TECHNOLOGY TRANSFER ACCELERATOR (TTA)

1 Executive summary

Europe has much to capitalise on

Professionals involved in technology transfer systematically agree that Europe faces a number of significant challenges. However, there are many resources on which it is possible to build in order to advance and there is no reason to copy others.

Although the project reviewed the US, Japan, Canada and Israel, it is significant that the recommendations presented in this report are largely inspired from existing European experiences.

The environment in which technology transfer takes place plays a key role in defining the best approaches and, ultimately, their success. It is therefore critical to adopt flexible solutions that take into account European and even sometimes local specificities. In other words, ***Europe-grown solutions are best positioned to rapidly deliver tangible results.***

Of course, this requires being open to the outside world: it is necessary to develop and commercialise European research in Europe but also to be open to generate a "centrifugal dynamic" by interacting with other world areas.

This summary report presents a number of recommendations and ideas to support the emergence of an effective technology transfer industry in Europe.

Introduction

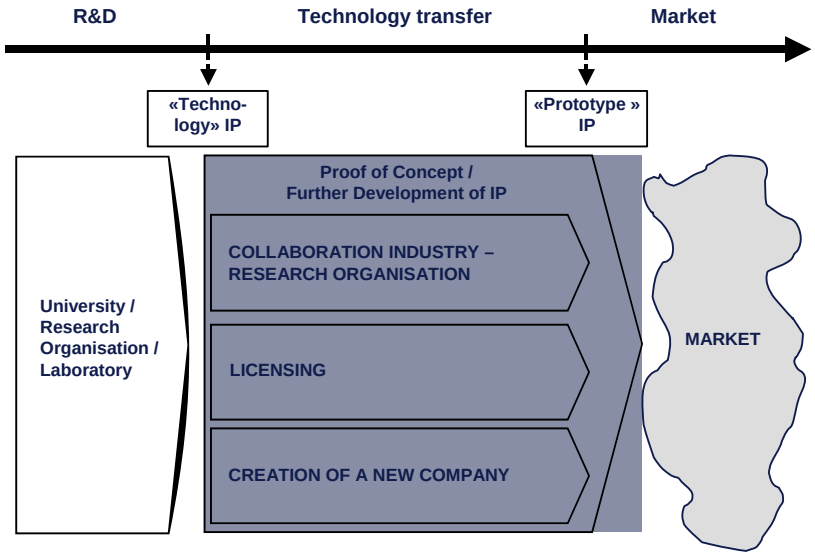
The TTA report presents the findings of a study carried out by the European Investment Fund (EIF) for Directorate General Research of the European Commission. The project's remit is to *"assess the feasibility and define the operational modalities of a new type of targeted risk capital and technology transfer investment vehicle linking centres of excellence from different European countries. The aim is to bridge the financing gap between research and early stage financing through a new scheme."* The underlying motive was to improve the prospects for the results of academic research and development to obtain financing and, ultimately, be commercialised.

The TTA report presents both a **diagnosis** or targeted analysis of the state of the commercialisation of research in Europe; and the **design** of a programme (the "TTA Programme") to improve the commercialisation of European academic research.

European technology transfer today shows similarities with an emerging industry: many valuable product ideas; a highly fragmented landscape; lack of critical mass; wide disparities in terms of performances; and developing practices. It is anticipated that the next decade will see profound changes in this landscape. The TTA's ambition is to accompany and accelerate this process, ensuring that European research is commercialised in an increasingly receptive innovation ecosystem.

1 Technology transfer

"Technology transfer" defines the process of transformation of the results of Research and Development (R&D) into marketable products or services.



This transformation process can take place in three main ways: through collaboration between the Research Organisation and industry; licensing; or the creation of a new company. This study focused on licensing and spinouts, as these are the mechanisms which face the most hurdles and where innovative financing solutions can provide the biggest impact.

The results of research can also be published. However, although a publication can lead to commercial applications, it is not considered as technology transfer since it does not seek to bring new products or services to the market.

A detailed discussion of the main technology transfer concepts is presented in Chapter 4 ("Definition of key concepts") of the main report.

2 Diagnosis

The diagnosis phase (Chapters 6 to 12 of the main report) shows that technology transfer in Europe is in a state of rapid transformation, with many Research Institutions establishing their own in-house technology transfer operations. Concomitantly, Member States are also taking action in response to findings confirmed by the Lisbon mid-term review.[1] The main conclusion is that there is indeed **a clear market failure in the area of technology transfer** and a *"considerable weakness of early stage venture investing in Europe"* [2].

2.1 Structural weaknesses of technology transfer

The technology transfer landscape in Europe suffers from a number of weaknesses.

2.1.1 Scale

Firstly, **Europe suffers from a very significant, growing gap compared to US clusters.** The table below illustrates this size gap at the regional level.

[1] European Commission, High Level Group chaired by Wim Kok, "Facing the challenge: The Lisbon strategy for growth and employment", November 2004, ISBN 92-894-7054-2. http://europa.eu.int/growthandjobs/pdf/kok_report_en.pdf

[2] European Commission, DG ECFIN, Note to the Economic and Financial Committee of the Council, "The shifting structure of private equity in Europe – What role for early stage investment?", ECFIN/L/6(2005)REP/51515, Brussels, 31 March 2005.

Size comparison of main innovation clusters in Europe and the US [3]

	Europe		US	
	Cambridge	Munich	Boston	Bay Area
Researchers	9,200	6,300	23,550	N/A
Publications	15,000	10,000	38,000	29,500
N° of public companies	>11	>4	>38	>44
N° of biotech companies	>110	>60	>200	>190

As the following table shows, a similar gap exists at the level of individual institutions.

Comparison of licensing revenues at academic institutions in the US and Europe (2003) [4]

US

University/Institution	Revenues [m€]
Columbia University	115.4
University of California Stern	65.3
University of New York	49.9
Sloan Kettering Institute for Cancer Research	43.3
Stanford University	40.0
University of Rochester	33.5
City of Hope National	31.4
MIT	30.2
University of Wisconsin-Madison	25.6
Florida University	25.2

Europe

University/Institution	Revenues [m€]
Pasteur	32.6
University of Edinburgh	4.5
Utrecht*	4.0
INRIA*	3.0
VIB*	2.7
Cambridge	2.3
Universities of Bern and Zurich	0.6
LMU Munich	0.2

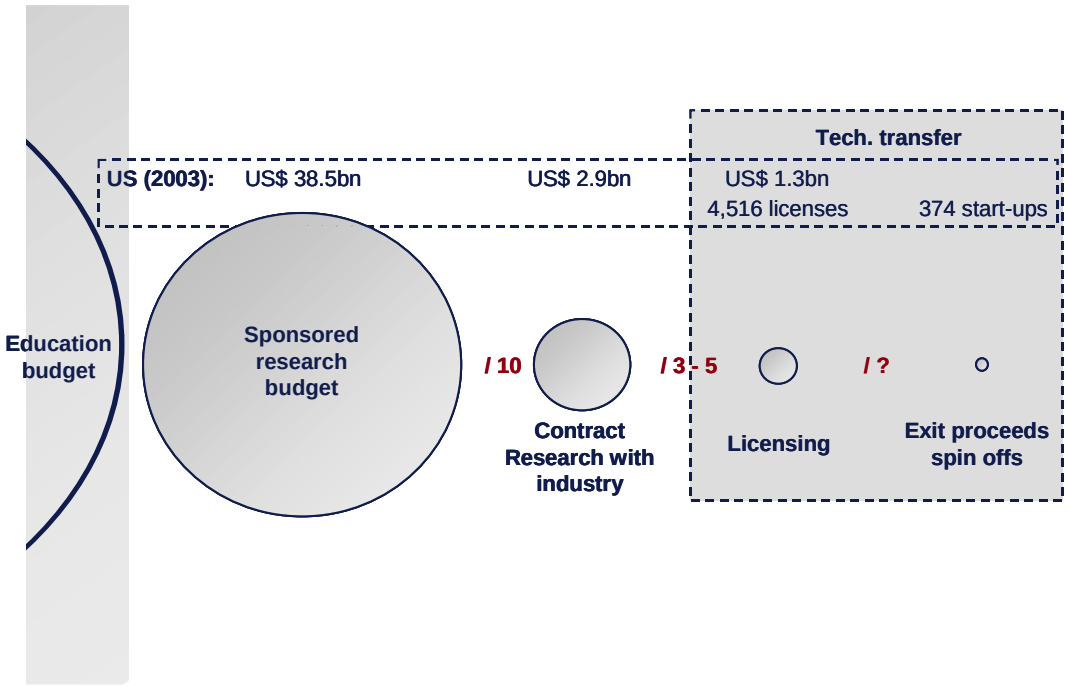
Note: * Revenues from industry

2.1.2 Positioning of technology transfer within Research Institutions

Secondly, technology transfer is still often considered as a marginal and relatively unimportant activity by many Research Institutions. This arises from the fact that the education and research budgets dwarf the proceeds from technology transfer, as depicted in the following graph. However, this view misses the crucial positive effects induced by the successful commercialisation of research on the other missions of Research Institutions.

[3] Source: European Innovation Scoreboard, BCG, TTA Project interviews; numbers are based on life science segment.
[4] Source: AUTUM 2003, Making Money out of Technology by Artley, Dobrauz, Plasonig and Strasser; TTA Project interviews.

Typical orders of magnitude – US [5]



2.1.3 Management of technology transfer

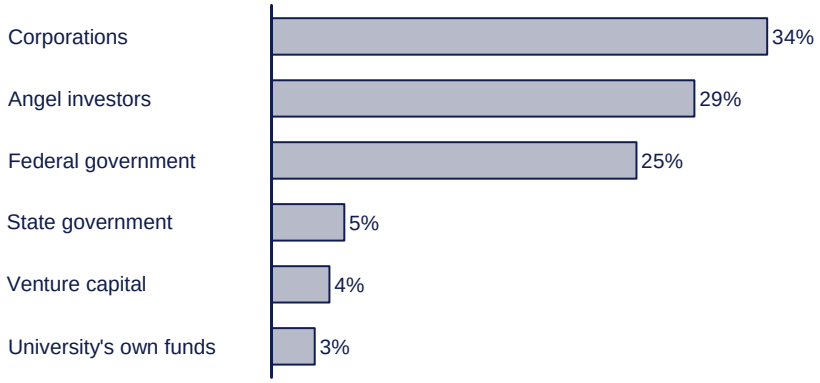
Thirdly, the management itself of technology transfer often suffers from major deficiencies. These start with objectives which are often not clearly defined: should technology transfer seek to maximise profits or not? Should it seek to maximise the number of spinouts? Should it play a role in defining research priorities or not? These and other questions rarely receive a proper answer. As a result, the strategy as to how to develop technology transfer is often blurred, decision-making is conflicted, and resources devoted to technology transfer are inadequate, both quantitatively and qualitatively.

2.2 Financing technology transfer

Today, technology transfer is most often financed by companies, informal investors and public sources. This is illustrated on the following graph, based on a detailed study carried out in the US.

[5] Source: TTA interviews, AUTM (212 US institutions).

Distribution of Sources of Finance for Early-Stage Technology Development (ESTD), US[6]



Although no such detailed study could be identified for Europe, the picture is expected to be broadly similar, with one key distinction. The informal investor community is much more developed in the US than it is in Europe. It is estimated that there are around 30 business angels per one million population in Europe, whereas the number is over 1,400 in the US. While these numbers should be treated with caution, there is no doubt that there is a massive gap between Europe and the US in this respect.

To address the gaps which have been uncovered, TTA is specifically tailored to supporting the various players active in technology transfer rather than to strictly supporting traditional venture capital. In fact, the diagnosis demonstrated that there is a need for financing mechanisms that will intervene upstream of venture capital and will therefore be complementary.

This is in line with the views expressed in the study referenced above: *"In summary, [...] the financing of the commercialisation of innovation cannot be solved solely through actions aimed to strengthen venture funds specialising in early stage investment [...]. Mechanisms for the financing of applied research, whether private or public, could play an important role in preparing projects to a development stage, where venture capital can realistically pick up the baton."* [7]

[6] Branscomb L. and Auerswald P., Between Invention and Innovation: "An Analysis of the Funding for Early Stage Technology Development", Report to the Advanced Technology Program, NIST, US Department of Commerce, 2003; and Branscomb L. and Auerswald P., "Valleys of Death and Darwinian Seas: Financing the Invention to Innovation Transition in the United States", Journal of Technology Transfer, 28, 227-239, 2003.

[7] European Commission, DG ECFIN, Note to the Economic and Financial Committee of the Council, "The shifting structure of private equity in Europe – What role for early stage investment?", ECFIN/L/6(2005)REP/51515, Brussels, 31 March 2005.

3 Recommendations

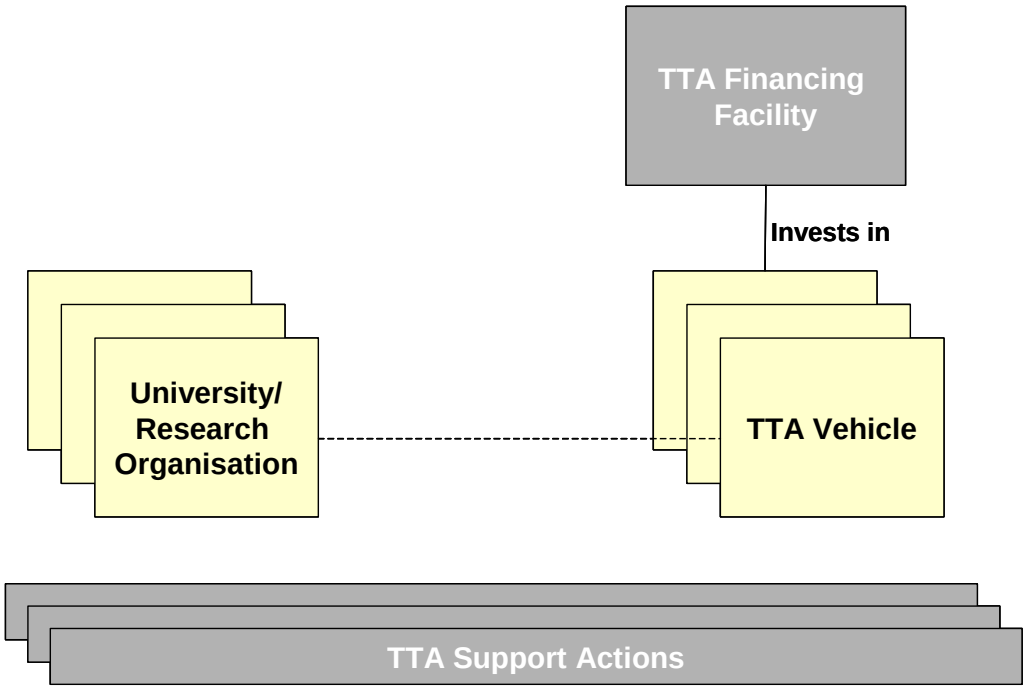
3.1 A flexible approach

European technology transfer requires flexible, agile support to be deployed starting immediately. For this and other reasons, although not without merits, the setting-up of a cross-border centralised vehicle to which a number of institutions would be partners or in which they would have a shareholding, cannot live up to the industry's needs: the set-up would be relatively heavy and slow, whilst the highly fragmented landscape would render its operation difficult. Therefore the TTA programme has been created in such a way that it allows greatest flexibility with a very high impact for the technology transfer market in Europe. This design reflects widespread expectations of the professionals involved in technology transfer in Europe.

3.2 The TTA Programme

The overall structure of the TTA programme is demonstrated in the following graph:

Overall structure of the TTA Programme



The TTA programme is built on pursuing, in parallel, two main sets of initiatives:

a) To support and accelerate the development of vehicles dedicated to technology transfer (the "TTA Vehicles"), a professionally managed TTA Financing Facility (the "Facility") providing the necessary funding for those vehicles, as well as management support to carefully screened technology transfer projects;
b) To capitalise on the Facility and enhance its wider impact, a number of accompanying measures ("TTA Support Actions") seeking to support the development of technology transfer in Research Organisations and address the weaknesses outlined above (section 2.1), as well as increase the awareness of stakeholders in the potentialities of technology transfer.

3.3 The TTA Vehicles

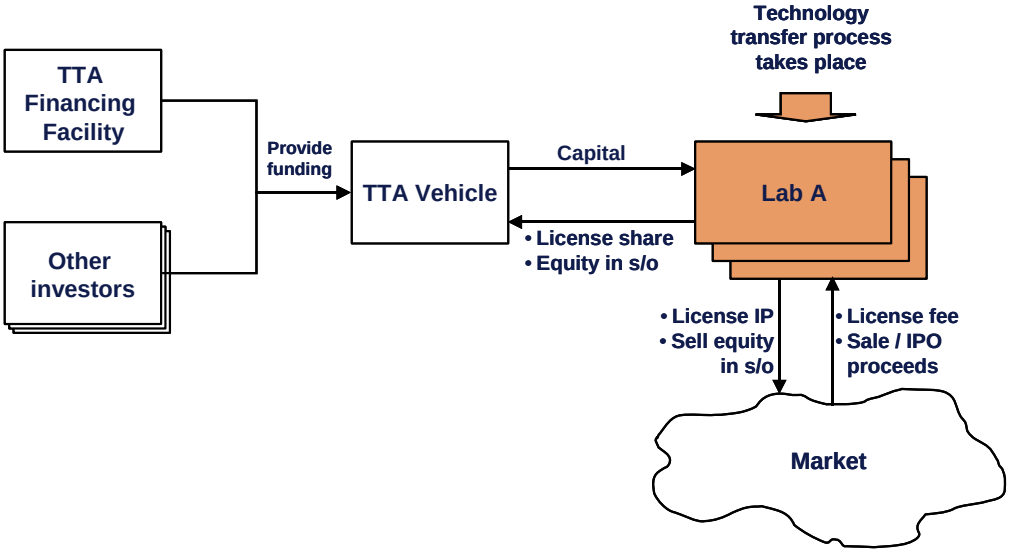
The TTA Vehicles are entities that seek to exploit technologies arising in Research Institutions. A number of such vehicles have emerged in Europe over recent years. These vehicles are attractive because they are tailored to the needs of technology transfer. This means that they are fully dedicated to technology transfer; provide a significant hands-on involvement in the various projects they nurture; access the right skill mix for technology transfer; take a comprehensive approach by financing not only spinouts but also licensing projects; accommodate the need for longer investment horizons; and / or provide adapted financing structures.

Through the review of projects and vehicles carried out by the TTA Project, it appeared that those vehicles can be broadly categorised in three categories. Such categories are illustrative and obviously do not represent all possible configurations. However it is important to note that this typology is not just conceptual, it corresponds to an emerging reality in Europe.

3.3.1 Technology transfer taking place within Research Organisations

In this model, the Facility finances TTA Vehicles that promote technology transfer taking place *inside* Research Organisations. The Vehicles provide funding and management support, in return for a share of the technology transfer proceeds, either "in kind" (% of licensing equity) or in specie.

Model A: Support technology transfer inside Research Organisations



Under this framework, the TTA Vehicle is an entity that provides funding and management support and/or management skills to one or several Research Organisations. In return for its funding, the TTA Vehicle typically obtains a right to the future revenue streams that will be generated by the Research Organisation out of its technology transfer operations. This revenue stream can take the form of a share in the license or royalty fees generated by inventions originating with the Research Organisation, or an equity stake in the spinouts created by the Research Organisation.

For this model to operate, the Research Organisation needs to be able to claim ownership on the intellectual property that is at the basis of license agreements or spinouts.

The Research Organisation has the option to keep ownership of such intellectual property, or to assign it to the TTA Vehicle.

In addition to funding, the TTA Vehicle can also provide management support to the technology transfer process. Management support provided by the TTA Vehicle refers to analytical support and business planning, identification of potential co-investors for spinouts, access to networks of experts and managers, management of the exit process (trade sale or Initial Public Offering), as explained in Section 14.1.1 of the report.

In order to work properly, this model also needs to define clear guidelines as to the choice between licensing or spinout creation on the one hand, and collaborative development with industrial partners on the other.

The agreement will typically run for a definite period of time, expected to be sufficiently long for the needs of technology transfer projects (15 + years).

The TTA Vehicle itself can be created for a finite time period or be evergreen. If it is created for a finite time period, this will need to be sufficiently long to ensure that it has the time to develop technologies to a point where they are mature enough and can be picked up by the market. This duration depends on the technology but it is generally expected to be at least 15 years i.e. much longer than classical VC seed funds. At the end of its life, the TTA Vehicle will be liquidated and its remaining holdings will be sold, either as a whole or asset by asset. In the case of an evergreen TTA Vehicle, the Vehicle can also be sold as a whole or asset by asset. It can also be IPOed, i.e. sold on the stock market through an "IPO".

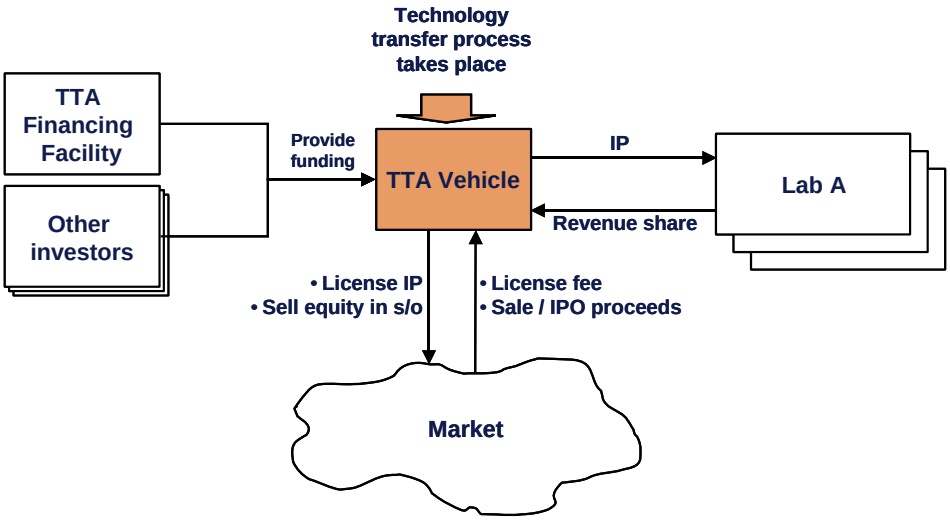
The funding from the TTA Vehicle is governed by two types of agreements. On the one hand, this can be a lump sum funding from the TTA Vehicle to the Research Organisation. On the other hand, it can be milestone funding or on a project-by-project basis. A project can be a spinout, but it can also be a development project that is expected to lead to a licensing agreement with a corporation or SME.

Here, the Facility provides funding to the TTA Vehicle in return for a share in the commercialisation proceeds which will usually be received in the form of dividends or capital gains.

3.3.2 Externalising technology transfer to dedicated Vehicles

In this model, the Facility finances TTA Vehicles that carry out technology transfer on behalf of Research Organisations or scientists. Such Vehicles will carry out technology transfer functions, including investment, in return for a share of the technology transfer proceeds. Thus here the technology transfer process takes place *outside* the Research Organisation.

Model B: Support technology transfer in dedicated vehicles



The TTA Vehicle is an entity that provides technology transfer services to one or several Research Organisations and / or scientists (services are usually provided to several organisations). These services cover most of the management of the technology transfer process and of the individual projects on behalf of the Research Organisation. They can also (but need not) include funding of technology transfer activities. In return for its services, the TTA Vehicle obtains a claim on the future revenue streams that will be generated out of technology transfer. As in the case of the previous model, such revenue streams can take the form of a share in the license or royalty fees generated by inventions for which the Vehicle has carried out technology transfer, or an equity stake in the spinouts created as a result.

In this model, the Research Organisation does not need to own the intellectual property. In countries where ownership of intellectual property is with the inventor such a TTA Vehicle can conclude contracts with scientists and support their technology transfer efforts. This gives an important level of flexibility to this model.

For this model to operate efficiently, it is expected that the intellectual property be assigned by the Research Organisation to the Vehicle, or at least that the TTA Vehicle has an exclusive license to the intellectual property, with a right to sub-license. This is required for the Vehicle to have sufficient control over the intellectual property so that it can choose the best way to exploit it. This means that, contrary to the previous model, the revenue streams go first to the TTA Vehicle, and a share is then passed on to the Research Organisations.

In this case, technology transfer is taking place in the TTA Vehicle. The TTA Vehicle can provide the same types of financial and management support as in the previous model.

As in the previous model, the agreement between the TTA Vehicle and the Research Organisations or the scientists will typically run for a definite period of time, being expected to be sufficiently long with regards to the needs of Technology Transfer projects (15 + years).

Here as well, the TTA Vehicle itself can be created for a finite or non-finite time period. If it is created for a finite time period, this will be sufficiently long to ensure that it has the time to develop technologies to a point where they are mature enough and can be picked up by the market. This duration depends on the technology but it is generally expected to be at least 15 years. At the end of its life, the TTA Vehicle will be liquidated and its remaining holdings will be sold, either as a whole or asset by asset. In the case of a non-finite life TTA Vehicle, the Vehicle can also be sold as a whole or asset by asset. It can also be IPOed i.e. sold on the stock market through an "IPO".

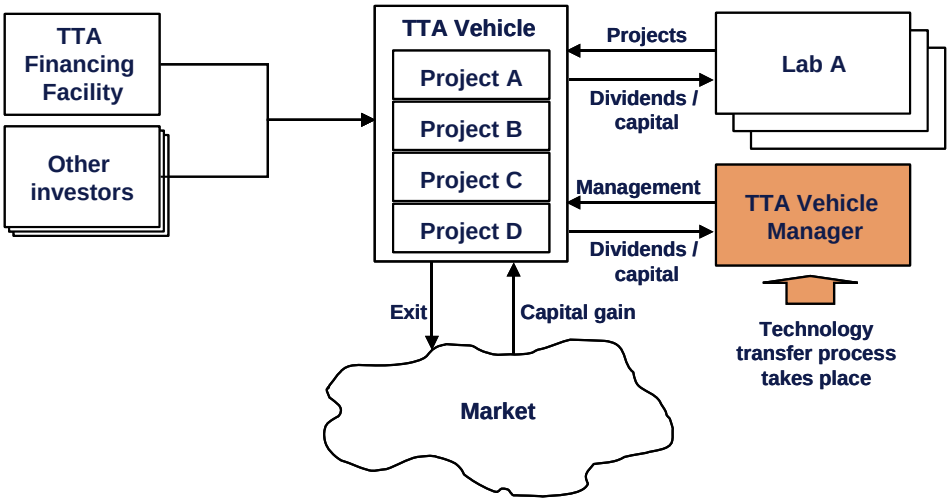
The agreement between the TTA Vehicle and the Research Organisation can be either a framework agreement, in which all intellectual property created by the Research Organisation is contributed to the TTA Vehicle (this is similar to an output deal in the media business), or ad hoc agreements, in which the TTA Vehicle has access to intellectual property on a case-by-case basis.

The Facility provides funding to the TTA Vehicle in return for a share in the commercialisation proceeds which will usually be received in the form of dividends or capital gains.

3.3.3 New Generation technology transfer VC funds adopting a portfolio approach

In this model, the Facility funds portfolios of technology transfer projects. The technology transfer projects are contributed by one or several Research Organisations. They can also be contributed by individual scientists. In return, the contributors receive a stake in the TTA Vehicle. In this model, the TTA Vehicle corresponds to such a portfolio of projects.

Model C: Portfolio strategy for technology transfer venture capital



A "TTA Vehicle Manager" manages the TTA Vehicle. This TTA Vehicle Manager is responsible for assembling the portfolio of projects, negotiating the terms of the contribution with the respective Research Organisations, raising funding for the portfolio, managing the portfolio, and ultimately executing exits.

As for model B, the Research Organisations in this model do not need to own the underlying intellectual property.

For this model to operate efficiently, the intellectual property either needs to be assigned to the individual projects constituting the portfolio, or licensed exclusively to them for a sufficient period of time, with sub-licensing rights. The

projects also need to be established as legal entities. Those legal entities can be either start-ups or entities that license intellectual property to third parties.

Technology transfer takes place within the various projects and is managed, for the portfolio as a whole, by the TTA Vehicle Manager.

The TTA Vehicle will usually be set up for a finite period of time. This period will be sufficiently long in order to allow for the projects to mature to a stage at which they can be sold.

At the time of setting up the portfolio, the financing needs are determined project by project and for the portfolio as a whole, so that projects receive sufficient resources up to the point where a profitable exit can be expected. Investors in the portfolio provide such funding. The Facility plays the role of investor in the portfolio. It is expected that it would play a catalytic role, not only by committing funds to such Vehicles but also by assisting in their set-up.

This model amounts to a rethink of the classical "VC seed" model (see Section 9.3 of the report) in that it neutralises the uncertainty surrounding deal flow sourcing (investors have access to an existing portfolio instead of a(n) (uncertain) future one) and timing (i.e. the "fund" starts operating with the existing portfolio instead of having to develop one).

3.4 The Facility

This Facility is the central part of the proposal and would support the emergence of the vehicles described above.

3.4.1 Key investment characteristics

Instruments

The Facility would use a range of instruments for its investments. These include equity, subordinated convertible debt, participating loans, loans, or guarantees. It is important that the right financing structure be developed that corresponds best to the specific projects to be financed.

In particular, the Facility could provide part of its financing through subordinated instruments allowing the risk return profile for other investors to be improved. Such subordinated financing can, for instance, take the form of a first or second loan tranche that reduces risk for other investors. These tranches are typically remunerated through a preferred return with participation in full or in part in the upside of the investment.

Investment amounts

The project indicated that a minimum size for TTA Vehicles to be viable would be around EUR 20 million, although some exceptions may apply, in particular in the case of a TTA Vehicle that can already capitalise on existing structures.

Given the high risk profile of technology transfer, there is a shared perception that the Facility will need to be ready to invest in a range of 30% to 50% of the total commitments to a given TTA Vehicle. In order for the Facility to meet the test of additionality, it should not hold in aggregate a share in excess of 50% of a TTA Vehicle. In exceptional circumstances, it should have the flexibility to invest up to 70% (TTA Vehicles in Objective 1 regions).

Investment horizon

The typical Venture Capital investment horizon of 10 to 12 years may be insufficient in a number of instances. The Facility therefore needs to be able to make long-term commitments in excess of 15 years.

Leverage

An investment in the range of 30% to 50% for the Facility implies a leverage of 2 times to 3.3 times at the level of the TTA Vehicle and, as a result, considerably more at the level of the end beneficiary.

Furthermore, it is expected that the existence of such a Facility will accelerate the emergence of TTA Vehicles. Evidence of this is provided by the growing stream of potentially attractive project propositions submitted to the TTA Project team.

3.4.2 Structure of the Facility

The recommendation is the creation of a dedicated operational platform which will provide both management support and funding to the TTA Vehicles presented in Chapter 14 ("TTA Facility: Key principles").

This platform would be operated and managed by EIF on behalf of the European Commission. This is similar to the MAP mandate currently managed by EIF on the behalf of the European Commission, or the RCM mandate managed on behalf of the European Investment Bank. EIF is well suited to such a role as it is already the EU operational platform for the implementation of Community objectives (SME Finance, Innovation) and includes in its shareholding base the European Commission, the European Investment Bank, and a number of European financial institutions.

The platform would benefit from EIF's operational expertise in similar fields (early stage venture capital), from the state-of-the-art risk management and reporting

systems of EIF, as well as from the standing of EIF as a triple-A rated institution with the status of Multilateral Development Bank. Furthermore, EIF has comprehensive experience in managing Commission mandates.

An alternative is obviously the creation of an agency: such an agency could function according to similar principles, however it would be more expensive and long to set up. Furthermore, it would not be able to reap the synergies that EIF would be able to bring to bear between its venture capital and technology transfer activities. Such synergies consist in assessing and sharing: technological expertise of team members; market knowledge; proficiency in due diligence techniques; risk monitoring and reporting systems; accounting and finance staff; legal staff. An agency thereby creates a more expensive overhead structure.

3.4.3 Structure of the funding

Under the assumption that the Facility would be financed by the EU, two main options are available: the Facility can be broadly structured either as a Commission mandate or as a revolving facility.

(i) Mandate

As a mandate, an envelope is allocated from the Commission's budget to the Facility for a predefined period of time.

The facility has a mission to invest the funds throughout the period. The proceeds are returned to the EU as they are realised. As a result, once these funds are exhausted, a new budget allocation needs to be negotiated.

In addition, there is typically a budget allocation per country linked with such a structure. This is broadly in line with the current ETF Start-up mandate (part of the Multiannual Programme for Enterprise and Entrepreneurship or "MAP", to be succeeded by the Competitiveness and Innovation Programme or "CIP" for the period 2007-2013).

Such an approach is ideal in the case of a financing support that is provided temporarily (for example over the next planning period of 2007-2013). Furthermore, it allows for a stronger budgetary control as the decision can be made in the future to reinvest the proceeds in the Facility or not.

On the other hand, it does not provide long-term visibility for either the market or the management of the Facility, as there is an uncertainty as to the renewal of the mandate for future periods and as to future levels of funding in case of renewal. This is a serious hurdle in order to recruit quality professionals dedicated to technology transfer. It also provides less of an incentive for the management of the facility to grow the funds as the proceeds from investments have no direct bearing on the future capacity to invest.

(ii) Revolving facility

In a revolving facility, the proceeds from investments are re-injected for further investments. This allows the Facility to grow over time. As a result, it provides an incentive for the fund manager to try and grow the funds at his disposal. It also provides the fund manager with improved long-term visibility. These are key advantages for the hiring of highly-skilled professionals.

Given the fact that many technology transfer projects are long term endeavours, the revolving facility also provides the key advantage of being able to support TTA Vehicles and ultimately technology transfer projects throughout their lifetime. This is crucial given that technology transfer in Europe has to be seen as an emerging industry.

Using the RCM investment as an example of a revolving fund, it also means that there is typically no country allocation in the sense of a predefined budget per country, but rather an objective to achieve a balance between the various countries. This allows for more flexible investments.

3.4.4 Potential finance providers

Given the market failure outlined in the diagnosis part of this report (Chapters 6-12), the proposed TTA Facility needs to attract public funding. Such public funding ideally needs to be of European nature, in line with the analysis presented in Chapter 19 ("Value added of the TTA Programme").

Such public funding could potentially be leveraged with additional funding from the European Investment Bank, as well as other International Finance Institutions. In the case of EIB, it is also important to note that financing by the TTA Facility could be complemented by funding of Research Institutions through the Structured Finance Facility managed by EIB on behalf of the European Commission. Concretely, this means that a Research Institution would be able to attract the full range of products (equity and debt) through the combined intervention of the TTA Facility and EIB.

In its current set up, EIF is set up to manage mandates for third parties and therefore would not be in a position, at least in its current form, to invest in such a Facility. However, as indicated above, it could manage such a Facility.

Attracting additional funding to the TTA Facility itself may be achievable. For instance, the remit of such a Facility could fit in well with the objectives of a number of Foundations. However, it is felt that it is probably more optimal to attract such additional funding at the level of the TTA Vehicles themselves, rather than at the level of the Facility. This is because the specific Vehicles may provide a better fit to the objectives of individual foundations than a broad-based Facility.

Furthermore, the impact for a foundation of funding a Vehicle is more visible and more traceable than in the case of funding the Facility as a whole.

3.4.5 Governance of the Facility

Issues of governance are largely similar whether the Facility is structured as a mandate or as a revolving facility.

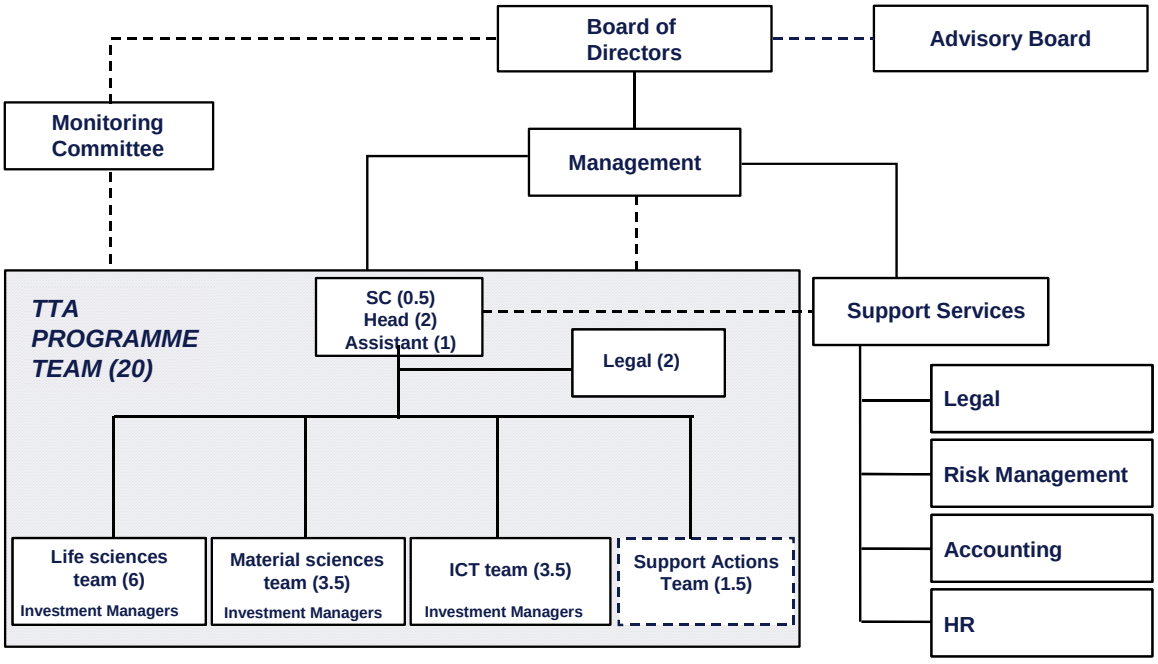
In order to ensure strict adherence to the objectives of the TTA Programme, and given the complexity involved in technology transfer, it is recommended that the Facility does not make investment decisions on a stand alone basis, but obtains approval from an independent body.

Such a body could be an ad hoc investment committee, with or without representation of the European Commission, as appropriate. Alternatively, in the case of EIF managing the Facility, it could be the Board of EIF. Obviously, in a number of cases, approval could be sought successively through both a dedicated investment committee and EIF's Board.

3.4.6 Management of the Facility

The following graph depicts the overall management structure of the TTA Programme.

TTA Programme: proposed organisation structure



The proposed team structure is as follows:

- One Senior Director (“Senior Cadre”) half time and two Heads and a Senior Cadre person are in charge of the TTA Programme. In the case of the structure proposed above (Programme managed by EIF), these individuals would be part of EIF's management team.
- A Life Sciences team consisting of six members with a mix of three senior professionals, two analysts and one administrative assistant. The three senior professionals must have an adequate scientific background and at least 10-year exposure to life science start-ups. The junior professionals provide support in due diligences.
- A Material Sciences team consisting of four members (one senior, two junior analysts and one part time administrative assistant shared with the ICT team).
- An ICT team with the same composition as the Material Sciences team. The lower number of professionals for Material Sciences and ICT is justified on the grounds that the market failure at technology transfer stage is perceived as being less of an issue in these areas than in life sciences.
- A Support Actions team managing the Support Actions identified in Chapter 3 ("TTA Support Actions"). This team should be constituted of only one full time junior analyst and one part time administrative assistant, as most of the operational work should be devolved to specific organisations taking care of the Technology Transfer Association, of the Best Practice label, and of the Business Plan Competition. The grants for the hiring of the technology transfer professionals should be handled by the teams mentioned above, as this is closely linked to due diligence of specific technology transfer operations. The Support Actions team would be a temporary team that would be dissolved once the Support Actions are running. It would therefore probably have a lifetime of approximately two to three years.
- Two dedicated lawyers: this is justified by the fact that a number of legal issues, in particular related to the protection and exploitation of intellectual property, would be specific to the TTA activity and therefore could not be shared with the remaining EIF operations.

This represents a total headcount of 20 people. As concerns timing, the target is to have such a team in place one year after the launch of operations. The team could then be further expanded in line with the market needs.

The remaining resources (legal, risk management, accounting, HR) should be shared with the rest of EIF.

The **management** of the Facility is of crucial importance in view of linking technology transfer and venture capital. The manager of the Facility should play a key role in enhancing the interaction among European centres of excellence, spreading good market practice and more generally acting as a "central

repository" of technology transfer know-how which is currently lacking in Europe. As a result, it needs to be professional, totally dedicated to technology transfer, and incentivised.
The overall quality and incentives of the management of the Facility will be a key success factor. Such management needs to include finance and industry professionals, who can identify viable investments, exercise strong critical sense, and be credible in the market.

3.5 The TTA Support Actions

It is important to note that technology transfer requires a broader approach than simply funding, an approach encompassing networking, human resource support, training and more generally advisory and technical assistance support. Therefore a number of "**Support actions**" (Chapter 15) are proposed to leverage on the Facility and improve the general ecosystem through an improved articulation between technology transfer and venture capital. They include a European Technology Transfer business plan competition; grants to hire technology transfer professionals; a technology transfer label; and the establishment of a European Technology Transfer Association modelled on EVCA's[8] success.

3.6 Addressing the structural weaknesses of technology transfer

The overview diagnosis presented above highlights three main issues: lack of scale, inadequate positioning of technology transfer in Research Institutions, and poor management.

3.6.1 Scale

The TTA Vehicles presented above are suited to work with several Research Organisations. In fact, the TTA pilot projects currently under consideration all involve vehicles that have links with several such institutes. The scale is primarily built at the level of the TTA Vehicle, where it makes clear sense to pool resources, both human and financial, for the development of commercial projects. It is expected that the scale at the level of the Vehicles will facilitate the creation of scale at the level of the Institutes themselves, by facilitating co-operations across institutes who have already de facto pooled resources at the level of technology transfer.

3.6.2 Positioning of technology transfer within Research Institutions

The positioning issue is primarily addressed through the TTA Support Actions. The Technology Transfer Association will play a key role in the

[8] European Venture Capital Association set up in 1983 with support from the Commission. See www.evca.org.

professionalisation and marketing of technology transfer, on the model of what EVCA has done for venture capital. The label will incentivise the deployment of best practices and act as a positive signal. The business plan competition will further enhance awareness about the benefits of technology transfer.

The TTA Financing Facility will also help address the positioning issue, in two complementary ways. Firstly, it increases the prospects for the technology transfer function to access increased financial and management resources. Secondly, the Technology Transfer Offices which will access such additional resources and increase their successes will act as an incentive for others to follow suit.

3.6.3 Management

The TTA Support Action consisting in providing grants to hire technology transfer professionals directly addresses the need to improve the management of Technology Transfer Offices. In particular, it will seek to improve the flow of professionals from industry to such offices.

The TTA Financing Facility will support the development of management at two levels. Firstly, management provided by the TTA Vehicles is a key feature of the proposed solution. This is a clear distinction with most venture capital funds, which are not set up to provide such hands-on management support. Secondly, management of the TTA Financing Facility will also play a key role, in particular in assisting in the structuring of TTA Vehicles and in fundraising.

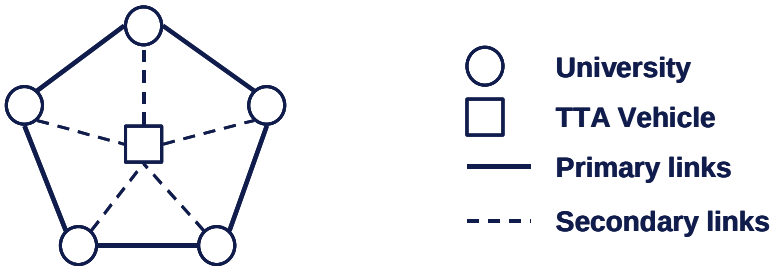
3.7 Linking centres of excellence around Europe: two models

3.7.1 The ring model

The first model for creating scale by linking centres of excellence consists in creating a network of such centres, cooperating with one another in a number of fields, including technology transfer (primary links). Once the network has been created, resources can be shared and a unified technology transfer approach can be applied (secondary links).

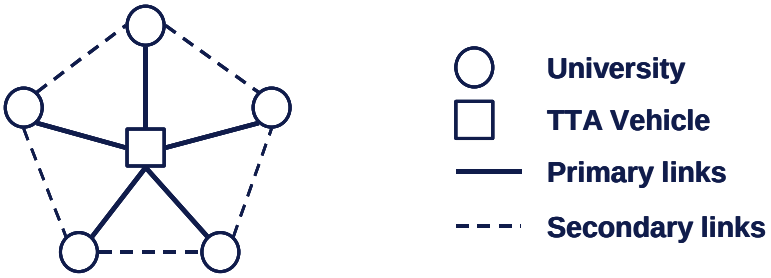
The difficulty with such an approach lies in the fact that it is very difficult for Research Institutions to build such networks autonomously. Although there are examples of Research Institutions entering cooperation agreements on technology transfer, this is rare today and the hurdles for active cooperation are such that this is not expected to change dramatically in the foreseeable future. These hurdles concern, on the one hand, a difficulty to agree on the concrete terms of cooperation between institutions which often have very different scientific agendas, organisation and governance structures, and are by nature fiercely independent and aware of their identity, and, on the other hand, a lack of perceived short-term benefits.

The ring model



3.7.2 The star model

The star model consists in putting the emphasis first on the creation of technology transfer vehicles cooperating with Research Institutions (primary links), with the emergence of links between the Research Institutions themselves as a potential longer-term benefit (secondary links).



This is the approach chosen for the TTA Facility.

The TTA Facility can play a key role in fostering the creation of scale through the development of such "star networks". This will be the result of three interlocked dynamics.

Firstly, the TTA Vehicles described above themselves provide scale by building links with several universities. In order for a vehicle to be attractive and attract the right resources, it needs to get access to sufficient deal flow and be able to create sufficient diversification. This means that such vehicles are expected to develop cooperation agreements with several universities, thereby creating scale at the level of the Vehicle itself.

Secondly, once such vehicles are up and running, universities cooperating with one Vehicle have de facto an incentive to develop cooperation upstream, directly between themselves. This is due to the fact that the higher the cooperation upstream, at the research and development phase, the more likely strong inventions will result at the technology transfer phase, with as few competing inventions as possible.

Thirdly, such dynamics and the existence of well-funded TTA Vehicles will be an incentive for universities to join existing or new Vehicles. By doing so, they will get access to both management and funding resources which they would not be able to access otherwise.

3.8 Complying with rules on State Aid

Effective compliance with State Aid rules will need to be reviewed in due course once the TTA Facility is financed and created. Furthermore, compliance with State Aid rules may have to be examined at the level of individual TTA Vehicles.

However, the TTA Facility itself is set up along commercial lines that seek to respect and even promote competition:

- Commercial motive: the TTA Facility will seek to provide some return to its investors and at least break even in the capital invested. However, given the characteristics of the market and the track record of seed capital in Europe, it is ludicrous to claim that the TTA Facility will achieve high levels of return.
- TTA Facility funding of individual TTA Vehicles capped at 50%, the remaining 50% coming from private investors.
- Financial instruments priced in line with the market. The TTA Facility needs to be able to offer different types of instruments, including equity and mezzanine products. Each product will be priced according to market practice.
- Due diligence assessing commercial viability. The TTA Facility intends to become a reference in terms of depth and quality of the due diligence it performs on candidate TTA Vehicles. This due diligence seeks primarily to determine the viability of the TTA Vehicles.

4 Budget

Rather than "re-invent the wheel" through a top-down approach, a flexible financial support for independent technology transfer initiatives is proposed through a **"ramp up" gradualist process which takes advantage of existing financial instruments**: ETF Start-up and its successor GIF, Sixth Framework Programme (under which EIF has joined a number of networks in bidding for funding) with the target of mobilising Seventh Framework Programme resources at the mid-term review (2008-2009), as well as, subject to a more in-depth review, joint initiative between EIB / DG Research and DG ECOFIN such as the RSFF (Risk-Sharing Finance Facility; RSFF only finances projects meeting eligibility criteria). This would maximise complementarity with Member States which are moving ahead with national programmes. Thus defined, 2005 and 2006 operations would mobilise a limited amount of EUR 50 million.

This agile, flexible engagement would have the advantage of immediately mobilising existing resources as well as providing real-life learning leading to the establishment of a more ambitious, permanent mode of support in the form of the Programme.

In the medium-term, it is estimated that, to have a sizeable impact, the Facility would require funding in the order of no less than EUR 50-70 million per annum for the period 2007-2013. The TTA Support Actions would have a rather limited cost, in the order of EUR 6 million per annum for the same period.

This envelope does not include the estimated running costs for the TTA Programme management.