference documents for software and transfers issued within the framework of the EC

- Transfer evaluation: document compiled by Emmanuel Ledinot, rapporteur, approved by the EC on 12 September 2007.
- Evaluating Software and Other Developments: document compiled by David Margery, Jean-Pierre Merlet, Cordelia Schmid, Agnès Sulem, Paul Zimmermann (rapporteur), approved by the EC on 12th September 2007.
- Proposal of Criteria for Software Self-Assessment – Inria Evaluation Committee (SoftWare Working Group – June 2011).

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