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# Collaborative innovation and intellectual property

*Best practices*

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## **ACKNOWLEDGEMENTS**

This study was carried out at the request of the INPI Observatory of intellectual Property. It is the result of many discussions we undertook with directors and managers of:

- Start-ups / SMEs
- Public bodies
- Large groups (directors of R&D, innovation, intellectual property and/or legal directors).

We wish to thank all these people for the precious time they spent with us in order to share their experience in matters of intellectual property management within collaborative innovation projects.

We also wish to thank the members of the steering committee for this study, for their clear advice and contributions to the realisation of this document: **Yves Lapierre** (INPI), **Laurence Joly** (INPI), **Dominique Doyen** (INPI), **Martine Planche** (INPI), **Jacques Larrouy** (AiCarnot), **François Jamet** (CEA).

**We express our most heartfelt appreciation.**

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# FOREWORD

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Yves Lapierre  
INPI Director General

The competitiveness of businesses is intimately linked with their capacity for innovation. Collaborative innovation is more than just a trend, it is a long-term activity that provides a new response to the deployment of innovation strategies, whatever the size of the business or research laboratory, whether the stakeholders involved are public or private.

So why this appetite? In short, this approach is a way of dealing with several challenges: increase in the capacity for innovation in businesses and research bodies, access to new skills, better cost control.

As part of a collaborative approach, industrial property has a highly strategic place. Planning is fundamental to ensure that each partner is recognised for his work and involvement in the process and to ensure a suitable return on investment.

Building on its mission of assistance, the INPI wishes to use this study to establish a benchmark of the best

practices in industrial property as part of collaborative innovation projects.

The analysis undertaken by the INPI concerning collaborative innovation is anchored in its very mission. For many years, the INPI has been involved in raising the awareness of innovation stakeholders, especially the understanding of the issues of industrial property in innovation strategies and the protection and commercialization of intangible assets.

Innovation is increasingly the source of creation of wealth in our world. Due to the massive acceleration in goods and services markets, and equally due to a more extensive and globalised access to information, to the need to control the costs of innovation, and lastly due to the increasingly fierce competition between economic players and to the growing complexity of technology, our role is to facilitate access to innovative technologies and to skills worldwide.

To foster a collaborative innovation approach, the study focuses on simple proposals. Of course, not all of these proposals are within the INPI's scope of activity, even if we can contribute to their implementation. Yet some of them must become our guiding light and make us reconsider our actions.

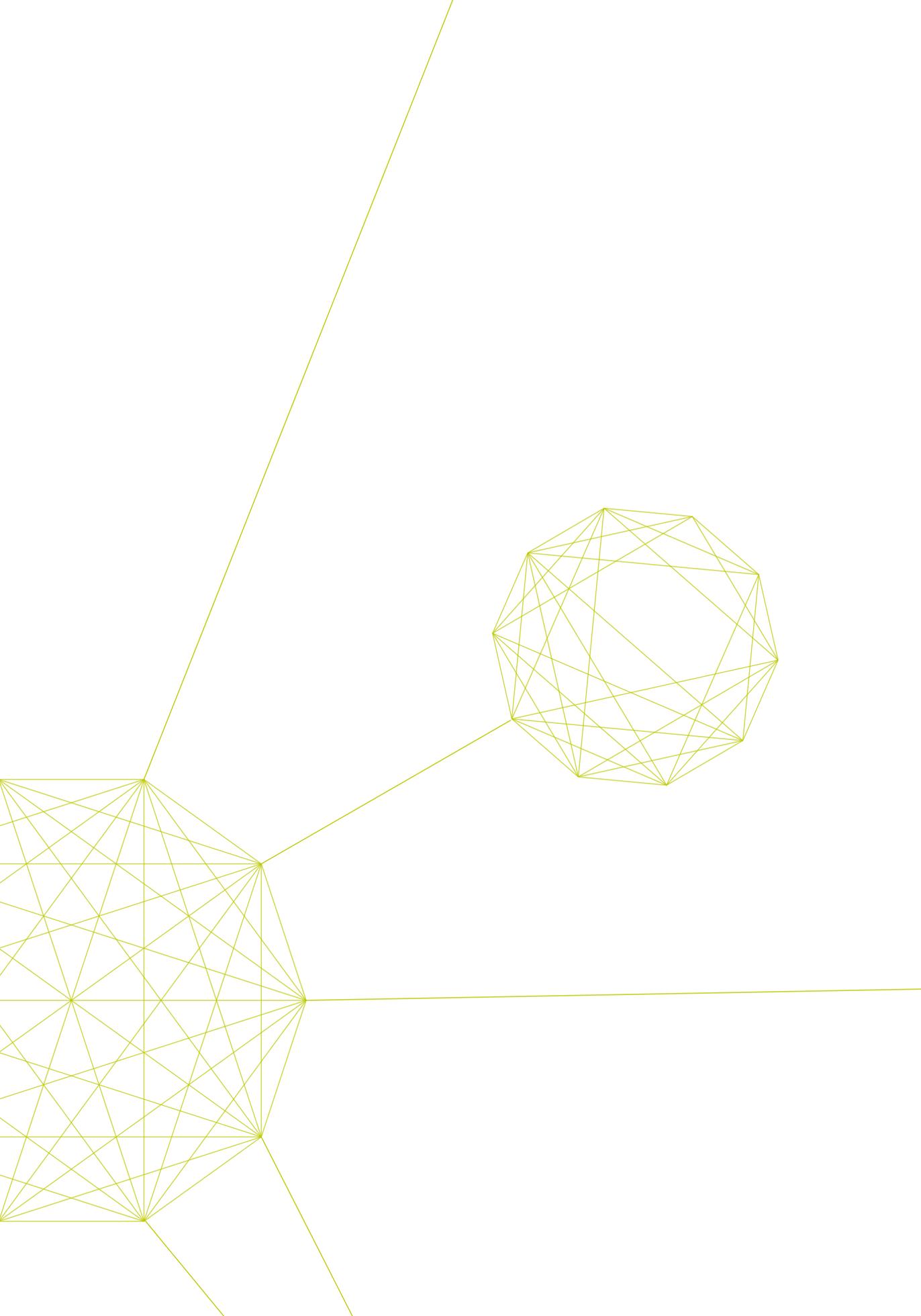
This illustrates the ambition that is required to foster the emergence or the multiplication of partnerships between businesses and research laboratories, to offer them a worldwide positioning. The purpose of our contribution is to supplement existing arrangements or those under creation, yet with a greater accent on the issues of industrial property, which is naturally a key factor in the competitiveness of our businesses.

And as we all know, innovation is not just a matter of creating new products. We need to know how to implement a collaborative innovation project in the field of industrial property. I am convinced that in this way we can make a significant contribution to improving the competitiveness of our economies.

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“Innovation is increasingly the source of creation of wealth in our world”

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# PREFACE

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**Alain Duprey**  
Director of the Association of Carnot Institutes

As businesses are faced with stronger competition on a worldwide level, their competitiveness, and even survival, depends on their ability to offer innovative goods and services that offer a genuine competitive advantage.

In parallel, the growing complexity of technologies and the vast scope of knowledge to master for the purposes of innovation imply that new alliances are required. As a matter of fact, we need to seek out and use the skills of new partners, to access other cultures and modes of thinking. Such partnerships are essential for all innovative businesses. They take the form of collaborative research projects undertaken with other businesses and with public research bodies.

Collaborative innovation has therefore developed strongly over the past few years. Its implementation must nonetheless be done professionally and intelligently. It must be embedded in enterprise strategy with a sustainable vision and measurable objectives.

The efficiency of a collaborative strategy depends on the definition of a strategic ambition, the availability of internal enterprise resources and know-how, as well as access to the skills and know-how that are available on the market. Each stakeholder must be aware of the expectations and objectives of their partners, and integrate these factors into negotiation phases and project management; otherwise, failure and disappointment are almost certain.

In this context, intellectual property (IP) and the sharing of IP play a major role in the selection and implementation of partnerships. IP is a strategic business function which must be positioned at the right decisional level in the organisation. It now plays a strategic role, especially in terms of business intelligence and of the identification of partners and innovation themes that are relevant to the enterprise and its development.

Sharing IP and shared use of IP must sometimes reconcile divergent cultures and objectives. It requires a win-win approach to partnerships, based on clear principles and rules that often result from a compromise in terms of domains of application, territories and period of use. Certain public research stakeholders have therefore become aware of the necessity to adopt a more professional approach to negotiating IP matters with businesses in a collaborative innovation context. As an example, I can mention the Charter of Best Practices in IP and Knowledge Transfer, developed by the Carnot Institutes. This charter was issued in 2008, setting out the main principles of IP negotiations applied by each institute.

The partnership situations are naturally varied according to the cultural differences between players, issues and objectives. There is no universal recipe to create a successful collaborative innovation project. This study illustrates the INPI's desire to accompany such changes. It offers a set of tools, best practices and real feedback that illustrate the typical situations which will serve as reference points for innovation stakeholders.

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“Collaborative innovation must be embedded in enterprise strategy with a sustainable vision and measurable objectives.”

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# CONTENTS

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FOREWORD  
PREFACE  
INTRODUCTION

## **1 Intellectual property at the heart of the development of collaborative innovation** **P. 11**

---

- 1.1 Collaborative innovation: one term, several realities**  
**Case study:** Collaborative work between a research body and several industrials
- 1.2 Collaborative innovation is a growing concern in businesses**  
**Case study:** Open innovation platform
- 1.3 Intellectual property, a lever or a brake for collaboration?**
- 1.4 Collaborative innovation and intellectual property: different problems according to the type of stakeholder**  
**Case study:** Partnership between a major group and start-ups/SMEs
- 1.5 Obstacles to overcome**  
**Case study:** Consortium
- 1.6 A growing international dimension**

## **2 Seven challenges to efficiently integrate intellectual property in collaborative projects** **P. 47**

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- 2.1 Establish a clear collaborative innovation strategy**  
**Case study:** Non-competing partners
- 2.2 Define an intellectual property commercialization model suited to the issues of collaboration**
- 2.3 Integrate intellectual property management into the heart of the development process**  
**Case study:** Consortium between competitors
- 2.4 Develop an internal intellectual property culture**  
**Case study:** Collaborative work between an SME and a research body
- 2.5 Define suitable governance**
- 2.6 Develop an innovation culture shared with partners**  
**Case study:** Consortium  
**Case study:** Builder / integrators and suppliers
- 2.7 Use intellectual property as a lever to accelerate collaborative work**

CONCLUSIONS AND RECOMMENDATIONS **P. 97**

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APPENDICES **P. 103**

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- A.1 Collaborative innovation: the main theoretical foundations**
- A.2 Glossary**
- A.3 List of persons interviewed and quoted in the study**

# INTRODUCTION

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The opening up of businesses to their ecosystem is a global trend characterised by a growing number of research and innovation programmes carried out in partnership. These partnerships may take varying forms depending on the status of the partners (public-private, large group-start-up, customer-supplier, between competitors, etc.) and the degree of collaboration can vary in intensity.

In this document, collaborative innovation<sup>(1)</sup> is understood to be when a business or research organisation actively participates in projects with other stakeholders from outside the entity (the study does not cover partnerships with end customers), but where this participation is not limited to a strictly financial contribution.

Beyond the trend effect, collaborative innovation is now a major lever to reinforce the innovation capacity of businesses, enabling them to access new skills and control their costs in uncertain markets.

However, opening up to collaborative work brings with it certain risks and the need for a cultural shift. Of these risks, the first is the management of intellectual property (IP). In a recent PwC study, intellectual property was cited by 56%<sup>(2)</sup> of those surveyed as the most critical risk in the implementation of collaborative innovation projects.

As a matter of fact, a collaborative innovation approach generates several key IP-related challenges for the partners, including:

- How to define the scope of collaboration?
- How to manage IP rights and know-how existing prior to the project?
- How to attribute IP created through collaborative work to partners?
- How to distribute the ownership and use of the IP generated?
- How to manage the strategic issues that differ according to the nature of the stakeholders?
- How to put a value on the contributions of partners?
- What is the right moment to determine the value of these contributions?
- How to manage the future value of the results of the collaborative work and distribute the potential gains?

Efficient intellectual property management is therefore a crucial aspect that must be determined upstream of the collaborative project, but also throughout its course.

The purpose of this study is not to present a method that will enable stakeholders to overcome all the challenges involved in IP management, as there are a great many different methods of collaborating (depending on the sector, the nature of the partners and the areas of collaboration). It is more concerned with identifying the issues, the hands-on approaches and aspects of IP management within such collaborative work projects. It will be useful to all those engaged in or who wish to undertake a collaborative innovation approach; it presents the issues and expectations of the different categories of stakeholders, which is a forerunner to future negotiations concerning the ownership and use of IP rights. It also sets out a certain number of best practices that enable users to efficiently handle intellectual property matters.

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1. Appendix 1 looks back over the main theoretical foundations of collaborative innovation.

2. Source: PwC study "Innovation and Performance. Where's Your R&D At?" (2010).

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**This document is divided into two parts:**

1. Analysis of the **emergence** of collaborative innovation and the associated intellectual property matters.
2. Presentation of **seven issues** that enable efficient management of intellectual property during collaborative work.

**Nine case studies** are included in the document to illustrate the problems associated with different types of partnerships, broken down as follows:

TYPE OF PARTNERSHIP / APPROACH	STRUCTURES CONCERNED	PAGE
Research body / Industrials	Armines, industrials	17
	CEA-LETI, Ryb (SME)	76
Collaborative platform	Hypios	23
Major Group / Start-up and SME	Orange, start-up and SME	31
Consortia	Competitiveness cluster, biotech company, chemical industrial, two university labs	38
	Guerbet, CEA, Siemens, Bruker, University of Freiburg	85
Non-competing partners	Major group, equipment manufacturer (SME)	49
Competing companies	Pernod Ricard, Danone, Bongrain, Sodial, Socopa, Soprat	67
Manufacturer / Integrators and suppliers	Alstom Transport, SME	90

This study is intended for all stakeholders in innovation and intellectual property managers. It is relevant to private entities (major groups, mid-size companies, SMEs and start-ups) and to public stakeholders (research centres, labs, etc.) that are active in collaborative innovation or desire to be so. We hope that it will contribute to providing the keys to better understanding of IP management.

We conducted this study with around forty public structures (research centres, labs, clusters, etc.) and private entities (start-ups, SMEs, major groups, etc.) belonging to various sectors: aeronautics, aerospace, defence, agriculture and food, energy, health, services, ICT, transport.

The qualitative dialogue was supplemented by a quantitative study online. The statistics we present are taken from the results produced with a panel of 70 public and private structures.



# INTELLECTUAL PROPERTY AT THE HEART OF THE DEVELOPMENT OF COLLABORATIVE INNOVATION

<b>1.1 Collaborative innovation: one term, several realities</b>	P. 14
<b>Case study:</b> Collaborative work between a research body and several industrials	P. 19
<hr/>	
<b>1.2 Collaborative innovation is a growing concern in businesses</b>	P. 22
<b>Case study:</b> Open innovation platform	P. 25
<hr/>	
<b>1.3 Intellectual property, a lever or a brake for collaboration?</b>	P. 28
<hr/>	
<b>1.4 Collaborative innovation and IP: different problems according to the type of stakeholder</b>	P. 32
<b>Case study:</b> Partnership between a major group and start-ups/SMEs	P. 33
<hr/>	
<b>1.5 Obstacles to overcome</b>	P. 36
<b>Case study:</b> Consortium	P. 40
<hr/>	
<b>1.6 A growing international dimension</b>	P. 44

# 1.1 Collaborative innovation: one term, several realities

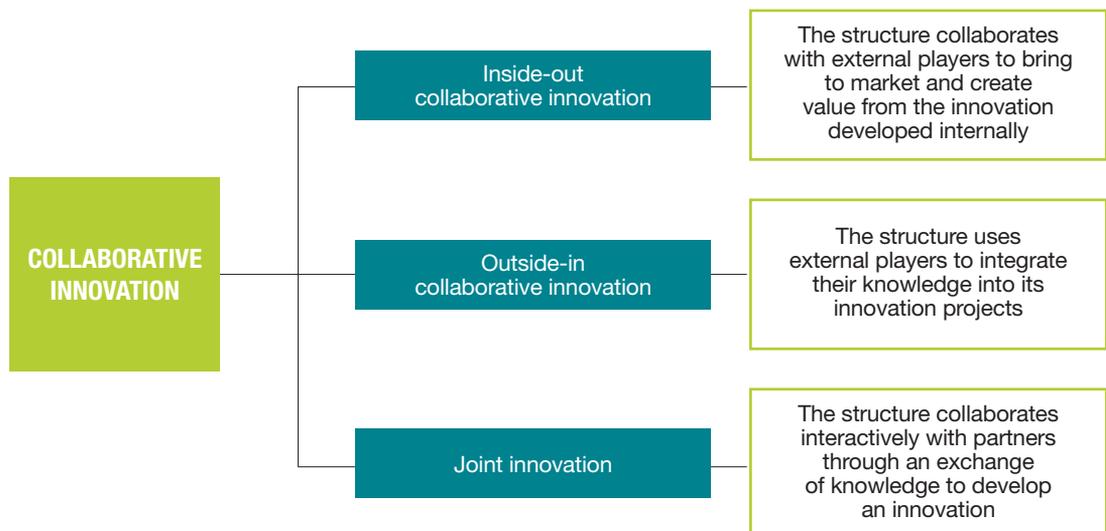
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## Overview

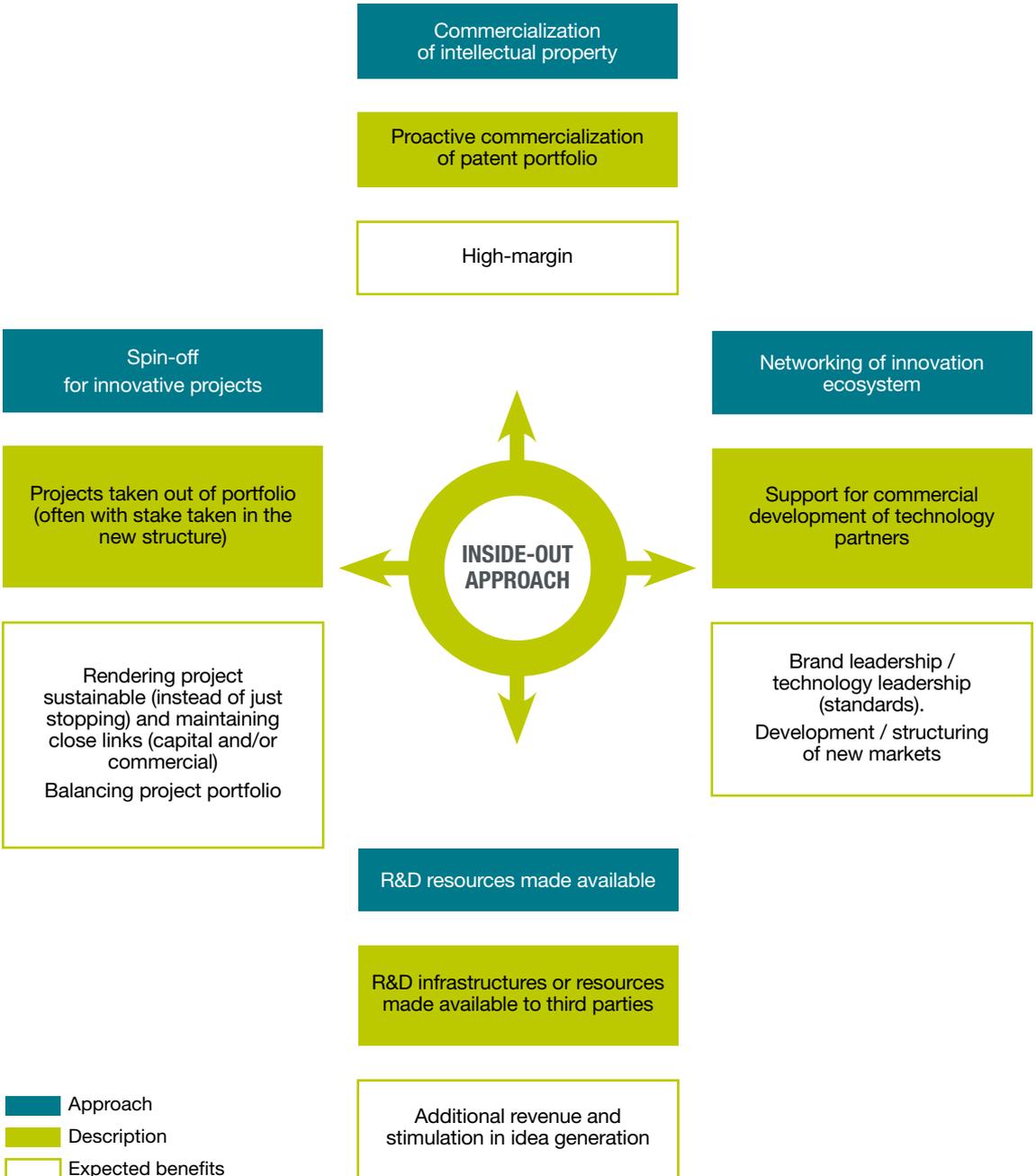
Whatever its type, collaborative innovation is based on an essential principle: foster innovation through partnerships, without simply relying on internal resources. It is necessarily multiform, according to the purpose of the approach, whether it involves the creation of value, the integration of external knowledge or co-construction and pooling. Sector-specific features — level of maturity, cycle duration, supply- or demand-driven innovation, etc. — obviously have an effect on the methods of implementation.

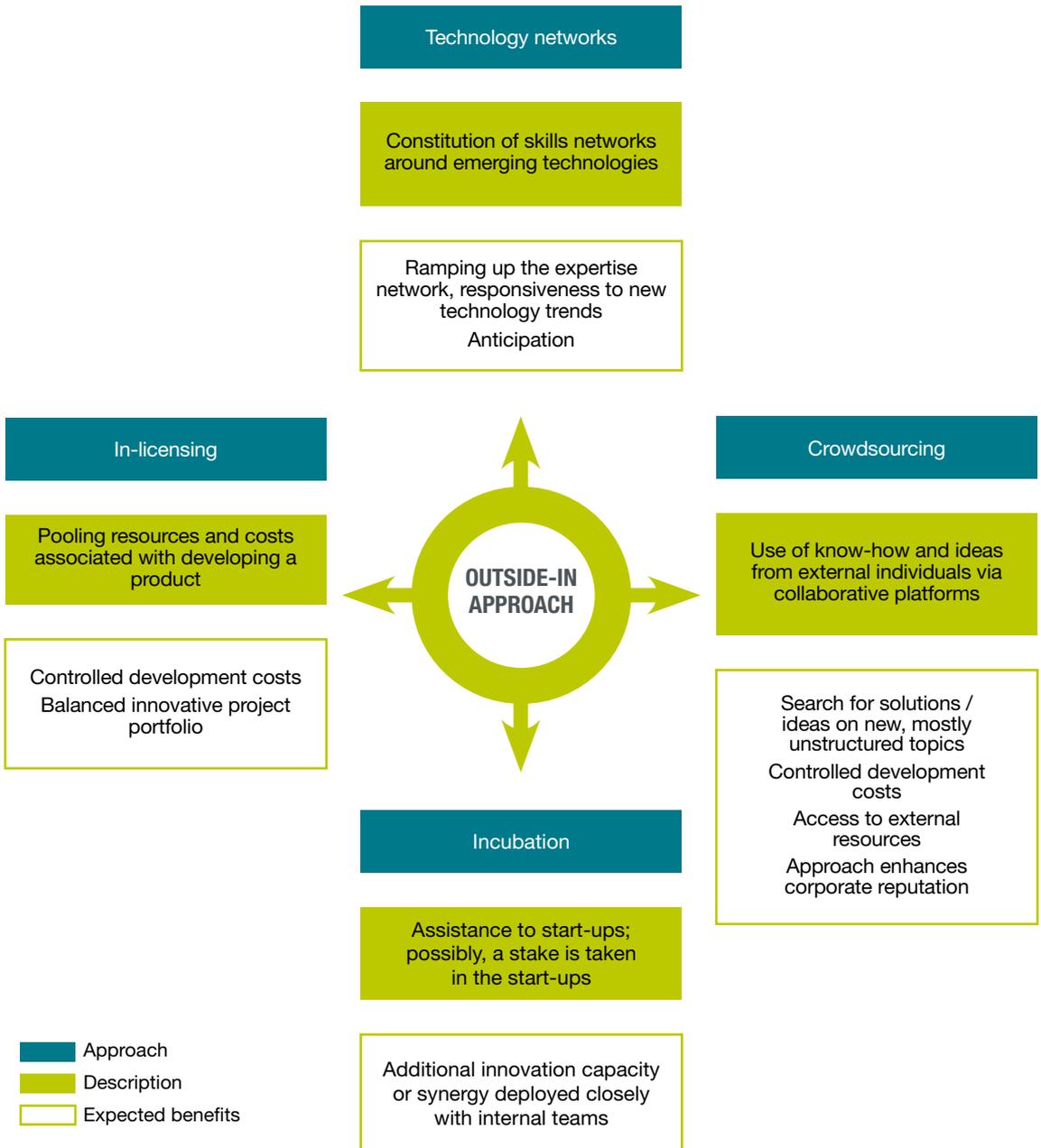
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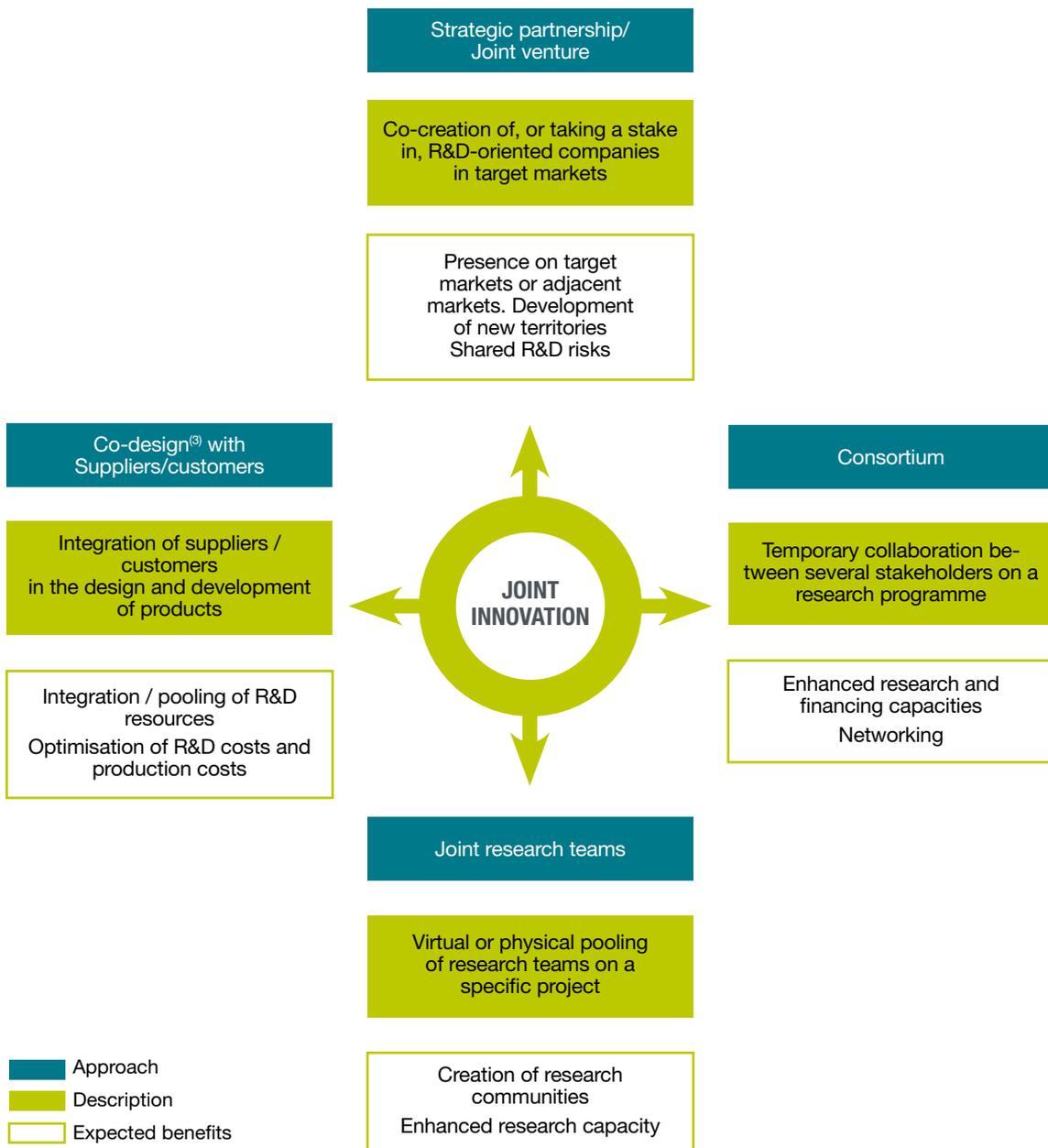
**Without embarking on a lengthy historical panorama of collaborative innovation, it is useful to remind ourselves that it has been used by public and private stakeholders for many decades.** The phenomenon of collaborative innovation has become more systematic and now reaches a larger number of stakeholders. It is therefore pertinent to define a typology of these collaboration modes. As a starting base, we propose the following classification:



Each of these approaches can be represented in the following manner:







Furthermore, these strategies respond to different issues depending on the sector of activity. It is possible to highlight several specific features of each sector in the table below. The information provided therein is not exhaustive. The intention is to remind us of certain characteristics that are inherent to each sector and which inevitably affect how collaborative innovation is implemented.

3. Depending on the analysis, this type of collaboration can also be identified as a form of outside-in approach

	Sector-specific aspects	Specific attributes of collaborative innovation
Health	<ul style="list-style-type: none"> <li>- Long cycles (&gt; 15 years)</li> <li>- Multiple research topics</li> <li>- Uncertain ROI*</li> <li>- Multiple start-ups (biotech)</li> </ul>	<ul style="list-style-type: none"> <li>- Mature collaborative innovation approaches, based on in-licensing*, co-development and joint ventures*</li> <li>- Growth of innovation between competitors for target markets</li> </ul>
Automotive/ Aerospace	<ul style="list-style-type: none"> <li>- Mature industries</li> <li>- Incremental innovation</li> <li>- Search for productivity</li> <li>- Positioning as integrator of technology and services</li> </ul>	<ul style="list-style-type: none"> <li>- Extensive use of “co-design with suppliers”</li> <li>- Multiple areas of innovation (electronics, materials, ICT, etc.)</li> <li>- Federative approach to skills</li> </ul>
Telecom	<ul style="list-style-type: none"> <li>- Rapid evolution of supply (technological standards and business models)</li> <li>- Innovation driven by supply</li> <li>- First mover advantage</li> <li>- Issue of cost control</li> </ul>	<ul style="list-style-type: none"> <li>- Incubation and corporate venture* as levers to accelerate TTM* and access new markets</li> <li>- Use of crowdsourcing*</li> <li>- Collaboration between competitors driven by standardisation approach</li> </ul>
Software/ Internet	<ul style="list-style-type: none"> <li>- Culturally open industry</li> <li>- Innovation by clusters</li> <li>- Short, even very short cycles (&lt; 6 months)</li> </ul>	<ul style="list-style-type: none"> <li>- Innovation platform (e.g. open source)</li> <li>- Use of crowdsourcing</li> <li>- Multiple partnerships and search for freedom to operate and speed of execution</li> <li>- Frequent technological spin-offs</li> </ul>
Energy	<ul style="list-style-type: none"> <li>- Long cycles</li> <li>- High capital intensity</li> <li>- Innovation driven by demand</li> </ul>	<ul style="list-style-type: none"> <li>- Strong presence of industrial consortia</li> <li>- Long-term public-private collaborations</li> <li>- Relatively moderate presence of SMEs, except in certain areas (new energy sources, smart grids, etc.)</li> </ul>

As an illustration, the following case study shows that it was advisable for several industrials to access the additional know-how owned by a public structure, concerning software development.

\* See glossary.

## Partnerships between a research body and several industrials

### Armines and industrials

#### Stakeholders involved:

##### Armines<sup>(4)</sup>

- Law of 1901 (not-for-profit) association with a convention with the French state, independent management
- Created in 1967
- Purpose: build a bridge between research and industry
- Over 500 employees
- €47 million annual activity

##### Several industrials

- Several industrials involved in different partnerships concerning the development and optimisation of a software product
- Areas of activity of the industrials: automotive industry, aeronautics, steel production, etc.

#### *What are the context and objectives of the project?*

Armines is an organisation that operates under the French law of 18 April 2006 which enables public higher education or research establishments to entrust their contractual research activities to private bodies. It is associated with its partner schools under state-approved agreements.

Armines participates in the development of the research centres that it shares with its educational partners in three forms:

- A management structure for the research partnerships, for which it manages the contracts and financial revenues.
- Provision of temporary resources (human and material) to research centres to complete contract work.
- Permanent in-house salaried research staff in its research centres, who contribute to operations and research activities.

To assist research staff in its R&D centres in their approach, Armines has a central services department that provides legal and economic oversight of all research contracts, assistance in setting up contracts and monitoring their execution, intellectual property management, personnel management, administration, accounting and finance.

The example studied concerns several partnerships between Armines and different industrials. These are partnerships that served to develop and optimise the numerical-simulation software Forge.

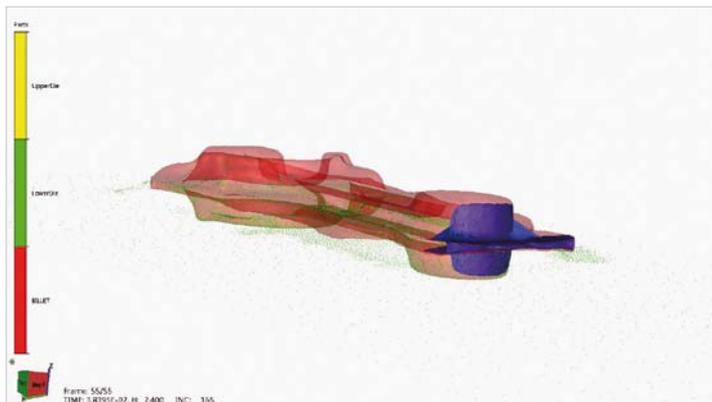
4. Component of M.I.N.E.S Carnot Institute

Forge is finite-element software, used to simulate the forging of ferrous metals (steel) and non-ferrous metals (aluminium alloy, copper alloy, titanium, nickel), using hot, semi-hot and cold methods, for 2D parts (revolving parts or plane deformation) and 3D parts. It was developed through past and present collaborative research work carried out with various industrial partners (major groups, mid-size companies, SMEs).

It is modular software that includes a pre-processor for data preparation, 2D and 3D solvers for the calculations and a post-processor for use of the results. The software features an interface used to import shapes from most CAD systems.

It also includes a materials database (hot and cold rheology database featuring over 1,000 references for steel, aluminium, brass, titanium and super-alloys), covering almost all types of press used in the industry. To be as close as possible to the activity, data preparation uses models that describe the main forming processes and which use line-of-business technology; it is therefore possible for a steelworker to use Forge.

Forge software interface.



### *What were the characteristics of the collaboration as regards intellectual property?*

To manage background, Armines applies the principle wherein **“the organization retains ownership of any advancement in its own knowledge.”**

In the case of the multiple collaborations concerning Forge (software development then production of new components with several industrials), the ownership of the development is retained by the organisation (the IP background of Armines is bigger than that of the industrial partner in this case). In compensation for the industrial partner’s participation in the development, Armines commercializes the co-financed work by granting licences to its partners at preferential rates and advantageous conditions of use.

In this way, the industrial partners have the necessary tools to resolve their line-of-business problems and the Armines research centre retains the ownership of the methodological aspects (in this case the software and its enhancements) that constitute the core skills of the teacher researchers.

As it is capable of freely continuing its activity, the research centre can pursue win-win relationships with other businesses. This is a dynamic principle for collaborative innovation.

### *What lessons and best practices can be drawn from this collaboration in terms of intellectual property management?*

This principle enables new versions of the software to be developed with custom modules to serve the needs of other industrials, without being held back by a problem of co-ownership with a former partner. All too often, former partners do not have either the resources or skills to propose further investment in the development or commercialisation of the module previously developed with Armines.

**The software has therefore been useful to stakeholders in different sectors:**

- Automotive
- Aeronautics
- Timepieces
- Fasteners
- Taps and fittings
- Free forging

### *What were the benefits/results of the collaborative work?*



**Pascal Iris, Director of Armines and CEO of Transvalor SA**

*“The segmentation of intellectual property is a barrier to innovation. If the IP generated on a collaborative project is assigned to an industrial which several years later decides to stop paying the annuities as they have decided to change strategy, the benefits of the collaborative work are completely lost. So to avoid this specific problem we decided to establish the principle by which the organization retains ownership of any advancement in its own knowledge. Through the application of this principle, our Forge software has been a genuine commercial success. It is currently used throughout the world by 250 customers, 80% of which are industrials. These users selected it to reduce the costs of producing new products. The virtual tests run on a PC vastly reduce the number of actual physical tests, thereby reducing pre-production costs. In France, this project enabled us to create a company (Transvalor SA) from a research centre and to offer high tech jobs, while enabling French industry to benefit from the results in advance.”*

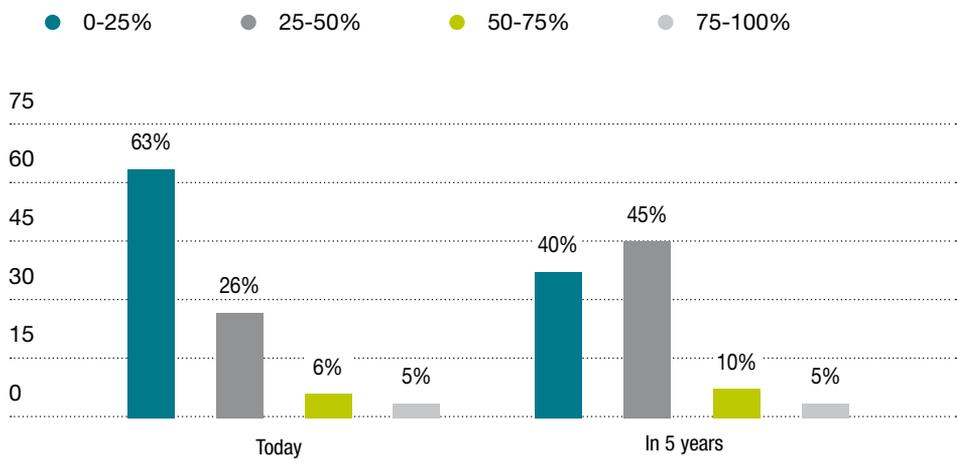
## 1.2 Collaborative innovation is a growing concern in businesses

### Overview

Whatever the profile of partners (size, public or private status, legal or natural person), it has become obvious that collaborative innovation is an essential component of business strategy. This trend is associated with the need to satisfy strict limitations in terms of innovation — good command of multiple and complex skills required, internationalisation, need for responsiveness, etc. — but also to seize the opportunities offered by the availability of new collaborative instruments and platforms.

For the majority of people we interviewed, collaborative projects now represent between zero and 25% of their total R&D expenditure. Although collaborative project expenditure represents between 25% and 50% of their global R&D budget for 26% of those interviewed, 45% believe that they will reach this level of investment in the next five years. This clearly shows a desire to ramp up collaborative projects with external partners.

### WHAT PORTION OF YOUR R&D SPENDING GOES TO COLLABORATIVE PROJECTS?



“ In a time of managerial and financial rigour, innovative partnerships are one of the most efficient levers for sharing risks, sharing R&D expenditure and speeding up the innovation cycle. ”

**Gilles Chrétien,**  
Director of IP and R&D Contracts, Alstom Transport

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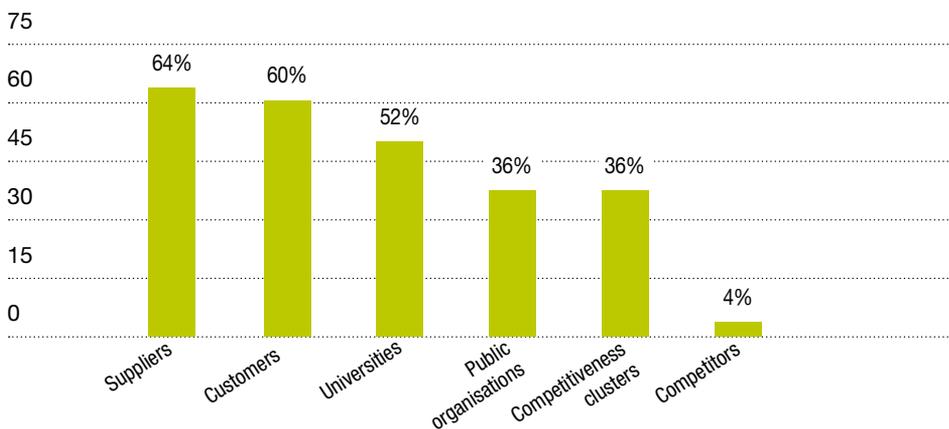
These stakeholders indicate several contextual elements to explain this willingness to collaborate:

- The multiplicity of knowledge and skills required and the difficulty of having good command of such skills internally, especially when they are not associated with the core business activity.
- The increased financial risk and difficulty in accessing funding, which persuade businesses to share their R&D investment costs.
- The internationalisation of markets and the growing necessity to adapt services to local use.
- The extreme specialisation of certain markets, where more specialised, more responsive and more innovative niche players are multiplying.
- The need to develop extensive agility on uncertain markets, especially those with a strong technology flavour, which drives stakeholders to integrate additional external components to keep up with demand.

The graph below shows that businesses mainly collaborate with their suppliers and their customers. However, collaborative work with competitors remains much more limited.

### HAVE YOU RECENTLY UNDERTAKEN COLLABORATIVE INNOVATION PROJECTS WITH ANY OF THE FOLLOWING? (BUSINESS FOCUS)

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Furthermore, the public-private collaboration dynamic has expanded strongly over the past few years, through partnerships that federate a greater number of stakeholders. We observe that 52% of businesses interviewed undertake projects in partnership with universities, 36% with public bodies and also 36% within the framework of competitiveness clusters.

The methods used to implement these partnerships are multiple:

- Firstly, as regards research, the project mode was introduced and became systematic from the 1980s. Concerning public financing, the collaborative mode is the accepted method, whether it involves programmes under the auspices of the National Research Agency (Agence nationale de la recherche, or ANR) on a domestic level, or the Framework Programme for Research and Development on a European level. Projects sponsored by French competitiveness clusters, likely to receive co-financing from the Single Inter-Ministry Fund (Fonds unique interministériel, or FUI), are run along the same lines. These different types of projects share a common point: they are operated by consortia which are governed by a convention signed by each party. The convention contains provisions concerning IP.
- There are many examples of long-term bilateral relationships between an academic partner and a private partner. Since the start of the 21st century, the trend is to formalise this type of partnership in the form of a “joint research structure”. This type of structure can take several forms, such as a Scientific Interest Grouping. In general it is established through the signature of a convention between the partners, wherein each party commits to assigning human and physical resources to a certain number of matters of common interest.
- More recently, new instruments have been proposed under France’s future investment programme (Programme des investissements d’avenir), that are more specifically dedicated to the development of technology: Technology research institutes (Instituts de recherche technologique, or IRT) and Institutes of excellence in de-carbonised energies (Instituts d’excellence dans le domaine des énergies décarbonées, or IEED). These structures also operate in public-private partnership mode. They are based on the principle of shared resources and their purpose is to provide a legal entity. They are assessed on their capacity to generate return on investment (ROI\*). In this framework, the constitution of an intellectual property portfolio held by the structure and likely to be commercialized is a critical point, representing a major factor in negotiations between partners.
- Under the Pact for Research (Pacte pour la recherche), the Carnot Institutes network was set up in 2006 by public authorities in order to develop direct research partnerships between public laboratories and businesses. It features stakeholders in public research who have the dual mission of developing scientific knowledge and developing collaborative innovation and who have made commitments to ensure high growth in their research activities to the benefit of businesses.

Lastly, another trend is encouraging the development of collaborative innovation: the emergence of intermediation platforms dedicated to innovation. These platforms aim to bring together businesses that are seeking solutions with research communities. They operate on a market-place model, enabling businesses to submit a problem, a desired resolution date and a fixed remuneration. They are enriched with semantic engines, used to identify the most relevant experts through their online publications. They therefore foster the openness of businesses to expert individuals and enable access to specific skills on an international scale. In addition to the emergence of specialised businesses such as Innocentive, NineSigma or Hypios, we can see that several businesses are developing these platforms internally or are initiating crowdsourcing approaches which are open to a large public, with the aim of fostering the emergence of innovative products or services. In this way, in 2008 Cisco launched I-Prize, an innovation competition offering a \$250,000 prize to the winner and the possibility of using Cisco-developed technology in their work.

We have opted to use the example of the Hypios platform and use the following case study to present how it operates, particularly in terms of intellectual property management.

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\* See glossary.

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## Open innovation platform

### HYPIOS

#### Profile:



- Collaborative problem-resolution platform
- Business created in April 2008 with capital of €103,167.97
- Eight employees based in Paris, France and in the UK
- Partnerships with innovation consultants
- Shareholder base made up of business angels and founders
- Board of directors featuring senior managers of Thales and EDF and entrepreneurs

#### *How to explain the emergence of open innovation platforms?*

Crowdsourcing platforms are based on the notion that businesses must be able to access a large pool of partners in order to innovate rapidly and more efficiently. These platforms enable businesses to present their own problems to a pool of problem-solvers made up of experts and other businesses, but also researchers and students.

The main advantage is the time saved in identifying a solution for a given problem and the scope of the areas of skills available. Another benefit is to be able to handle innovation problems that are less critical or outside the company's areas of research.

Open innovation platforms put businesses in contact with experts, who may or may not work in the same industrial sector. "The interest is in the multi-disciplinary aspect. Innovation is effectively highly relative and a solution which is commonplace in one sector could be highly innovative in another," explains one of the co-founders of Hypios.

#### *How does the Hypios platform work?*

Hypios puts businesses (seekers) in contact with a network of researchers (solvers) to whom they present their technological or organisational problems in order to obtain intellectual property. Hypios can also satisfy other needs such as the search for existing patents, service providers, white papers, etc.

The platform browses multiple online resources and selects among more than 950,000 researchers active in 150 countries those who are most likely to identify a solution. 6,000 of these experts are part of Hypios's active solver community. To achieve this, Hypios performs a real-time search using proprietary algorithms, to identify the most diverse skills and the most apt to solve the problems presented. This is intelligent problem solving.

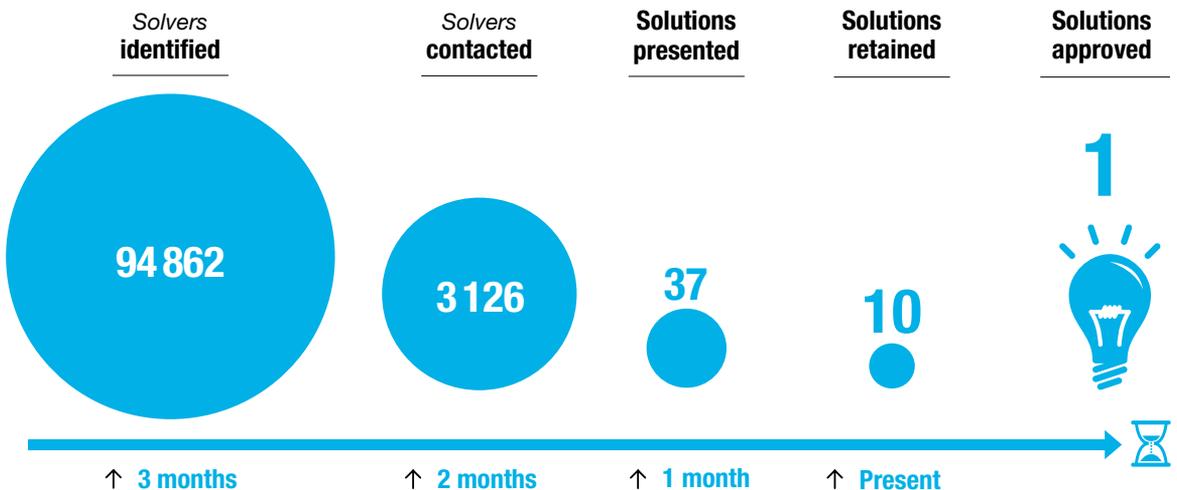
## An example in the food industry

A *seeker* in the food industry needed a simple and inexpensive flexible bag closure solution to replace twist-ties (plastic strips with a metal wire) for uses such as closing a bread bag.

With assistance from Hypios, the seeker completed a form describing the problem in question, the desired deadline and the compensation they proposed for the solution. The amount of the compensation is defined between the *seeker* and Hypios beforehand, according to the complexity of the problem to solve and the importance of the solution for the *seeker*. It may be high. In one case, an American company proposed USD 5 million for the resolution of one particular problem. In our case, the deadline was three months and the compensation amounted to \$6,000.

Hypios and its certified partners worked with the seeker to ensure the feasibility of the challenge and that it was expressed correctly. The Hypios semantic analysis engine examined the challenge to extend it to relevant skills areas. Of the 950,000 researchers identified on the Internet, Hypios technology selected over 94,000 with the skills required to solve the problem at hand. Then 3,126 researchers were informed of the existence of the challenge. The Hypios *solver* relationship managers contacted these people one by one, by e-mail then by phone, to provide information and answer their questions as best as possible.

This personalised care is offered by Hypios and the sector-specific experts of its partners. It serves to ensure that only the most suitable solutions to the problem are presented to the *seeker*, along with information concerning any patents related to the **intellectual property** involved.



Hypios received 37 proposals and after filtering them transmitted 10 to the seeker, who then performed its own analysis. The *seeker* opted for a solution which it wished to make even more specific to the issue and for which it wished to own the intellectual property. One of the *solvers*, an inventor or a lab researcher, who owned the IP and whose solution was chosen, received compensation of \$6,000. During the process, the *solvers* are not made aware of the *seeker's* identity.

## What is the adopted policy in terms of intellectual property?

The Hypios model is based on transferring the knowledge of a solution from the owner of said solution to the *seeker*, in exchange for a predefined amount of compensation.

**This transfer is done in three stages:**

**1) Upstream, when the challenge is published on the platform.** The *seeker* signs a contract with Hypios, which also provides the terms of the contract between the future *solver* and Hypios (the solver general terms and conditions). The compensation is then paid by the *seeker* and placed in an escrow account.

**2) When the seeker selects a solution,** they access the description of the solution and benefit from a defined period of time to carry out a number of verifications. The *seeker* will also conduct the usual prior art or novelty searches. “We are never invulnerable to a dishonest individual who sells an already existing and protected solution,” insists the head of innovation of a major company.

**3) Subsequent to this exchange and verification step,** the transfer of intellectual property is effective and the compensation is paid to the *solver*.

It is important to note that these rules are specific to Hypios and that each stakeholder in the business of open innovation platforms has their own requirements and procedures in terms of intellectual property management.

## What are the benefits of this platform?



**Alain Risbourg, CEO, Hypios**

*“This platform enables businesses to identify an appropriate and innovative solution to a problem for which they do not have the internal resources or skills, in just a few months, by accessing an immense network of researchers.*

*Furthermore, by responding to challenges on the Hypios platform, corporate in-house research labs may also enhance and promote their skills or resources to external customers.”*

# 1.3 Intellectual property, a lever or a brake for collaboration?

## Overview

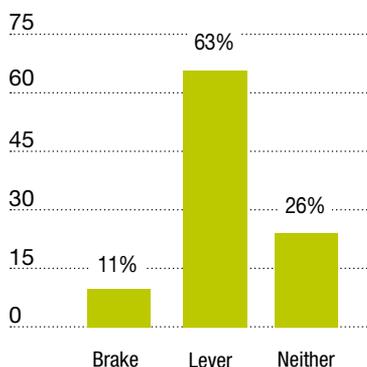
For the most part, the relevance and efficiency of intellectual property are acknowledged. IP is essential when the issue is to consolidate and commercialize the results of innovative projects, and its formal character may serve to clarify partner relationships. Nonetheless, IP management is still perceived as rather complex, especially in a collaborative context. It is not surprising therefore, that it becomes rather a sensitive matter when the issues — e.g. rights of use — are of a commercial nature.

For 63% of interviewees, intellectual property is today a lever for collaborative innovation. From their point of view, efficient IP management is a genuine opportunity to:

- Create value through the optimal use of IP rights resulting from research.
- Identify new partners through fine analysis of patents filed in the target areas of activity.
- Boost trust between partners.
- Offer better protection on highly competitive markets, by developing a dissuasive force.

The stakeholders we met with tend to underline that the efficient IP management models can be characterised by their flexibility, their adaptability according to the nature of the partnership agreements and the existence, from the start, of a proximity of the IP teams to sponsors of innovative projects. In this respect, the involvement of IP teams at the negotiation phase of an agreement with a partner is considered to be too late in the process.

## IN YOUR COMPANY/ORGANISATION, IS IP PERCEIVED AS A BRAKE OR A LEVER IN YOUR COLLABORATIVE PROJECTS?



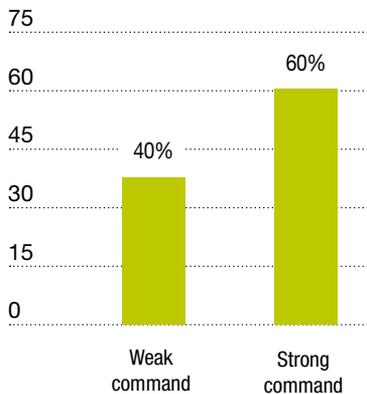
For certain interviewees, this lever cannot be activated in all areas of activity, and some consider that it is not strategically possible to collaborate with external partners on sensitive subjects (e.g. defence), or which are considered to be the core line of business and where the in-house know-how is difficult to protect and would be exposed.

Further along in the study we will analyse the various best practices implemented to enable them to achieve this result.

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## DO YOU FEEL THAT YOUR COMPANY/ORGANISATION HAS GOOD COMMAND OF THE IP ISSUES IN YOUR COLLABORATIVE INNOVATION PROJECTS?

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Although this graph may seem to indicate that good command of IP management is achieved for 60% of interviewees, the figure hides the reality of the situation: few of the people interviewed have genuinely deployed a detailed collaborative innovation strategy and structured a rigorous IP management strategy when they are not simply opportunistic. In support of this strategy, the search for partners is not highly “industrialised” internally and is largely dependent on their knowledge of the existing ecosystem. Of course we can note the facilitating role of certain services such as the Technology development networks (Réseaux de développement technologique, or RDT) which aim to orient businesses towards the skills they are seeking on specific subjects. Competitiveness clusters also have this role of introducing contacts, of being intermediaries that work to identify available

skills (a different positioning than collaborative platforms, where challenges are submitted to a wide community). Nonetheless, more often than not these intermediaries are active in a local arena and propose few openings to partners in other regions or in other countries.

We often see a lack of knowledge of practices in industries other than their own and few innovative IP management models. Unsurprisingly, IP issues are considered to be best understood and managed in large companies.

Several factors exist that make IP management for collaborative projects complex:

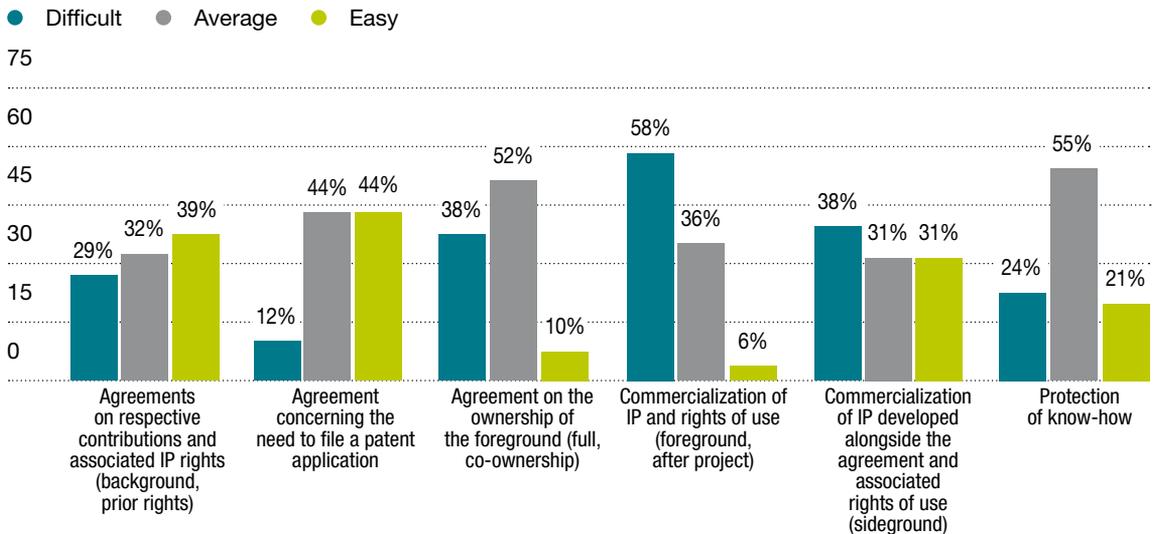
- Agreements on the use of IP rights<sup>(5)</sup> resulting from the project are considered difficult by 58% of respondents. The distribution of rights to use between partners involved in the invention is revealed to be complex when it is not easy to establish distinct and complementary domains of application for each partner. Furthermore, many stakeholders stress the fact that it is a delicate matter to identify the right time to assess the value of the joint invention. Negotiations concerning licence fee amounts too early on in the process may be a block to the process, as it is a complex matter to estimate the value.
- Agreement on the allocation of ownership<sup>(6)</sup> is also cited as a difficult point to negotiate by 38% of respondents. In particular, we see occasionally contradictory interests in collaborative work between large groups and public organisations. The former often seek full ownership, which to them seems the simplest way to manage the commercial use of resulting patents without restriction. The latter are often evaluated by the number of patent applications they file and wish to obtain ownership in order to reuse it in other areas with other partners. These contradictory interests may represent a blockage to the collaboration.

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5, 6. The notions of ownership and use are discussed in part 2.2 of this report.

- The third point of complexity identified by respondents is the commercialization of IP developed alongside the research project (background). The creation of background art may be a source of tension. In effect it is a frequent occurrence that partners in the collaborative work want access to the background art or its ownership. It is therefore important to establish suitable clauses on this matter to avoid litigation.
- Agreements on respective contributions, the associated IP rights and the conditions of access to these rights (background, prior rights) are also widely cited as sources of difficulties. In several projects we observed, the managers pointed out that this phase was neglected because it was considered too time-consuming. In addition, it raises the question of formalisation of prior know-how. It is all too often insufficiently documented, so it becomes difficult to estimate the contribution of each partner. Lastly, in this context, partners have a natural reticence to formalising and sharing elements that may be of strategic importance for them. It is therefore essential to distinguish public and/or protected knowledge (thesis papers, patents, codes, publications, etc.) from secret know-how during the negotiations.

**DURING THE NEGOTIATION PHASE, HOW COMPLEX ARE THE FOLLOWING POINTS?**



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## BACKGROUND, FOREGROUND AND SIDEGROUND: THREE KEY NOTIONS TO MANAGE IN A NEGOTIATION

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	Definition	Essential questions to ask
Background	All information and knowledge (including inventions that are patented or not, databases, etc.) owned by the participants prior to the project. Includes the various associated IP rights.	<p>How to document/codify prior know-how?</p> <p>What level of information concerning prior knowledge is to be shared with the partner (technical documentation, etc.)?</p> <p>How to ensure that the prior art search has been correctly done by the partner, especially concerning adjacent patents?</p>
Foreground	All results, whatever their form, generated by a project, whether they can or cannot be protected by IP rights.	<p>Which partner will own the IP rights generated?</p> <p>How to define a framework that will enable satisfactory use for each partner?</p> <p>On what basis are the methods of distributing income generated by the invention defined?</p> <p>How to assess the results that need protection throughout the term of the project?</p>
Sideground	All results generated through activities undertaken in parallel to a project.	<p>How to correctly define the border between foreground and background?</p> <p>Can the areas for which each partner can make use of the background be defined a priori?</p> <p>What will be the conditions applicable to use of the background by partners?</p>

# 1.4 Collaborative innovation and intellectual property: different problems according to the type of stakeholder

## Overview

Schematically, two principal characteristics have a direct impact on the way in which IP is approached and managed, especially in a collaborative framework: the public or private status of the entity and its size.

The IP issues depend on the type of partner. The table below provides a simplified summary of the main characteristics of stakeholders and the IP issues relevant to each category of stakeholder.

	Common characteristics	Frequently expressed issues
Large groups / Mid-size companies	<ul style="list-style-type: none"> <li>- Existence of an IP function attached to the R&amp;D or legal directorate</li> <li>- Multiple partners (industrials / public bodies / start-ups)</li> <li>- Experience on collaborative projects, but growth in number</li> </ul>	<ul style="list-style-type: none"> <li>- Development of internal culture of proactive IP management</li> <li>- Deployment of structured processes to integrate IP in R&amp;D projects</li> <li>- Coordination and consistency of collaborative innovation strategy</li> </ul>
SME / Start-up	<ul style="list-style-type: none"> <li>- Lack of IP manager. IP often managed directly by the company head</li> <li>- Need for collaborative work but frequently, perception of high risk (confidentiality, loss of autonomy)</li> <li>- No formal IP management process, empirical approach</li> </ul>	<ul style="list-style-type: none"> <li>- Definition of correct level of investment to protect IP (filing and extensions)</li> <li>- Need to retain ownership of innovations, as it represents an essential asset to attract investors (specific to start-ups)</li> <li>- Capacity to develop strategic partnerships with groups, while preserving IP rights</li> <li>- Adaptation of IP strategy according to company's development phase</li> </ul>
Public bodies	<ul style="list-style-type: none"> <li>- Long-term culture</li> <li>- Institutional complexity</li> <li>- Diversity of methods for commercialization</li> <li>- Peer review, based in particular on the number and quality of publications</li> </ul>	<ul style="list-style-type: none"> <li>- Enhancement of commercialization aspects in evaluation criteria: licence revenue, contracts, creation of start-ups, etc.</li> <li>- Development of research in partnership in a context of low growth of recurrent funding</li> <li>- Future impact of new IP and commercialization instruments: technology research institutes, technology transfer acceleration companies, etc.</li> </ul>

Some companies have developed a method of efficiently managing a wide variety of collaborative projects by creating specially-designed competitions for start-ups and SMEs. The Orange UK OSCR competition presented following is an excellent example, as the system creates a relationship of trust with partners and reassures their fears about the theft of their ideas.

## Partnership between a major group and start-ups/SMEs

### Orange Service Call + Reward (OSCR) project



#### Stakeholders involved:

ORANGE UK - ORANGE GROUP	NESTA (UK)
<p>Orange Group</p> <p>172,000 employees in 35 countries, over half of whom in France</p> <p>€45 billion turnover</p>	<p><i>National Endowment for Science, Technology and the Arts</i></p> <p>Independent organisation with the mission of assisting British businesses to innovate</p>

#### 85 start-ups and SMEs submitting innovation proposals as part of the competition

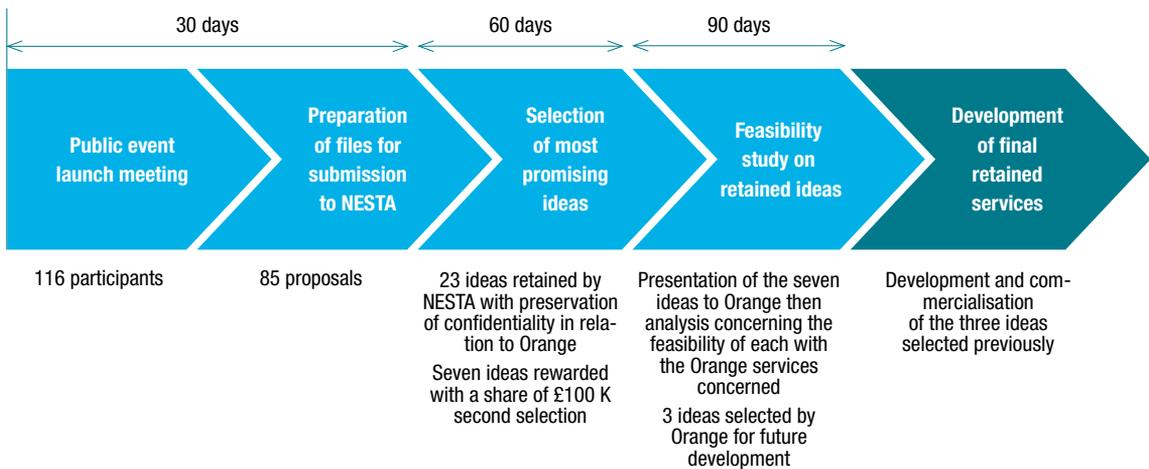
#### *What are the context and objectives of the project?*

Orange collaborates with many SMEs and start-ups. Although these partnerships are a strong lever for innovation, they are sometimes held back by the wariness of the small companies towards assigning or losing their know-how and intellectual property to Orange. This is not specific to Orange, but represents a situation frequently encountered by all large groups, both in France and internationally.

To ensure trust in its relationships with these start-ups and SMEs, Orange UK launched the OSCR (Orange Service Call + Reward) project in October 2009. The purpose of the project was to foster the emergence of new ideas that would enable the group to develop new services on a short timeline, while protecting the intellectual property and know-how of the participating businesses. The partnership was based on the **reciprocity of benefits** and protection for the businesses. The products and services produced had to enable Orange to increase its audience share, boost customer loyalty and generate potential profits estimated at €20 million over three years, through new innovations. For the SMEs and start-ups, the main novelty in this partnership was that it enabled them to benefit from Orange human and financial resources, in particular to protect their ideas or know-how, even before Orange had any direct contact with them.

To facilitate the mechanism, Orange therefore decided to bring in an independent organisation that would serve as a **Trusted Partner**. An agreement was signed between Orange and NESTA, a body responsible for promoting innovation in the UK.

## THE PROJECT WAS UNDERTAKEN IN SEVERAL STAGES:



The companies had one month to propose their ideas to NESTA. Then, an initial selection was carried out by the organisation, which enabled it to select 23 ideas that were then presented to a single person working for Orange, **a trusted person having a duty of confidentiality**. Subsequently, seven winners were selected, again via the trusted partner. The winners presented their ideas to several Orange representatives. The winners had the opportunity to receive counselling from NESTA prior to the presentation.

The seven winners shared a sum of £100,000 to develop their solution or protect their know-how before the presentation to Orange. After the presentation, Orange had 90 days to study the feasibility of the ideas selected. Once the studies were completed, three innovative ideas were selected by Orange. The companies whose ideas were not retained at this stage departed with their award, their idea and the benefits of the dialogue with the industrial entity. Two possibilities were then available to the SMEs/start-ups selected: either they continued their collaboration with Orange, or Orange could make **an offer to purchase the patent(s) from the SME / start-up**.

### *What were the characteristics of the collaboration as regards intellectual property?*

The companies participating in this competition were not forcibly owners of a patent concerning the proposed solution, which vastly increased the number of small businesses taking part. The start-ups were able to retain ownership of their ideas/patents for two reasons:

- NESTA's aim is not to take possession of the idea or patent in order to use it.
- The trusted partner working for Orange had a duty of confidentiality.

Through this arrangement, Orange scrupulously protected the ideas of its partners. The financing of a possible company patent filing by Orange and NESTA prior to the presentation to the group was a strong indication of the ethical approach adopted. It was extremely well perceived by all small high-tech companies in the UK.

### **What lessons and best practices can be drawn from this collaboration in terms of intellectual property management?**

Firstly, Orange was informed only of those ideas submitted by the seven award winners. Then the use of NESTA as a trusted third party ensured that ideas, even non-patented ideas, were protected.

### **What were the benefits/results of the collaborative work?**



**Luc Savage, Director of IP and Commercialization, Orange.**

*“This experiment produced good results. The Fun Finder offer developed for the UK, which enables Orange customers to access last-minute theatre tickets via their mobiles, and at preferential prices, is one example of the results of this process. It is available to 30 million customers. What is more, the project enabled the group to promote its willingness to work together with start-ups and SMEs, thereby positioning itself at the forefront of innovation. A study undertaken with the London School of Economics measured the highly positive impact on the image of Orange with innovative small companies.”*

This pilot business model for collaborative innovation was very efficient in terms of cost control and deadline management. It was transferred to other group entities in France and may well be adopted in other countries in the future.

## 1.5 Obstacles to overcome

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### Overview

Divergent interests and objectives, but also different cultures, are obstacles that may render negotiations between partners problematic. This is all the more true when the partners are direct competitors, which may automatically limit the possibilities of collaboration to matters where the IP issues are modest. Alongside this example, major obstacles remain for partnerships between businesses and research: above and beyond the marked divergences in their concept of timescales, the achievement of a compromise in terms of IP is often perceived as laborious.

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When we interview companies about the ease of reaching an agreement in terms of IP, we observe that:

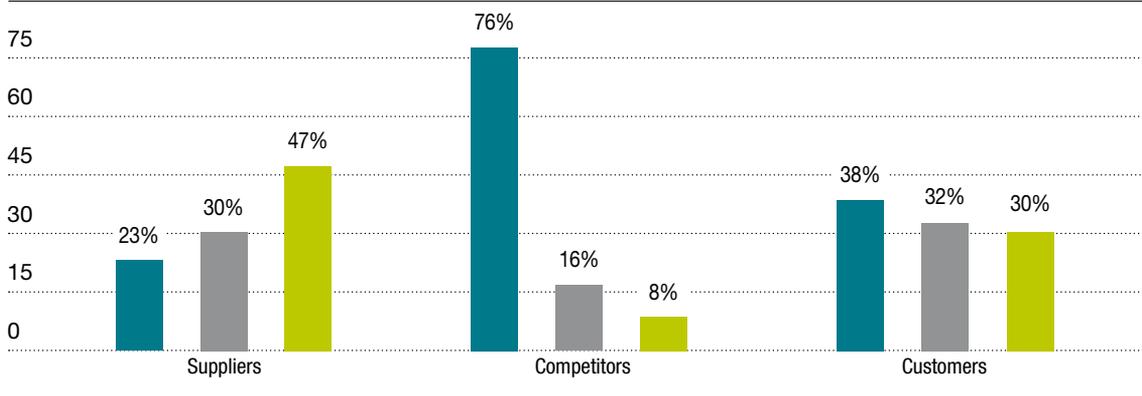
- Collaborative work with suppliers is considered easy by 47% of respondents, which illustrates the phenomenon of a stronger and stronger functional integration between businesses and their suppliers. For example, a stakeholder in the automotive industry pointed out that long-term collaboration with their suppliers had enabled the development of a relationship of trust between the research teams, making the upstream negotiations concerning IP all the easier.
- Conversely, collaborative work between competitors is revealed to be much more complex. Few cases of genuinely open collaboration were reported. Sharing sensitive R&D information is rarely an option for the stakeholders we interviewed. Collaborative work usually concerns a standardisation or risk management approach, wherein the issues concerning IP are limited.

Note that for competitors, it is sometimes easier to agree on innovative work intended to deal with a shared risk than on projects intended to generate business. We have observed that in the agriculture and food industry, a consortium was created between competitors of all sizes to develop solutions to handle sanitary risks. In this situation the purpose and the challenges were equally shared, as the risk was perceived as being critical to all.

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## HOW EASY IS IT TO REACH AN AGREEMENT IN TERMS OF IP WITH THE FOLLOWING STRUCTURES? (BUSINESS FOCUS)

- Long and laborious agreement
- Difficult but achieved in a reasonable timeline
- Fast and rather easy agreement



### FOCUS: COLLABORATION AND COMPETITION

As we saw previously, partnerships are developing and represent a strong lever to encourage innovation. However, certain alliances may be seen as anti-competitive collaboration. For example, if the end customer is faced with a more limited offering or higher prices as a result, we can consider the collaboration as a brake to correct open-market operations. Competition authorities are vigilant to avoid the appearance of such situations. Collaborative work between competitors is naturally more closely monitored than other types of partnerships, especially if, considering the innovative product or service, this collaborative work is close to the market.

There are however situations in which collaborative innovation between competitors is developing:

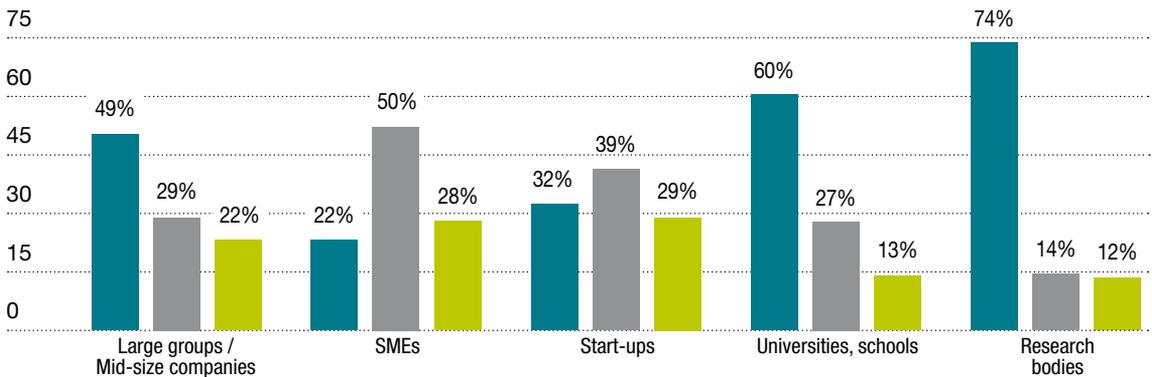
- When the target markets present a need for standardisation in order to develop (e.g. telecommunications).
- When a risk shared by all stakeholders in an industry can be identified and become a federative factor (e.g. sanitary risk for the agriculture and food production industry).
- When stakeholders observe high attrition in their portfolio of innovative products and do not have the means of re-balancing it rapidly (e.g. the pharmaceutical industry on certain market segments).

We have also observed that 74% of businesses consider that negotiations with research bodies are long and laborious. The stakeholders interviewed provided two main explanations:

- The different approach to timescales is often a vector of divergence. If for the business, time to market (TTM)\* is often a key factor in the success of an innovation, this dimension may be much less critical for public organisations. This leads to the involvement of public sector stakeholders preferably in upstream and long-term projects.
- The emergence of commercialization issues for public research organisations may contradict the freedom to operate sought by industrial stakeholders. As regards patents, grounds for compromise must therefore be identified in terms of the field of use and the associated compensation methods.

### HOW EASY IS IT TO REACH AN AGREEMENT IN TERMS OF IP WITH THE FOLLOWING STRUCTURES? (BUSINESS FOCUS)

- Long and laborious agreement
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After the public organisations and competitors, the other stakeholders with whom obstacles to IP agreements are extensive are start-up companies. This can also be explained by divergent approaches to timescales, but in this case it is the opposite of public organisations. For a start-up, deadlines are often day-to-day and not highly compatible with the structured processes of a large group, where priorities may be altered or delayed for strategic reasons.

Moreover, our discussions with IP professionals enabled us to observe recurrent obstacles in the different types of partnerships. These obstacles have differing degrees of intensity depending on the type of partnership. We have summarised them in the following table. These are of course qualitative observations on the frequency of such problems, without any specific statistical value.

\* See glossary.

## FREQUENCY OF OBSTACLES ENCOUNTERED IN IP MANAGEMENT ON COLLABORATIVE INNOVATION PROJECTS



The following case study highlights several best practices in terms of intellectual property management, in the context of a consortium between two industrials (SMEs) and two academic laboratories.

## Consortium

### Collaborative project on search for molecules for therapeutic applications

#### Stakeholders involved:

##### Biotech company

Biotech company specialised in the search for molecules for therapeutic applications.

20-30 employees  
€450K in 2010

Worldwide market

##### Industrial in chemical sector

Industrial chemical lab, specialist service provider in therapeutic chemistry and medicinal chemistry.

30-40 employees

Worldwide market

##### Academic laboratory A

Mixed research unit  
University/CNRS

##### Academic Laboratory B

Research institute of a biotech school

#### *What are the context and objectives of the project?*

This project was presented under an FUI (Fonds unique interministériel, or Single Inter-Ministry Fund) call for projects. It brought together **two industrials** (a specialist in biotechnologies and a chemist) as well as **two academic partners**. The objective of the project, sponsored by the biotech firm between 2007 and 2010, was to identify **new candidate treatments for Parkinson's disease**. The objective was fully achieved as such a product was identified and a licence granted to a major player in the pharmaceutical industry.

The partners in this project were all part of the same network of local acquaintances. The limitations imposed by the R&D geographical zoning within the framework of the competitiveness clusters prevented the participation of a fifth partner.

The relations with the two academic partners resulted from **long-term partnerships**, as the technology used by the biotech firm was produced via research work done by the university teams of the two academic partners. The latter were natural partners in this project to enhance and optimise the technology.

The relationship with the chemical industrial was built via the **local effect**, as the two companies are located on the same business park. Their activities are **fully complementary**, one with the skills necessary to create ligands (chemical libraries), the other with the tools required to evaluate them. This also means that the industrial partners are accustomed to meeting each other at seminars, trade shows and conferences.

The project ideas slowly took shape through the informal scientific discussions between the partners. The initial dialogue focussed on the feasibility of the project, which according to the literature, was considered impossible. The **FUI call for projects was then the trigger element** in the decision to join forces on this project.

The effective structuring phase for the project was relatively fast (a few months). The **terms of the partnership were negotiated** between the **biotech firm**, which also represented the other industrial partner, and the **commercialization unit** of the university, representing the two academic labs.

In hindsight, the negotiations were possibly too rapid and lead to certain difficulties during the project (researchers' lack of understanding of the terms and conditions concerning the sharing of rights on the results of the work) and at the end of the project (difficulty in generating licensing agreements with a third party).

The collaborative work between these four partners was primarily an ideal method to pool complementary skills in order to produce the desired result. Their skills mainly involved techniques, know-how and IP owned by the partners but used only according to the needs of the project.

Each partner also contributed human and physical resources necessary to the outcome of the project. The operational phases took place separately, as all the researchers worked in their respective laboratories.

The collaborative project was also the chance to **share the financial risk**, as the two industrial partners made financial contributions to complement the FUI grant. This self-financing was intended to cover the costs of external services — for evaluations such as ADME-T/evaluation of toxicity (Absorption, Distribution, Metabolism and Excretion) — and patent filings or investment in equipment.

### *What were the characteristics of the collaboration as regards intellectual property?*

For the biotech company and the chemical industrial, the Chief Scientific Officer and the CEO were directly involved in intellectual property matters, **with the assistance of a specialised external consultancy**. The academic partners were represented by the university's commercialization unit.

The discussions centred on the negotiation of the terms of the partnership contract, in particular the shared ownership of future patents, the management of patent use, but also to define the terms of use of patents owned by each partner prior to the project.

These discussions resulted in the drafting of **consortium agreements** and a preliminary project setting out the conditions of the creation and sharing of the intellectual property, along with **non-disclosure agreements** to maintain secrecy throughout the project.

A patent application was filed at the end of the project, as late as possible, to extend the effective protection period for the innovation as long as possible. Sharing the ownership of the patent, initially determined by contract, was in the end renegotiated on amicable terms at the end of the project, as a potential buyer of the innovation required a single contact person (and therefore a majority owner) for the purchase of the rights.

### *What lessons and best practices can be drawn from this collaboration in terms of intellectual property management?*

The main challenges in terms of intellectual property on this project were as follows:

- Difficulty to rapidly **assess the freedom to operate** the models proposed by the academic partners, due to a lack of traceability of certain work, that could endanger all the results of the project.
- **Management of secrecy with academic partners**, who need to communicate their scientific data (publications, posters, presentations).
- **Impairment of equitable sharing** of intellectual property between the industrial partners, by a buyer of the innovative molecule who only wanted to **sign an agreement with a single party**.

To meet these challenges, the following actions were taken:

- Exhaustive **IP analysis and securing work** upstream and throughout the project.
- The industrial partners demonstrated vigilance and were **allowed scrutiny** over the academic communications published during the project.
- The terms concerning patent sharing were renegotiated at the end so that the biotech company, which managed the co-ownership, would be a majority owner and therefore the single party interacting with the potential client.

### *What were the benefits/results of the collaborative work?*

This collaboration enabled the biotech company to find a solution to **a scientific problem that was reputed to be unsolvable**, by searching for technical/scientific and financial support from partners who would share the results of the work. This company was therefore able to **sign a product licensing agreement with a major player in the pharmaceutical industry**.

The chemical industrial **boosted the visibility of its expertise** in medicinal chemistry and, as co-owner of the patent, receives its share of the sale of the product.

The academic partners were able to expand their knowledge of the domain, **sell the new tools produced during the project to one of the consortium partners**, derive value from their know-how and enrich their panels of experimental techniques and research tools.

This project also enabled the partners **to identify best practices in terms of intellectual property management**, which have been deployed on a new project since then.

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In particular, the following points are to be considered:

- **Avoidance of egalitarian sharing** of IP rights in order to facilitate decisions and negotiations concerning patent use.
- **Involvement of research staff in negotiations concerning sharing of IP rights**, which when badly negotiated, may lead to de-motivation. Effectively, research staff are often represented by a commercialization unit, which may or may not provide sufficient information. In the case presented, full assignment of the rights to the partner companies, even for ancillary applications that were of no use to them, gave the research staff the impression of not working for their own benefit. The participation of research staff in the negotiation process will help avoid this.
- Good **upstream management of data secrecy and exchange, of freedom to use** laboratory tools and technologies by better raising the awareness of academic laboratories to these issues.

# 1.6 A growing international dimension

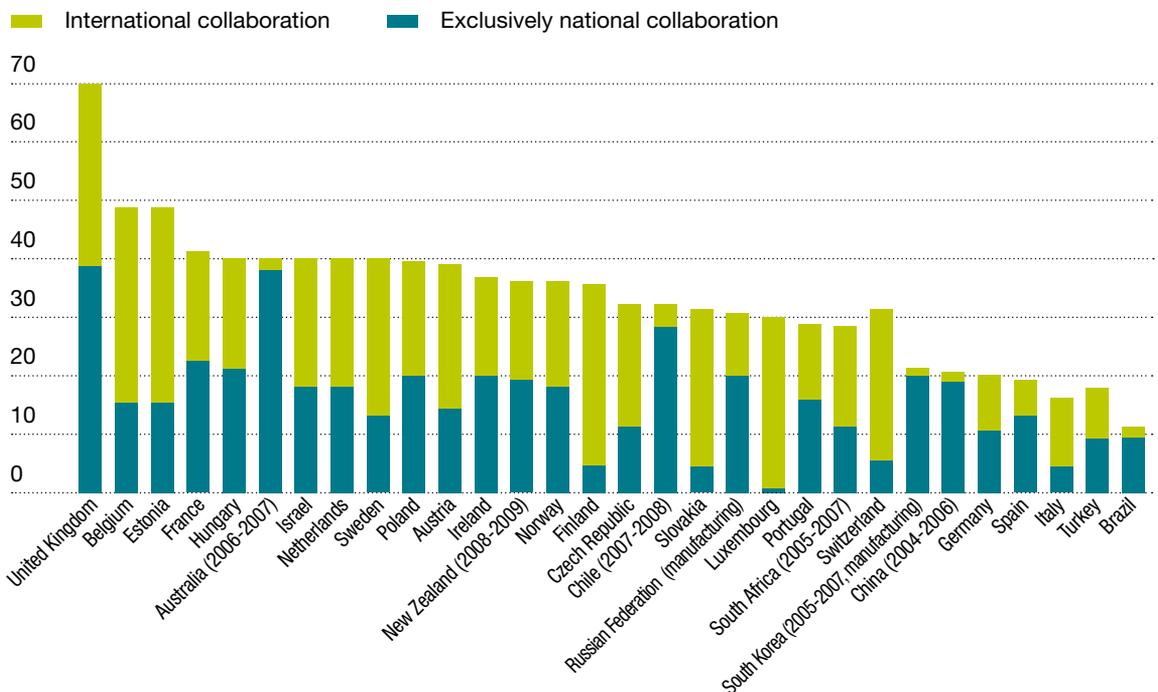
## Overview

The internationalisation of research and innovation partnerships is not a new trend, yet it has logically expanded in the current context of globalisation. In practice, two approaches in terms of building partnerships exist: firstly, an approach involving geographical and cultural proximity; secondly, a “global” approach wherein the market and skills dimensions are more important than the local aspects, and where partnerships with developed countries or those with high development potential are preferred.

For small structures, their partners often come from within the regional ecosystem, but large businesses have always developed collaborative work projects with foreign structures and are increasing this practice, as observed in the increased number of projects seeing the day under European programmes. We should nonetheless remember that this international openness can vary from country to country, as illustrated in the following diagram.

## NATIONAL AND INTERNATIONAL COLLABORATION BETWEEN BUSINESSES ON INNOVATION

(as a percentage of innovative businesses, 2006-2008, for certain countries)



Note: The definitions and reference years vary according to the country.

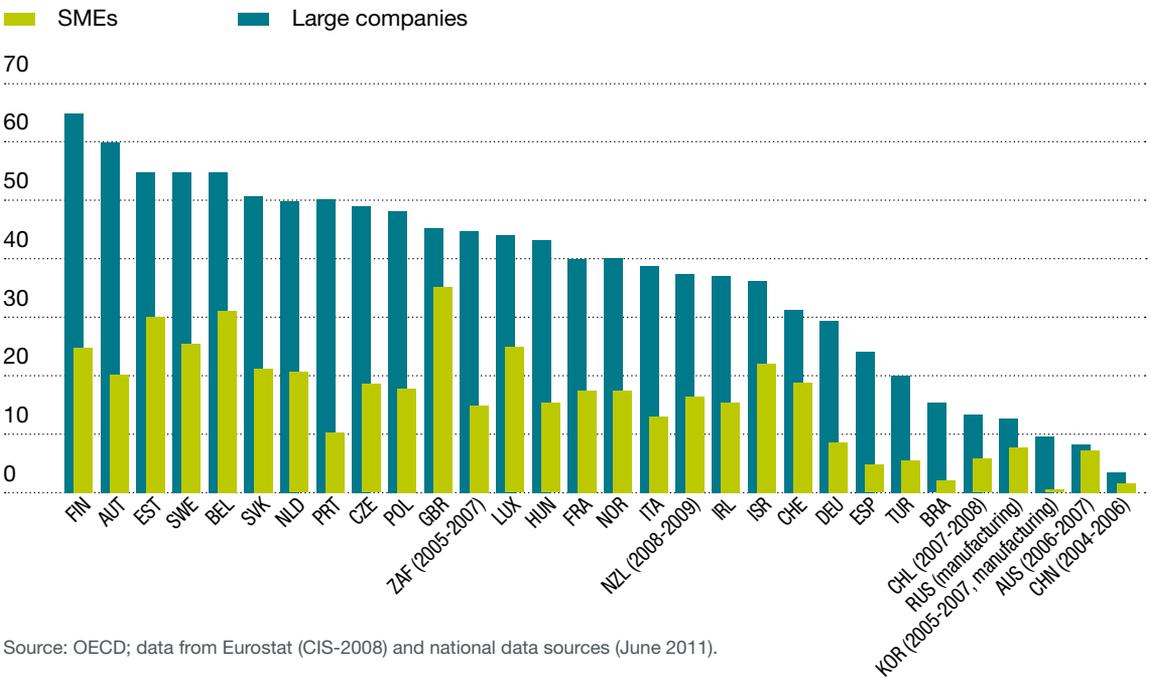
Source: OECD (2011); data from Eurostat Community Innovation Survey (CIS) 2008 and other national sources (June 2011).

In countries like South Korea, China, Australia and Brazil, businesses mainly collaborate with national partners. Inversely, Switzerland, Luxembourg, Slovakia and Finland are the countries most open to foreign business partners. French businesses do more collaborative work with national partners than international ones.

Large groups are more likely to do international collaborative work than SMEs. Belgium, the United Kingdom and Israel have the largest number of innovative SMEs working with international partners.

### BUSINESSES ENGAGED IN INTERNATIONAL COLLABORATIVE WORK ON INNOVATION, BY SIZE, 2006-2008

(as a percentage of innovative businesses in each size category)



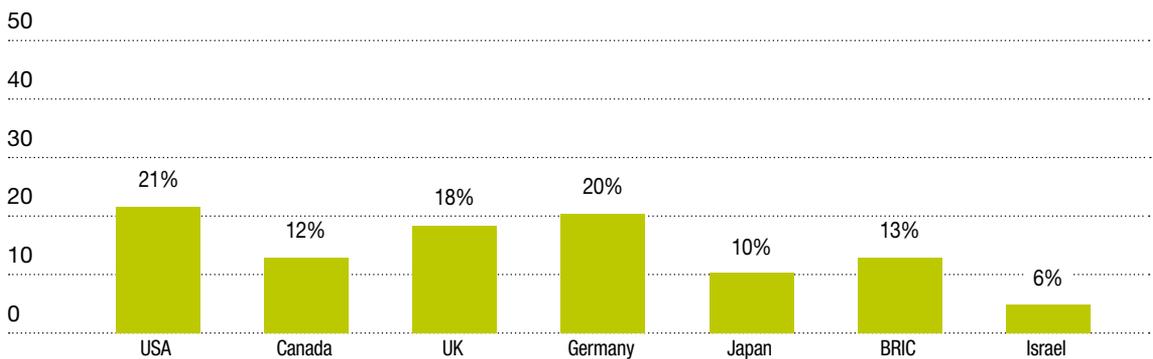
Source: OECD; data from Eurostat (CIS-2008) and national data sources (June 2011).

Concerning collaborative work projects with academic partners, 72% of structures interviewed work with international partners.

Naturally, it is with geographically close partners that our interviewees work the most (18% of structures acknowledge that they work with UK academic organisations, 20% with German organisations), as they are most often commercial partners. The weight of the USA in the world's economy and the reputation of their universities make this country a partner of choice, especially for working with academic structures. We can note the high attractiveness of the BRIC countries, as they are new markets for commercial development. The consequence is that international collaboration enabling partner products to be adapted to local specificities is encouraged.

### PREFERRED DESTINATIONS FOR THE DEVELOPMENT OF PARTNERSHIPS BY STRUCTURES WORKING WITH FOREIGN ORGANISATIONS

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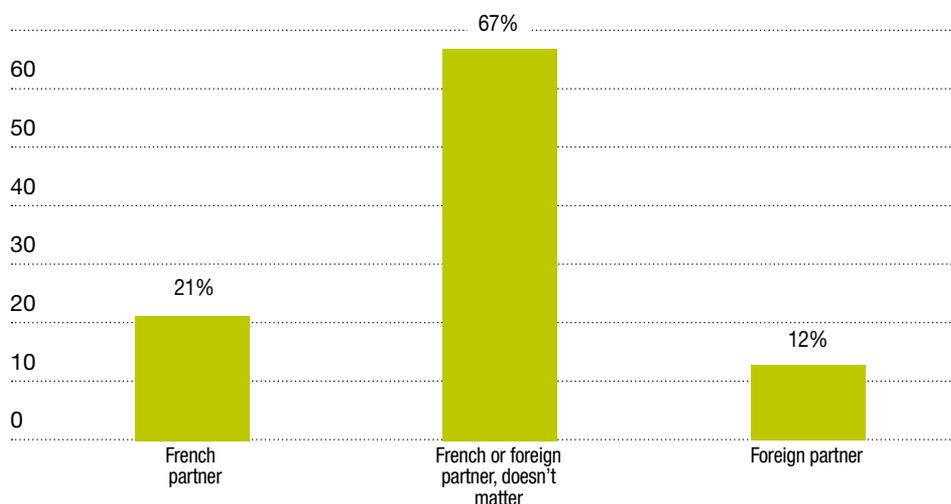
Furthermore, 67% of interviewees consider that the difficulties encountered during collaborative work are not accountable to the geographical location of the partner.

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## IN TERMS OF IP, IT IS EASIER TO COLLABORATE WITH:

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For 21% of respondents who feel that collaborative work is easier with French academic partners, several reasons are put forward:

- The language barrier and the cultural differences.
- A lack of knowledge of laws, which differ in each country, especially for small businesses.
- Internationally, and especially in the USA, universities have a mature approach to the commercialization of IP. More often than not, financial participation is required to fund the research effort and a license fee must then be paid to the university, which seeks to retain ownership of the innovation. Somewhat therefore, only large groups have sufficient weight to negotiate acceptable financial conditions for the use of the resulting IP. SMEs that don't have the weight required are more likely to turn to national or European academic partners (especially under consortium agreements).
- The desire to develop proximity relationships, as working with a geographically close academic team has several benefits. In certain cases, businesses may be motivated to install their premises locally, close to a campus, which will facilitate sustainable relationships.

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# SEVEN CHALLENGES TO EFFICIENTLY INTEGRATE INTELLECTUAL PROPERTY IN COLLABORATIVE PROJECTS

<b>2.1</b> Establish a clear collaborative innovation strategy	P. 48
<b>Case study:</b> Non-competing partners	P. 48
<b>2.2</b> Define an intellectual property commercialization model suited to the issues of collaboration	P. 58
<b>2.3</b> Integrate intellectual property management into the heart of the development process	P. 64
<b>Case study:</b> Consortium between competitors	P. 67
<b>2.4</b> Develop an internal intellectual property culture	P. 73
<b>Case study:</b> Collaborative work between an SME and a research body	P. 76
<b>2.5</b> Define suitable governance	P. 79
<b>2.6</b> Develop an innovation culture that is shared with partners	P. 84
<b>Case study:</b> Consortium	P. 85
<b>Case study:</b> Collaborative work between a manufacturer and integrators and suppliers	P. 90
<b>2.7</b> Use intellectual property as a lever to accelerate collaborative work	P. 94

## 2.1 Establish a clear collaborative innovation strategy

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### Overview

Although in some ways, collaborative innovation has become a common activity, it often remains something that is done opportunistically, on a case by case basis, or is a continuation of “historical” partnerships. To ramp up its efficiency, it is necessary to formulate a clear strategy, based on an in-depth diagnosis, to finely define the motivations that underpin collaborative innovation (in particular internal strengths and limits). This exercise must enable the business to identify the domains where such innovation is desirable and, if necessary, the preferred partners.

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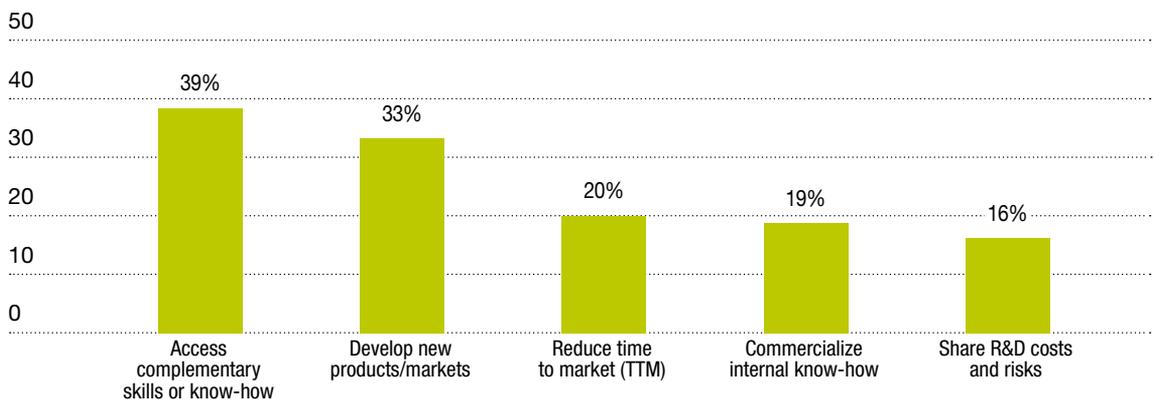
### Collaborative innovation can satisfy several types of strategic objectives

We have observed that multiple factors can drive businesses to collaborate. Over half of the respondents identified four of the five proposed objectives as a priority for their collaborative innovation strategy.

#### USE OF COLLABORATIVE INNOVATION TO:

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(several answers possible)



Access to additional skills or know-how is the primary objective mentioned by the interviewees. It is difficult for a business to have all the internal skills it needs to develop ever more complex systems. For this reason, partnerships with laboratories or specialised businesses are greatly sought after, as illustrated by the following case study.

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## Non-competing partners

### Programme: Surface functionalisation

#### Stakeholders involved:

##### Stakeholder A

##### Stakeholder B

French group	SME specialised in surface treatment equipment
World leader in chemical industry	
40,000 employees	
€14 billion sales in 2011	

#### *What are the context and objectives of the project?*

This project brought together a large French group that is a leader in the chemical industry with an SME specialising in surface-treatment equipment. The aim of this programme was to develop a new polymer material surface-treatment technology, which would modify the function of the surface to render it better suited to a given usage. This was made possible by very strict control of the chemical species formed on the surface of the material during the treatment. The benefits of this innovative treatment are lower deployment costs (compared to conventional surface-treatment technologies), enhanced productivity and a reduced environmental footprint.

The collaborative project was made possible by the complementary features of the two partners. In effect, the proposed technology blends:

- Precursors (chemical species that act on the surface of the material) and a deployment method proposed by the large group.
- Original surface treatment equipment developed by the SME.

The extensive expertise of the partners and their respective know-how on these two distinct areas were the key to the successful outcome of this collaborative project.

## *What were the characteristics of the collaboration as regards intellectual property?*

**During the negotiations, the IP and Contract teams for both companies were extensively involved in the discussions.** This enabled the project to be handled as closely as possible with the desired conduct in terms of IP on the collaboration, especially concerning the conditions of access to each partner's background.

Two main contracts governed the project. The first defined the conditions of the collaboration and governed the sharing of intellectual property. The second set out the conditions of use.

The patents generated by the collaboration were filed either in co-ownership or by a single partner. The choice depended on **the field of application** for the two stakeholders (precursors for the large group, equipment for the SME). The project resulted in the filing of around **15 patent applications**.

The conditions of use of the intellectual property (whether under co-ownership or not) were defined by a specific contract. Use was only controlled in a specific area. Outside of this area, the partners were free to use the patents as they saw fit. The conditions of use are based on the payment of **fees** to the partners by the end customer:

- The SME sells equipment to the customer and receives a fee included in the equipment sale price.
- The large group sells precursors to the customer and also receives a fee. The sum perceived is related to the quantity of precursors sold.
- The end customer receives a non-exclusive licence to use the technology.

## *What lessons and best practices can be drawn from this collaboration in terms of intellectual property management?*

The **complementary positioning of the partners in the value chain** facilitated the definition of their respective contributions, as well as the negotiations of the future intellectual property rights.

The **sales forces** of the two partners were also complementary. Through its experience and network, the large group was able to accompany the SME in its development on the world-wide market.

The partners also shared an identical technical vision and rigorous culture in the management of complex engineering projects. **These common aspects, the strong involvement of their teams and the willingness to succeed together** made project management easier and enabled the partners to integrate their respective limitations.

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Furthermore, the **intervention perimeters were clearly identified at the start of the project**. The contract was drafted rigorously, both in technical terms with the definition of the sharing of intellectual property (equipment vs. precursors) and in terms of intellectual property commercialization (clearly defined rules of use). It formed a solid base for the stakeholders to make their collaboration a success.

Lastly, this project was a success due to the **transparency of the discussions and a balanced relationship between the two partners**. The partnership was based on sharing efforts (in terms of costs), results (in terms of intellectual property) and the benefits (in terms of commercialization). It was a successful model for the partners.

### *What were the benefits/results of the collaborative work?*

This collaboration enabled the development and commercialisation of a highly-differentiating technology, supported and protected by extensive intellectual property (some 15 patents). It served to build a **high added value offering** that represented a major competitive advantage for the two partners due to the absence of competition and the advances in technology developed.

The SME was therefore able to propose turnkey equipment that set it apart from its competitors, while the large group considerably enhanced the performance of its customers' process, by proposing a unique technology enabling the sale of its products. This technology represents a high use value for clients, resulting in **greater loyalty** on their part.

For 33% of respondents, the use of collaborative innovation stems from their desire to develop new products or new markets. Collaborating with a partner who is already active in this new market or who has the type of products desired helps them acquire the experience required more rapidly.

The reduction in time to market also represents a major objective for respondents. An alliance with a suitable partner with the same objective of reducing TTM enables to share R&D efforts and accomplish the desired objective.

Creating value from internal know-how represents the fourth objective of businesses. In several industrial groups, we have observed the emergence of more systematic strategies, using dedicated entities that serve to generate additional sources of revenue. A company such as Technicolor, a pioneer in this respect, developed this model into a genuine commercial activity, which generated almost €451 million in 2011 (13% of its total sales of €3.45 billion).

To a lesser extent, sharing costs and risks is also cited by respondents. In a context where businesses have had to moderate their spending on innovation due to the economic climate, collaborative innovation strategies have blossomed as a lever to develop and maintain their innovation capacities. As an example, in parallel to reduced R&D budgets, an international energy business actually increased the portion of collaborative projects it undertook. This was driven by the R&D project managers, who were encouraged to identify where there was available room for manoeuvre outside the company as internally none was available.

“For us collaborative innovation has two objectives: reduce costs by sharing them with our partners and access additional skills and structures, such as demonstrators.”

**Bruno Stoufflet**, Director of Forward Planning and Scientific Strategy, Dassault Aviation

“Collaboration is essential for us, as it provides access to the best skills available, but also to get points of view different from our own. In this respect, today we give priority to the integration of public or private research staff on our premises over subcontracted work on certain research activities.”

**A major group**  
in the Media & Entertainment sector

“Why collaborate? Firstly, we don't have all the skills and know-how required internally; they would be too costly to acquire. Secondly, for certain projects, the risk factor is very high and a venture-capital investor would not go it alone.”

**An SME**  
in the biotechnology sector

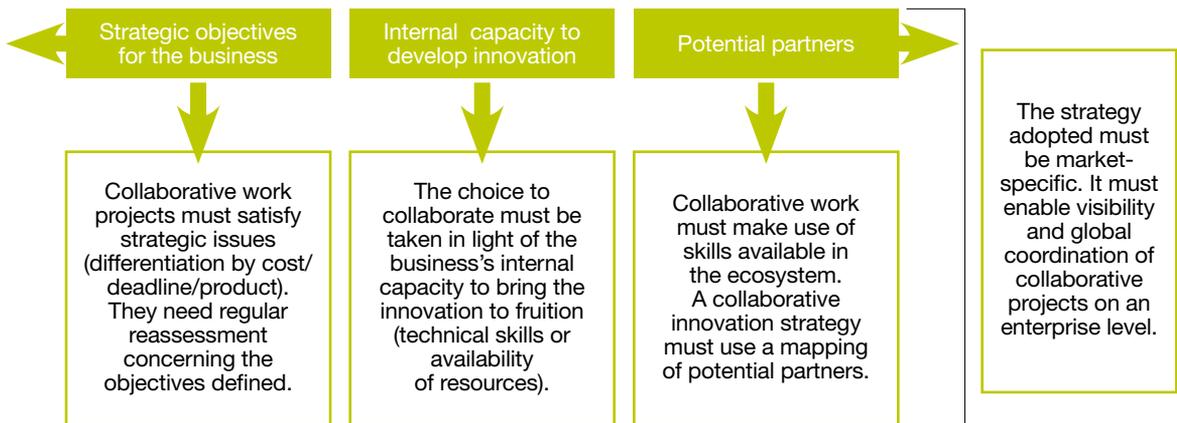
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## Defining a collaborative innovation strategy serves to define priority areas for collaboration

### WHY DEFINE A COLLABORATIVE INNOVATION STRATEGY?

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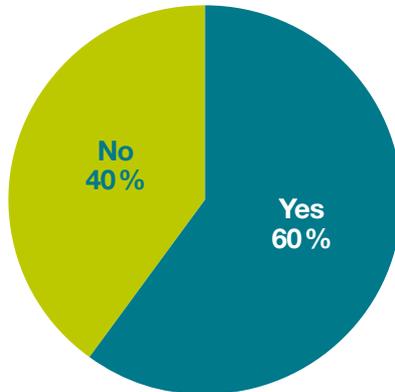
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60% of respondents say that they have defined a collaborative innovation strategy. Our experience in the field leads us to believe that this optimistic figure hides highly heterogeneous realities and maturity levels. In any case it underlines that companies are extremely aware of the need to organise their openness strategy for a long-term approach. This is especially true for stakeholders who are active in a great many collaborative projects, in diverse research areas and with varied types of partners.

Amongst the large corporations we met, certain stakeholders have initiated a structured, strategic steering approach to collaborative innovation, notably through the creation of a dedicated function or department. At this stage, such practices remain emergent and the prerogatives assigned to the function may vary.

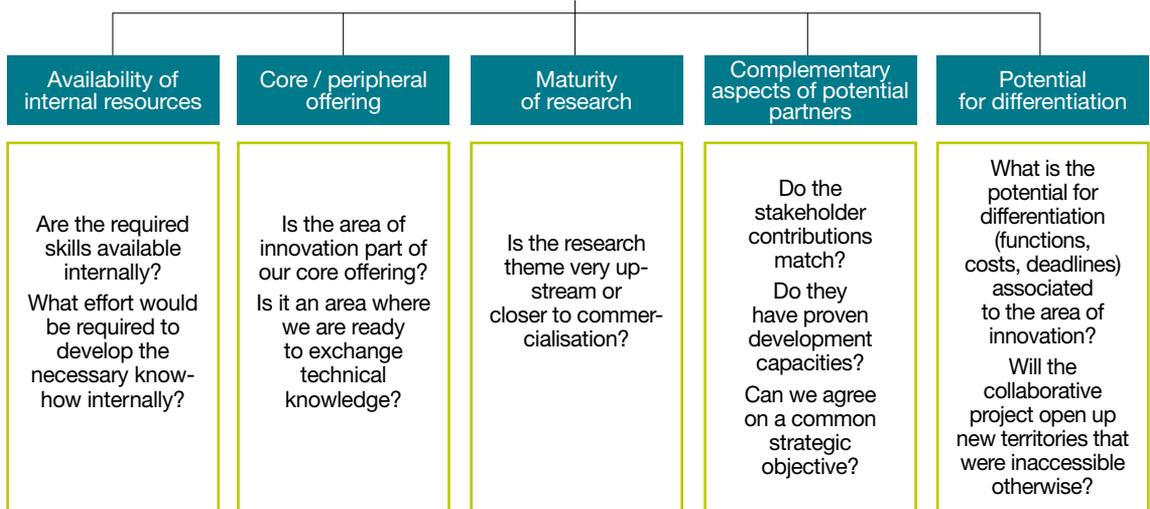
Nonetheless, approaches are often empirical and founded on opportunities for collaboration on a project-by-project basis, or as part of a historical relationship between two partners. If we look more closely at the SMEs, very few of them state that they have established a collaborative innovation strategy.

## HAVE YOU DEFINED A COLLABORATIVE INNOVATION STRATEGY?



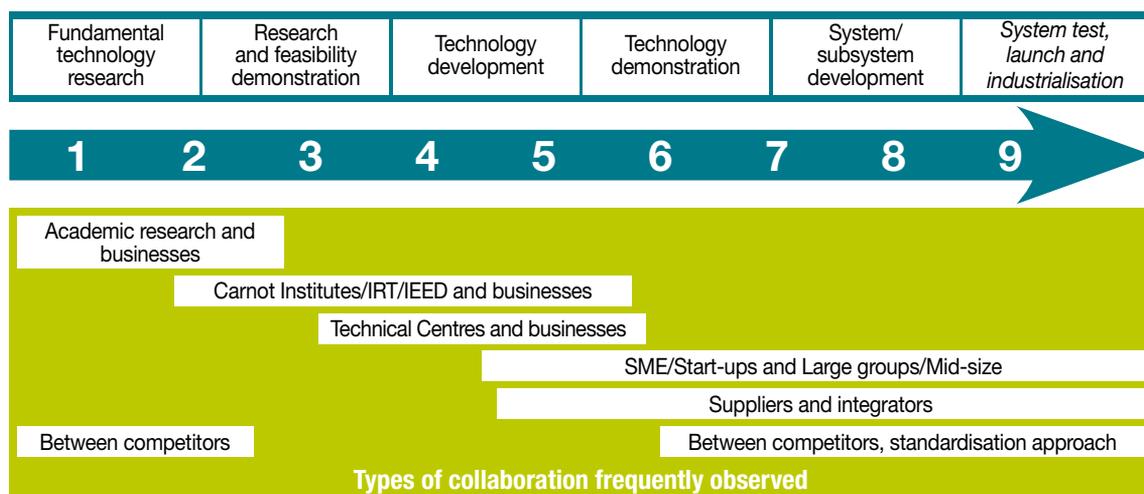
Structured collaborative innovation requires the upstream development of a mapping approach, in order to define the areas of innovation where collaborative work would generate added value. Through our interviews, we have been able to identify five dimensions that should be taken into account when establishing this strategy:

### KEY DIMENSIONS IN ESTABLISHING A COLLABORATIVE INNOVATION STRATEGY



The maturity of the research that we wish to undertake is an important parameter to consider. The collaborative innovation strategy adopted must depend on this level or maturity, which can be defined using the Technology Readiness Level (TRL\*) scale. The following illustration presents the most frequently observed types of collaboration for the businesses we met, positioned on this scale.

### TECHNOLOGY READINESS LEVELS (TRL)



Amongst the large businesses we met, certain stakeholders base their approaches on the mapping of strategic partnerships and use “innovation density” mapping tools, and use domain-specific key words to analyse the accumulations of patents existing in areas of interest.

\* See glossary.

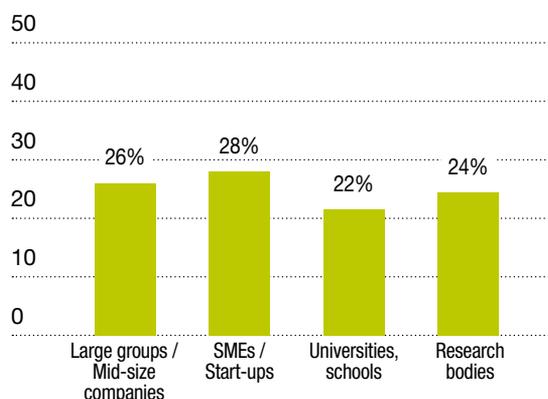
## Stakeholders choose partners in accordance with their objectives

In light of the diversity of possible partnerships, it is also important to ensure that the selection of partners is consistent with the objectives assigned to the collaborative innovation approach. In first place, the choice is associated with the skills areas of the respective partners, but our survey and the discussions held with a large number of stakeholders serve to clarify the typology of potential partners according to the intended strategic objectives.

### WITH WHOM DO YOU COLLABORATE MOST INTENSELY ON THE FOLLOWING OBJECTIVES?

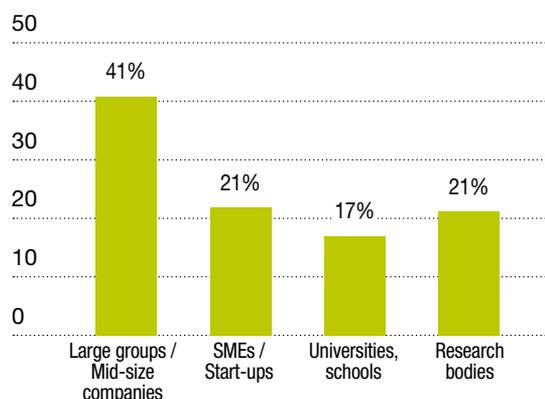
(Several answers possible)

#### Develop new products/markets



To identify new innovative products and especially disruptive products, the whole ecosystem is used homogeneously, with a slight preference for SMEs and start-ups, enabling agile innovation.

#### Share R&D costs and risks



To share R&D costs and risks, structures with sufficiently deep pockets to engage in risk-taking are clearly preferred.

“ We decided to extend our collaborative work with start-ups and high-tech SMEs. We do this in areas that are not directly involved with our core business. This enables us to extend our research capacities and expand our agility. ”

**Michel de Crémiers,**  
Director of IP, Safran Group.

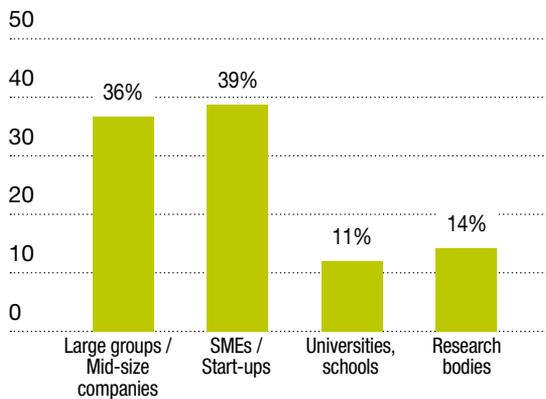
“ We draw a real benefit in cultivating a sectoral/non-sectoral balance by contributing to consortia outside our main area of activity. For example, we are a member of the systematic competitiveness cluster, which has enabled us to meet non-competitor companies but who have the same challenges. ”

**Bruno Stoufflet,**  
Director of Forward Planning and Scientific Strategy, Dassault Aviation.

“ It is essential to learn how to read the strategy of large groups that will be big players in tomorrow’s economy. Track their involvement in research, their technology developments, and monitor their movements. ”

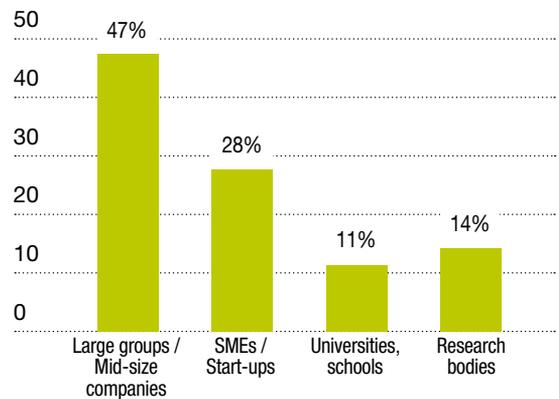
**Jean Therme,**  
Director of Technology Research, CEA

### Reduce time to market (TTM)



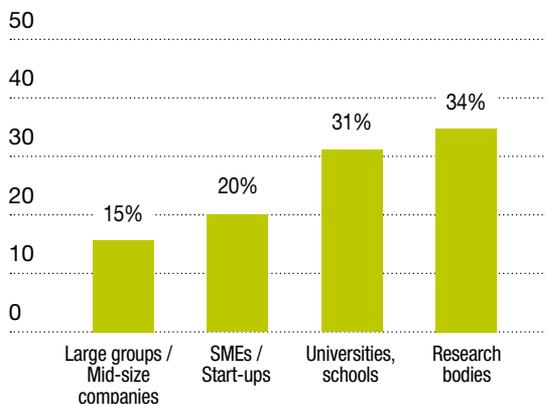
To reduce TTM, companies join with partners who share the same strategic TTM issues. SMEs and start-ups are desirable for their responsiveness.

### Commercialize internal know-how



To commercialize internal know-how, companies need partners that are close to the markets for fast commercialization.

### Access complementary skills or know-how



In order to access additional skills or know-how, companies often seek partnerships with public structures or private research labs, as few businesses still have upstream research labs.

## 2.2 Define an intellectual property commercialization model suited to the issues of collaboration

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### Overview

The issues of ownership of IP and more importantly, use of IP, are at the heart of IP issues surrounding partnerships. A clear definition of the objectives of the collaborative work is an indispensable forerunner to the negotiation concerning the corresponding IP rights. The choice of the mode of use is partly dependent on this definition: several models are possible and a certain amount of flexibility is possible. The issue for the partners is to identify a compromise that respects the interests of each party.

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The definition of a clear strategy is an essential forerunner to collaborative innovation, yet it is also necessary to define a suitable model for the commercialization of this innovation, or one that is at least compatible with the objectives of the partners and the nature of the collaborative project.

### Reminder concerning ownership and use

A reminder of the difference between the ownership of IP and the use of IP is perhaps useful:

- When a partner has ownership of an IP right (patent, trademark, design, etc.), this means that it has a monopoly on the use of the right. It must pay<sup>(7)</sup> annuities to maintain a patent or a renewal fee (every 10 years) for a trademark, and is liable in the event of litigation. The owner takes all decisions concerning use.
- Use is the process by which IP rights can be used and commercialised/licensed.

The owner has the possibility of granting the right to use the IP through a licensing agreement, which may or may not be exclusive.

### Ownership automatically implies management of IP rights

A partner owning an IP right must manage it accordingly: the administrative and technical/legal activities concerning prosecution up to grant/registration, the fees to pay<sup>(7)</sup> and the formalities concerning international extensions represent the most challenging constraints.

In collaborative projects, we can identify two cases:

- One of the partners is the sole owner of the IP right.
- The partners are joint owners of the IP right.

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7. Unless it concerns copyright (regarding software, for example).

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In the case where the partners are joint owners of the IP right, each owns a defined portion. Co-owner partners generally draft a **joint ownership agreement** specific to their collaborative work. Such an agreement may for example be appended to a consortium agreement. Most commonly, it establishes a framework covering the following points:

- Determination of the partners' respective portions.
- Decisions concerning prosecution of the patent (filing, drafting of patent claims, responses to office actions, etc.).
- Decisions concerning international extensions.
- Distribution of maintenance costs.
- Management of infringement proceedings.
- Rules concerning use by partners or by third parties.
- Licensing under exclusive or non-exclusive agreements, cross-licensing.
- Assignment of a partner's portion of ownership, merger/acquisition.

If such an agreement is not made between the partners, by default co-ownership is governed by the provisions of the Intellectual Property Code<sup>(8)</sup>.

It is therefore important that the partners reflect on their **interest in being co-owners** as, amongst other factors, it imposes their participation in the costs of maintaining the IP right. The benefits of co-ownership are multiple, for example:

- Industrial property rights represent intangible capital (intangible assets on the company balance sheet).
- In terms of reputation, it may be essential to be seen as a co-applicant with an organisation with a strong reputation or recognised expertise in a technological area.

However, the joint ownership regime has several drawbacks, in particular:

- When the legal structure of a joint owner changes (restructuring or buyout, for example), any agreements in place must be re-negotiated with the new structure.
- A joint ownership agreement often stipulates that a partner must request the agreement of the other partner if they wish to grant a licence to a third party, which frequently leads to time-consuming procedures.
- Businesses interested in taking out a license in respect of the patented innovation often wish to deal with a sole stakeholder.

In light of these limitations, certain companies make **full ownership** of IP rights a prerequisite to their collaborative innovation approach, which may turn out to be an obstacle to the emergence of partnership projects.

Simple models exist and can be used to overcome these obstacles. For example, it may be agreed that an IP right be owned outright by one of the partners, who will in turn compensate the other member(s) of the collaborative project. This may take the form of financial compensation, rights of use (exclusive or not), marketing rights (exclusive or not), etc.

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8. French Intellectual Property Code, articles L. 613-29 to L. 613-31

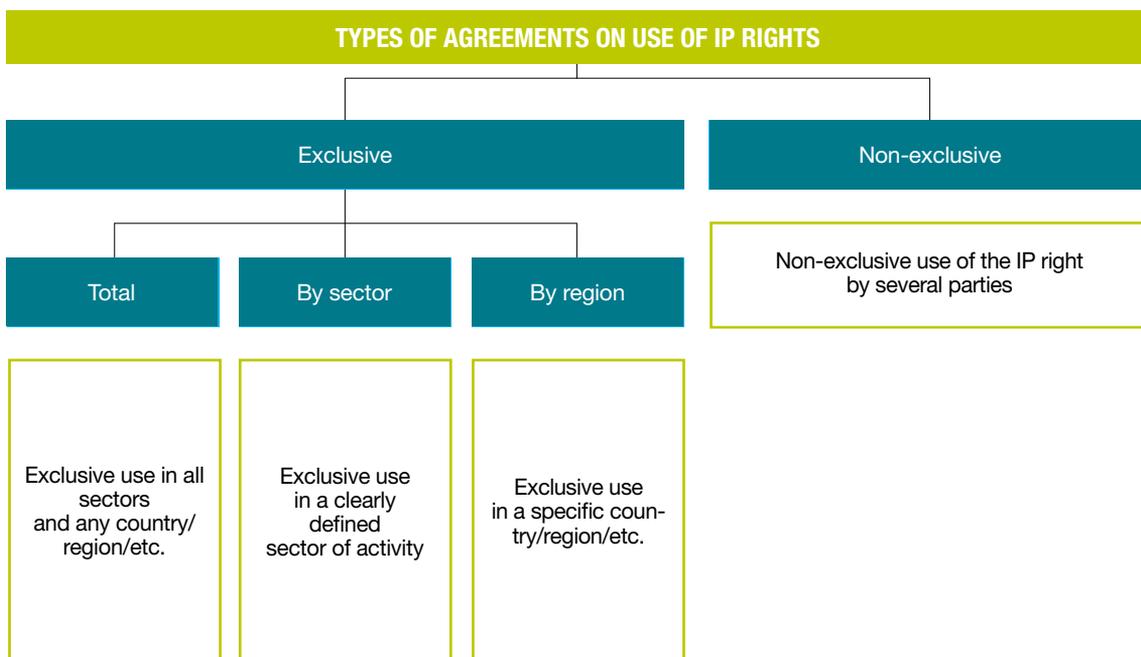
“In negotiation phases concerning IP rights, we need to spend more time on the questions of use than on ownership.”

**Hubert Kiehl,**  
Director of Industrial and Intellectual Property, SEB Group

### IP use: a priority matter for businesses

Discussions concerning the use of IP are indicated as the most critical for the majority of interviewees. Negotiations concerning ownership are of course important, but the focus must be on the use of IP. Often, a full ownership requirement is just a method of ensuring unrestricted use.

Agreements on the use of IP rights are of different types:

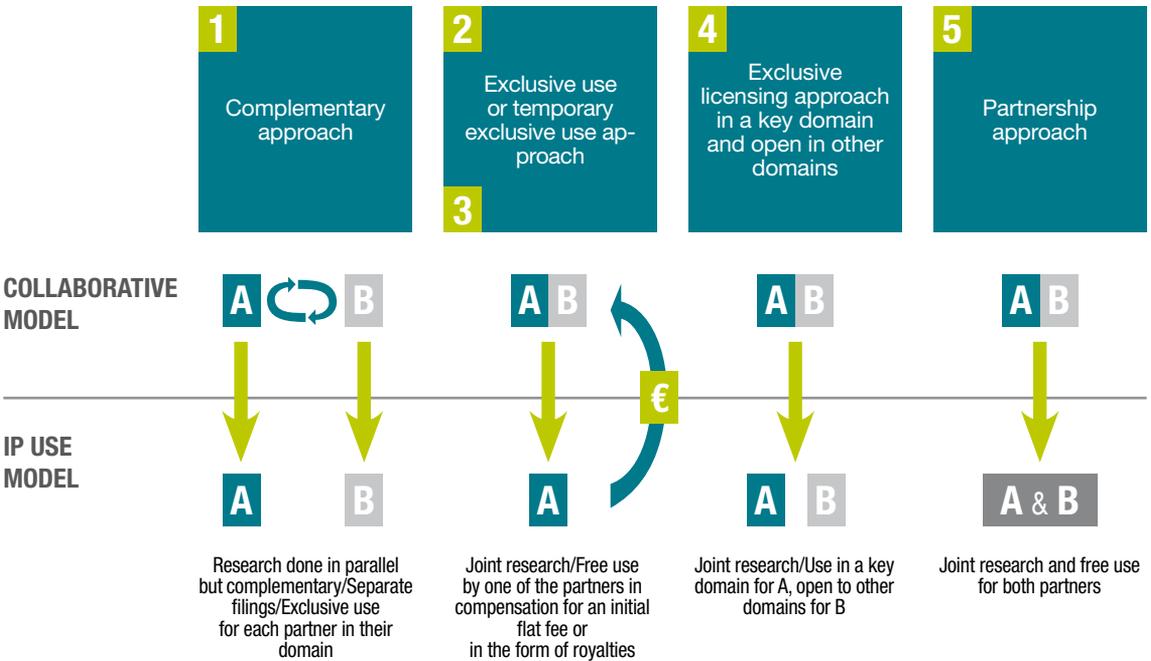


The fee amount depends on the contribution of each partner to the IP right (contributions to collaborative project), but also takes into account the commercial and marketing efforts of the partner who makes commercial use of the product or service.

By analysing collaborative projects from two angles:

- The collaborative model.
- The IP use model.

We have distinguished five distinct approaches, which are outlined below.



Each approach can be described as follows:

Characteristics/Context	Expected benefits	Prerequisites/Limits
1. Complementary approach	<p>Clearly defined fields of skills</p> <p>The products of each partner are complementary and address a customer need and are non-competing products</p>	<p>Needs clear identification of fields of skills for each partner</p> <p>Suited to collaborative work between partners with distinct fields of activity</p> <p>Highly specific approach</p>
2. Exclusive use approach	<p>Desire of one partner to maintain long term control, in all areas, over use of IP rights</p> <p>Imbalanced power relationship in negotiation</p> <p>Strategic character (core activity) of innovation for one of partners</p>	<p>Total freedom to operate for right holder</p> <p>Product rationalisation</p> <p>Simple to manage</p> <p>Facilitates integration of patent in a patent pool</p>
3. Temporary exclusive use approach	<p>Suited to customer/supplier relationship</p> <p>Exclusive use of the innovative product/service resulting from collaborative work to the benefit of the client only, for a deliberately limited period</p>	<p>Enables the supplier to consider access to a wide market after the exclusivity period.</p> <p>Defines an exclusivity period providing a competitive advantage to the client over its competitors</p>
4. Exclusive license approach in a key domain and open in other domains	<p>Desire of one of the partners for long-term control, in a specific key domain, often corresponding to strategic markets, over use of IP rights (core business activity)</p>	<p>Significant market size/ sufficient market share for client to commercialize the innovation</p> <p>Capacity to finance exclusivity (initial financing and annuities)</p> <p>Difficult to integrate in a patent pool</p>
5. Partnership approach	<p>Market with rapid TTM as one of the main features</p> <p>Weight of one of partners in ecosystem, enabling it to impose its innovation as the de facto standard</p> <p>Innovation associated to management of common risk for partners (e.g. sanitary risk for the agriculture and food industry).</p>	<p>Improvement of TTM</p> <p>Freedom to operate and simplicity of management</p> <p>Balanced contributions and benefits</p> <p>Healthy relationships between partners that may be competitors</p>

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## The IP management model must be aligned with the objectives of the collaboration.

Choices made concerning IP management must be consistent with the issues of each partner concerning the collaborative project. Below are two practical examples:

- As part of a collaborative project to ensure rapid market introduction (fiercely competitive environment), a simplified IP management approach is preferable. The partners opt for a co-ownership approach and a right of unrestricted use is granted to all parties. The decisions are therefore taken faster, patent applications are filed before competitors and the innovative product is put on the market faster.
- In the second case, a supplier wishes to consolidate its leadership position in the domain of hybrid engines. To do so, it contacts the reference research centre in these matters. The supplier needs to protect their core know-how and business. It seeks exclusivity and ownership (defensive approach) on its market. Nonetheless, it allows the research centre to use the innovation on other markets after the expiration of an exclusivity period.

Note that for the same issue, e.g. accelerated TTM, the strategy adopted may differ according to the nature of the finished product, depending on whether it integrates a small or large volume of patents.

In this way, a player in the telecom sector and a general public cosmetics producer both pursue the same rapid TTM objective as their product cycles may only be six months to a year. Telecom products integrate several dozens of patents, whereas cosmetic products often only refer to a few (one or two, usually less than 10).

The telecom stakeholder may choose an unrestricted use approach with its partners, as the speed of the introduction to market, combined with the complexity of the product, will enable it to lead the race.

On the contrary, the cosmetics producer will seek to obtain ownership and temporary exclusive use, as the complexity of its product will probably not be sufficient to protect it against infringers. After a period of exclusive use, it may possibly grant a right of unrestricted use to its partner, or even assign the ownership.

## 2.3 Integrate intellectual property management into the heart of the development process

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### Overview

The establishment of a partnership is necessarily done in several stages, from the identification of topics of collaboration up to the definition of the framework for making commercial use of the results. In general, under these conditions, several successive agreements are negotiated. Good IP management therefore supposes that the partners define at what moment various aspects (confidentiality, use of IP rights, etc.) must be handled and what skills, in particular legal skills, are to be mobilised. The formal definition of such processes contributes to making the completion of collaborative projects more efficient.

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### Persistent inequality in integration of IP teams in the process

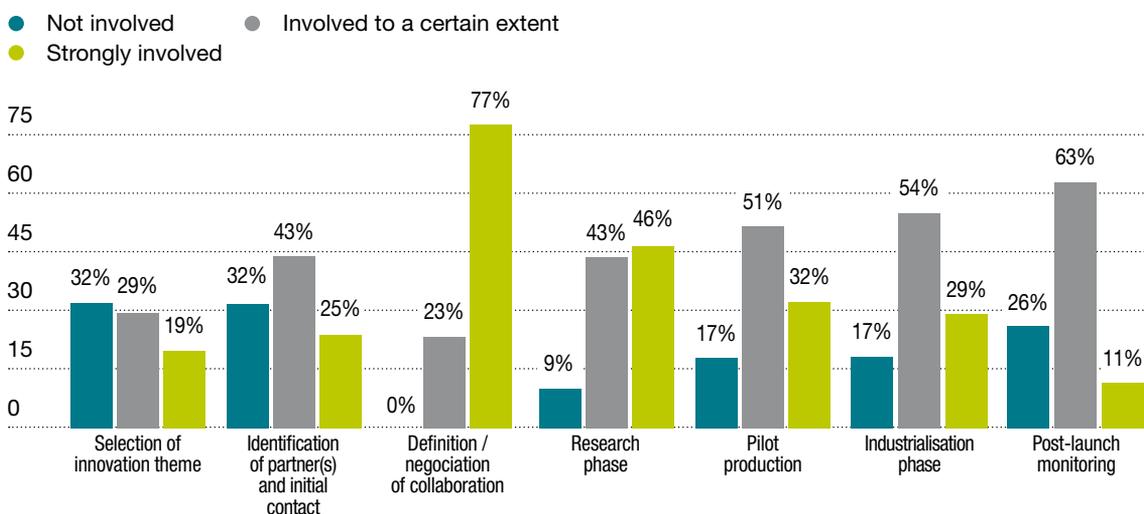
We asked our interviewees at what stage of the collaborative project the staff in charge of IP became involved. We were able to make the following observations:

- Generally, **IP teams have very little involvement in the identification and selection of the innovation topic, and in the identification of the research partner.** In these structures, the IP reflex is anything but widespread in the exploratory phase. We can therefore observe that respondents rarely use IP in a **business intelligence**, technology intelligence or strategic intelligence approaches (in particular for new patents), which is an activity that serves to understand the technology development policy of the competition or their geographical expansion strategy. Checks on the prior art and of the domains protected is not systematically done by the patent department before any new projects are undertaken. As a general rule, the intelligence department is responsible for this activity and if necessary enlists the support of the patent department.
- For the majority of respondents, **the IP teams enter into the picture for the first time in the negotiation phase.** Nonetheless, a large number of interviewees underlined a change in their practices over the past few years, with in mind the better integration of IP upstream of projects, notably in order to:
  - manage confidentiality with all third parties with whom future collaboration is considered
  - set down a convergence of willingness as soon as it exists, to specify the main terms of the collaboration (generally in the form of a protocol of agreement).

In the opinion of the majority of those interviewed, the involvement of IP as early as possible in the collaborative innovation process serves to avoid numerous blockages, by sketching out an initial framework for the collaborative work and the use of future innovations. We should remember that this requires suitable training for IP teams and full understanding of the associated business issues.

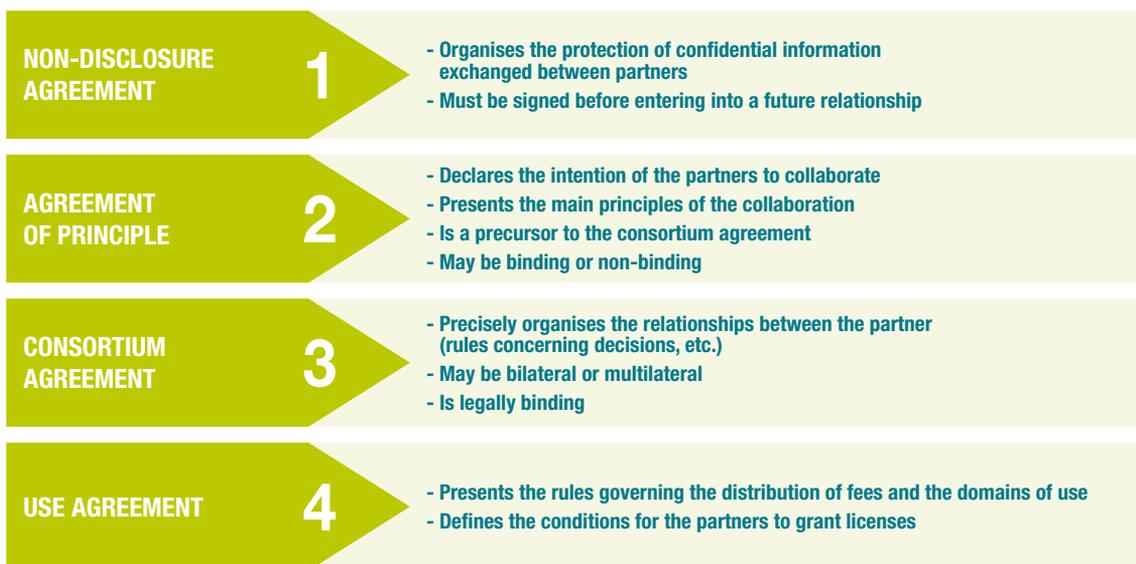
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## IN WHAT STAGES OF THE COLLABORATIVE PROJECT ARE THE PERSON/PEOPLE IN CHARGE OF IP IN YOUR STRUCTURE INVOLVED?



### Definition of the rules upstream of the collaboration is a key success factor for the partnership

The need to define a detailed framework for the collaborative project generates a process with several milestones featuring agreements. Typically, **four types of contracts** are signed: a non-disclosure agreement during the initial discussions; an agreement of principle when the partners have defined the main points of their future collaboration; a consortium agreement setting out these main points; then a licensing agreement, setting out the rules for the use of the IP generated by the project.



The question of **disclosure** must be handled at the start of negotiations. This point becomes critical when each of the partners must declare the background that will be used to complete the project correctly and use the results. Effectively, this background includes secret knowledge (therefore not patented) considered as know-how that will be made available to each of the partners. The partners must therefore make a strict commitment concerning the manner in which they will use the know-how in this project.

In general, the consortium agreement specifies the choices the partners make concerning the following points:

- **The context of the research activities**

The objective of the partnership and its duration are the first points to be defined.

- **The rules of governance for the collaboration**

The partners must appoint at least a project manager and a steering committee.

The role of the committee, the decision rules and the frequency of the meetings must be clearly set out.

- **The rules concerning modification/change of partners**

New partners may for example be invited to participate in a project depending on the results achieved. It is important to define the rules that will enable these partners to take part in the consortium activities prior to their joining.

- **Partner contributions**

The contribution of each partner must be clearly defined. These contributions may take various forms: human, financial, equipment, trademarks, etc.

- **Intellectual property relating to prior knowledge (background) and new knowledge (foreground and sideground)**

It is fundamental to clearly define the contributions of each partner in terms of IP and the conditions under which their contributions are used. Similarly, the consortium agreement clearly sets out the rule of ownership of the new knowledge and its use by the partners or by third parties.

The UNIR case study following illustrates a collaborative project between competitors in the agriculture and food industry. It highlights the need for a clear definition of the framework of the collaboration.

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## Consortium between competitors

### UNIR

(Ultrapropre – Nutrition – Industrie – Recherche) (Ultra-clean – Nutrition – Industry – Research)

#### Stakeholders involved:



#### *What are the context and objectives of the project?*

The UNIR consortium was created in 1991, an initiative of the French ministries for Agriculture, Research and Industry. It brought together nine industrials belonging to **seven major competing agri-food groups** (Danone, Fleury Michon, Pernod Ricard, Sodiaal, Soparind Bongrain, Socopa, Soprat) and public institutions such as CEA, INRA and CNRS.

The main issue at hand was **to improve hygienic conditions in the preparation and conditioning of food products**, reconciling bacteriological safety with the taste and quality of foods and beverages.

UNIR was 60% financed by its members, the other 40% coming from subsidies from the ministries indicated previously.

For six years the consortium ran about 30 different programmes, representing almost 90 research projects carried out either by its members, or by public/private research organisations.

R&D work was undertaken concerning the preparation and conditioning of foodstuffs and beverages to protect them from all forms of contamination. The research projects covered:

- The analysis of interfaces between products and packaging.
- The management of air on production sites and the control of airborne contamination during the transformation of the food products.
- The hygiene-oriented design of equipment.
- Cleaning and disinfection.
- Prediction, rapid detection and monitoring of microbial activity.
- The analysis of the composition of flora residing in work areas and the identification of means to control it.

These problems were shared by all stakeholders involved in UNIR and brought together industrials in competition in order to conserve the market where they all operated. This alliance could seem **somewhat unnatural as it involves competitors** working together, but it seems essential to each of them due to the strategic importance of food safety and hygiene in their respective activities.

### *What were the characteristics of the collaboration as regards intellectual property?*

The first phase of negotiation consisted in **clearly defining a framework for collaboration**. Therefore, the first six months of the joint work was devoted to defining:

- Governance methods.
- Research themes in order to submit requests for financial backing.
- The collaborative agreements.

The private industrial partners formed a **consortium**, responsible for handling the issues of intellectual property, amongst others. The consortium also defined the framework agreements with the public laboratories. The consortium was the single point of contact for all partners, which greatly simplified communication. The decisions were taken by an **administrative board** comprising a representative of each partner (R&D director, industrial director, CFO), under the supervision of an inter-ministerial steering committee.

Three types of projects were undertaken during the programme:

- Projects involving all partners.
- Projects concerning only certain partners, referred to as associative projects.
- Projects specific to a certain partner.

**The modular architecture** of the consortium enabled projects to be developed easily, whatever the number of participants. The results produced generated the filing of **15 patent applications** on behalf of UNIR.

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## What lessons and best practices can be drawn from this collaboration in terms of intellectual property management?

The first best practice is in the definition of a **robust and clear cooperation framework**. During the first six months, which were devoted to defining the framework and the legal aspects of the project, solid foundations were created to ensure the collaboration was a success. Through these efforts, several important aspects were defined: the mechanisms to identify research domains, which partners would take part in each project and the validation of the contributions of each partner.

**Mechanisms to encourage collaboration** were established with public partners, to ensure that as the number of partners grew, so did the financial assistance received.

The efficiency of the collaboration depended on the partners' **transparent and honest approach to the hygiene problems they encountered** in the preparation and packing of food products. The transparency and dialogue were difficult to implement initially but were strongly supported by highly dissuasive non-disclosure clauses.

**The modular architecture** (joint projects, associative projects or specific projects) of the consortium offered the room for manoeuvre needed by the partners to decide whether to commit to a project or not.

Lastly, **each research project was run by a leader** from amongst the industrials, considered by its peers in the consortium to be the most apt. Within the project technical committee, this leader was responsible for the operational management of the joint teams, which often worked together in the R&D centre of one of the partners.

## What were the benefits/results of the collaborative work?

In the opinion of its Chairman, Patrice Robichon, *“UNIR developed a global concept of ultra-clean work areas that clearly set itself apart from of clean rooms customarily seen in the food industry. The processes we developed associate close protection of the food products and hygiene-oriented equipment design. For example, UNIR developed a multi-blade ultrasonic slicing process. This ensures optimum regularity of slicing, while reducing the risks of clogging the blades and therefore the risk of product contamination.”*

### Patrice Robichon, chairman of UNIR, Scientific Advisor to Pernod Ricard

*“The success of project like this depended on the fact that it was a subject that created a common interest for the various partners who were in competition. This consortium paved the way to other collaborative projects: the scientific interest grouping Sym'Previus is a direct descendent of the UNIR programme. It is a national predictive microbiology network, which has used contributions from UNIR to develop tools to assist expert management of food safety, enabling the reduction of lead times and the number of experimental tests.”*

UNIR also decided to propose the results of its research and its patented technologies to all companies concerned by living matter: the food industry, pharmaceuticals, biotechnology, health.

The results of collaborative work projects can give rise to the signature of use agreements.

The people we met underline the interest in using standard contracts, to save time in negotiations. However, it is primordial that these contracts are flexible and enable the insertion of additional clauses and amendments according to progress on the project, such as use agreements. On this point, we observe a certain willingness on the part of the public sector to develop standard contracts in order to avoid having to redefine the major principles of each partnership. For large groups, most of them possess a large array of standard contracts, such as non-disclosure agreements, specific contracts according to the partners.

### **It is essential to identify the right moment to create value from the invention and to determine how IP rights are shared**

It is vital to draft the contracts according to the state of advancement in the collaborative project.

The use agreement, the last contract to be signed, must be drafted at the most opportune time. This may be delicate to determine. All the more so that in upstream research phases, it is as difficult to draft a use agreement at the start of the partnership as the vision of the market is distant. In this case, it may be interesting to limit the scope to possible domains of use and to leave openings for future contracts when partners will have a clearer vision of the potential products or services.

### **The deployment of a structured IP management process and the creation of joint teams are essential for efficient integration**

66% of interviewees said they had set up structured approaches for collaborative projects, including IP management processes.

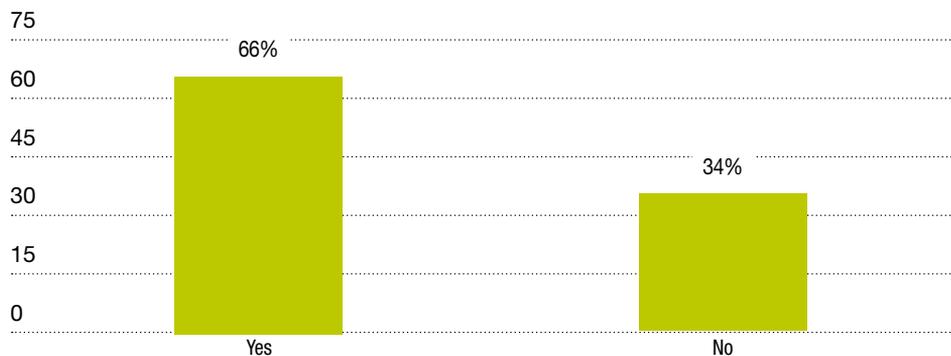
Of the 34% who had not yet done so, over half aim to develop such approaches in the next five years. These results promote the professionalisation of IP management and the strategic importance that it has come to have.

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## HAVE YOU DEFINED A FRAMEWORK OF RULES AND IP MANAGEMENT PRINCIPLES FOR COLLABORATIVE PROJECTS?

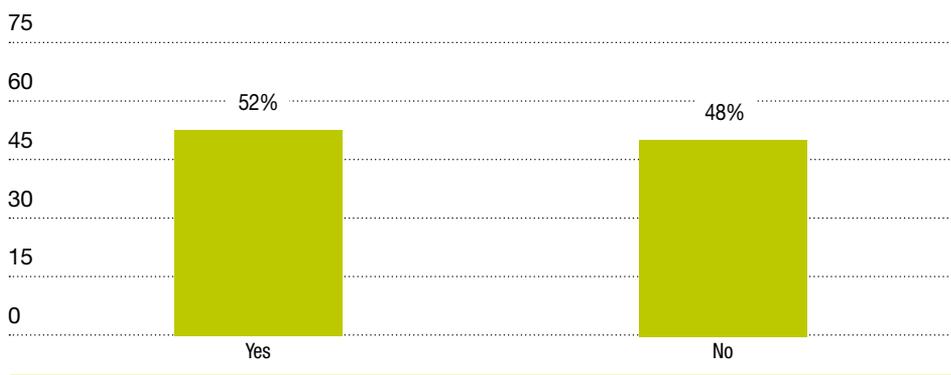
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## IF NOT, DO YOU INTEND TO DEVELOP ONE IN THE FUTURE?

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A structured IP management process, which can even be based on a workflow system, serves to ensure the involvement of IP teams at all critical moments of the collaborative innovation process. It also has the benefit of simplifying the preliminary work for all collaborative projects, such as the determination of each partner's background. Note that lab notebooks and Soleau envelopes are often used to this end.

Soleau envelopes filed at the INPI serve to prove the state of knowledge at a given date. For lab notebooks, it is essential to keep them in compliance with the standards applicable in the countries concerned, especially in international partnerships

A typical IP integration process, from the initial idea to commercial use on the market, is illustrated below.

	Idea for theme of collaborative project	Research then development	Commercial launch of the innovation	Commercial use of the innovation
Key issues	Search for existing solutions, prior art Analyse legal feasibility No-go on channels blocked by IP rights	Do R&D work concerning the product/service targeted by the partners and retain proof of dates of creation Establish a strategy to protect innovations elaborated within the collaborative project	Protect innovations in France and internationally	Support growth in market share Monitor technical developments and market trends Manage reduction in market share then withdrawal from market
IP actions to take	Use patent databases to do research Verify freedom to operate to avoid infringing	File Soleau envelopes, use lab notebooks Define the method used to protect the innovation: keep it secret, opt for IP or disclose/publish without protection	Prepare and file industrial property applications Extend protection to other countries within the priority period	Maintain IP rights (payment of renewal fees) Monitor markets and fight counterfeiting Create value from IP assets: licensing or assignment Abandon rights to public domain

Source: INPI Campus.

While on the subject, we observe that very few start-up companies and SMEs have defined a framework for IP management for collaborative projects, mainly for reasons of scarce resources, which are forcibly more limited in small structures. These questions are most often handled informally on a case by case basis. Where necessary, actions are taken as reactions, in response to requests from a partner who is more experienced in the matter or from a financial partner who conditions their participation on IP being integrated correctly.

A lever that enables efficient integration seems to be the development of joint teams, a choice that is made by certain structures that we met. For example, these teams may feature:

- An R&D engineer and a patent engineer working together.
- An R&D engineer, a buyer and an IP manager (especially in a partnership with suppliers).

Often the IP manager adopts an oversight role due to their multi-disciplinary vision.

## 2.4 Develop an internal intellectual property culture

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### Overview

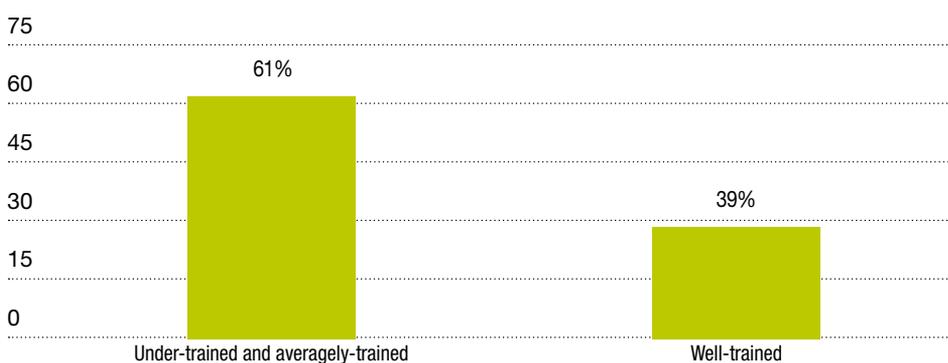
If for the majority IP is considered a major issue, the “IP culture” is not yet sufficiently generalised throughout organisations. Of course, this issue must be approached differently depending on the size of the entity, the organisational methods and the resources available. Toolboxes exist, whether for training, incentive programmes, management tools, etc., but a wider deployment and greater sharing of experience would be useful.

### A growing number of businesses are setting up training plans to develop knowledge of the issues surrounding intellectual property

61% of interviewees consider that their teams involved in partnership projects have received little or no training on IP issues. If we only consider research organisations, this percentage rises to 76%. It is true that this matter is not always correctly integrated in initial training, or even in higher education. Furthermore, IP is only covered from a legal and procedural point of view, and its interaction with company strategy is barely covered.

### ARE TEAMS INVOLVED IN COLLABORATIVE INNOVATION PROJECTS WELL TRAINED IN MATTERS OF IP ISSUES?

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To remedy this lack, certain large businesses have set up IP training plans for their employees. Such training covers a wide range of R&D functions and is sometimes extended to other enterprise functions (e.g. production) that participate in the innovation approach. These training plans are generally long-term (on average two to three years) and are supported by general management.

The courses feature various modules (quizzes with prizes, e-learning, group training, but also raising awareness of members of the executive committee). They are accompanied by internal communication campaigns via newsletters or email campaigns. Raising IP awareness can start with new hires, simply by providing them with a welcome pack that underlines the strategic importance of IP.

Full IP training should provide employees with knowledge of the basic concepts (monopoly and freedom to operate, counterfeiting, etc.), the tools (means of protection/proof, patent vs. trade secret, etc.) and their practical implementation (what to protect, why, when, how and at what cost), IP management in relationships between stakeholders (especially in a contractual framework), commercialization (licensing, assignment). The subject is vast and relatively complex. It requires a modular training approach as the expected level of skills is not the same for commercial employees as it is for research staff with a role devoted to invention.

### **Knowledge and collaboration management tools are an efficient lever to accompany this movement**

Amongst the IP practitioners interviewed, certain have developed tools and approaches that facilitate the assimilation of IP concepts by engineers. For example, a French stakeholder has set up a process suited to the management of collaborative projects, which project managers must follow and validate with IP managers. This process was deliberately designed to be similar to the V-cycle or V-model\*, a conceptual project-management model well-known to engineers, in order to facilitate their assimilation of this process.

Such management tools also serve to keep data concerning projects in the event employees change, thereby ensuring continuity in projects and deadlines are respected.

They also enable optimal management of collaborative projects. For example, using dashboard performance indicators, management can view the following information in real time:

- Number of partnerships currently under negotiation.
- Number of partnerships agreements signed.
- Partnerships with a given organisation.
- Number of non-disclosure agreements signed.
- State of progress on a project, etc.

Using these tools, the IP department can see exactly who is involved on what collaborative projects and therefore manage the network to raise awareness on specific point, update knowledge, apply new regulations, etc.

The R&D department and general management also use such indicators to efficiently manage research activities.

For small structures, the smaller volume of research activities enables a lighter management approach. The main issue consists in ensuring a certain level of quality in the monitoring of innovative projects, whether it concerns traceability or reporting. It is of course essential that IP aspects are explicitly taken into account and that an expert assessment (often external) is done as soon as a critical point is identified.

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\* See glossary

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## **Award programmes encourage the development of collaborative innovation and integrate IP management best practices**

Like award programmes to reward the best innovators or best researchers, programmes are being developed to promote collaborative innovation. Prizes are now sometimes used to reward the “best collaborative project manager”. The selection criteria typically include:

- Respect of deadlines.
- Respect of objectives.
- Management of relations with partner(s).
- Respect of processes.
- Intellectual property management.

## **In SMEs, IP culture is vastly fragmented**

The degree of integration of IP issues can vary greatly depending on the company in question. SMEs active in mature sectors, essentially positioned as subcontractors of large order-placers, often have an under-developed IP culture. Inversely, certain SME specialised in the design of technically complex products have perfectly integrated these issues and regularly protect their work with patents.

We can nonetheless underline two aspects common to all SMEs:

- According to a study carried out jointly by OSEO and the INPI in 2009, in eight SMEs out of 10, it is the company CEO him/herself who manages IP activities. The enterprise culture in this domain is therefore highly dependent on the sensitivity of the CEO to this matter.
- Globally, there is an increased awareness of the need to innovate in an uncertain economic climate where competition is fierce. This is resulting in the continued growth of SME membership of competitiveness clusters. In this framework, the ramping up of SME innovation capacities must be accompanied by more extensive integration of the issues surrounding IP.

The following case study illustrates how a partnership between an SME (Ryb) and a research body (CEA) was run, in particular in terms of IP management.

## Partnership between an SME and a research body

### Ryb and CEA-LETI

#### Stakeholders involved:

Ryb	CEA-LETI
Business based in Isère, France, founded in 1962	Public scientific research body
Specialist in polyethylene duct-work systems	Microelectronics, micro- and nano-technologies
130 employees	1,335 employees (LETI)
€40 million sales in 2010	Budget €250M
	Member of Carnot Institutes network

#### What are the context and objectives of the project?

The initial motivation was the desire of Ryb, a plastics manufacturer specialising in duct-work, to **raise the added value of its products** and thereby to justify maintaining its production facilities in France.

The CEO of Ryb took the initiative of contacting CEA in Grenoble after a public presentation in 2006 by the director of Technology Research on relationships between the CEA and SMEs. Ryb expressed its specific need, of being able to detect its plastic pipes underground in different types of soils, more specifically to identify and locate pipes with an accuracy of 20 cm at 1 metre underground. The company had therefore identified the function it needed, but had no idea of how to achieve it. An electronic solution was nonetheless considered.

Ryb opted to work with LETI (Carnot Institute CEA-LETI) as its **exclusive partner** for this project. The skills areas of the lab (short-distance communications, localisation and integration of components in materials) and its geographical location near to Ryb were an important factor in this choice.

The project started with a feasibility study on remote detection, exploring several technological avenues, and was completed in phases with several Go/No Go decisions bases on a SWOT (strengths, weaknesses, opportunities, threats) analysis, which then enabled the partners to start development work on the technical solution.

The final solution adopted was RFID chips, an existing technology but which needed adaptation and improvement to satisfy the exacting specifications of Ryb. The project was initiated in early 2007 and the product (commercial name: Eliot) was presented to the public at the Pollutec trade show in November 2011.

### *What were the characteristics of the collaboration as regards intellectual property?*

The negotiations between CEA and Ryb lasted for approximately 18 months. During this phase, all the technical content of the mission and the methods of sharing the industrial property were developed in parallel. On this second point, it was necessary to carefully and precisely define the field of application that would encompass the IP rights generated. It was decided that Ryb would be able to patent the inventions it owned. All these terms were integrated into the collaborative work agreement signed by the parties.

Ryb supplied most of the financial support for the project, making use of the CIR Research tax credit to cover a large part of its expenditure. As for LETI, the main contribution from the CEA lab was the method and the prototypes for the detection solution, while Ryb supplied the duct work and an experimentation area with trenches for life-size testing.

Consideration of the possibility of filing patent applications came into the picture when the solution was being developed. CEA research personnel were a source of ideas for inventions that could be patented at each milestone.

The project resulted in the filing of a patent application by Ryb and three others by the CEA, on which the plastics company would be granted a license restricted to its area of activity, for a suitable fee. Currently, Ryb is studying the possibility of filing additional patent applications concerning developments in progress, and has also registered the Eliot trademark.

### *What lessons and best practices can be drawn from this collaboration in terms of intellectual property management?*

For Ryb, the aim was to protect the invention using a patent, in order to prevent competitors using the same technology. The IP generated was managed transparently with the CEA; LETI was assisted by its legal department while Ryb was assisted by its own IP attorney. These two parties were involved at different stages of the project:

- For the definition and validation of the terms of sharing future IP.
- For the definition of the subject matter when the patent applications were filed.

**The terms for sharing were validated rapidly** for inclusion in the collaborative work agreement. It is true that this was a bilateral agreement outside of a predefined framework, as is the case for co-financed projects (such as ANR or FUI projects), which simplified the negotiation framework. Moreover, it should be noted that the CEA imposes that a minimum amount of research be done on the state of the art, work which is updated regularly and which serves to **identify prior patents**.

Subsequently, when the first results from the project were generated, the definition of the subject matter to protect depended largely on brainstorming sessions to ensure the most complete protection of the inventions possible.

## *What were the benefits/results of the collaborative work ?*

This collaborative project resulted in the invention of a saleable product, now marketed under the trademark Eliot. Furthermore, one of the research engineers at the CEA-LETI Carnot Institute received the FIEEC first prize for applied research for his work on signal processing, electromagnetic applications and the RFID techniques used in the Eliot system.

### **Marc Palomares, Technical Director of Ryb**

*“Through our experience on this project, our business is now better equipped in terms of collaborative innovation; the company is more familiar with this type of approach and we can better appreciate the obstacles that need to be managed, especially in terms of monitoring the implementation of the project. IP was managed efficiently because the rules of sharing were clearly defined before work was started. No unpleasant surprises were waiting for us round the corner. It really is essential.”*

### **Pierre-Damien Berger, Research scientist at CEA-LETI**

*“The project specifications are a critical point, so suitable time and effort must be devoted to them during the negotiations. Also, the fact that the organisation retains ownership of at least a part of the IP generated enables it to commercialize it in other domains than those covered by its industrial partner.”*

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## 2.5 Define suitable governance

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### Overview

Traditionally, the IP function is often perceived as a legal function and a support function with an almost administrative nature. This model needs to evolve extensively, due to on one hand the appearance within organisations of departments expressly devoted to collaborative innovation, and on the other to the ramping up of the role of IP in terms of protection and intelligence.

Naturally, the almost organic association between the R&D department and the IP teams is more than ever a hot topic, but greater awareness of the extensive issues surrounding IP should logically have implications from an organisational standpoint, based on the principle of closer relations between the IP function and general management. For large companies, this would involve changes in structures and governance; for SMEs, the CEO is and will remain the focal point of these questions. In general, a major difference in maturity can be observed between the strategic and operational layers of organisations, whether private or public.

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### The closeness of IP and R&D teams in the organisation favours efficient integration of intellectual property in collaborative innovation

In our interviews, we mainly encountered two possibilities for IP team attachment in businesses and research organisations: they can report either to the R&D department or the legal department.

Whatever the attachment, our respondents underlined the importance of close relationships between R&D teams and IP teams.

We often noted that the protection of trademarks and designs was entrusted to the legal department, whereas patents remained in the hands of the IP department, attached to a technical department. In this configuration, coordination between the two activities is a matter of debate for our respondents: certain patent managers think that the association is pointless, while others are convinced that coordination is vital, especially when the technical offering is identified by the company's trademarks. In the event of licensing agreements covering patents, trademarks and designs, the need to coordinate these two activities is paramount.

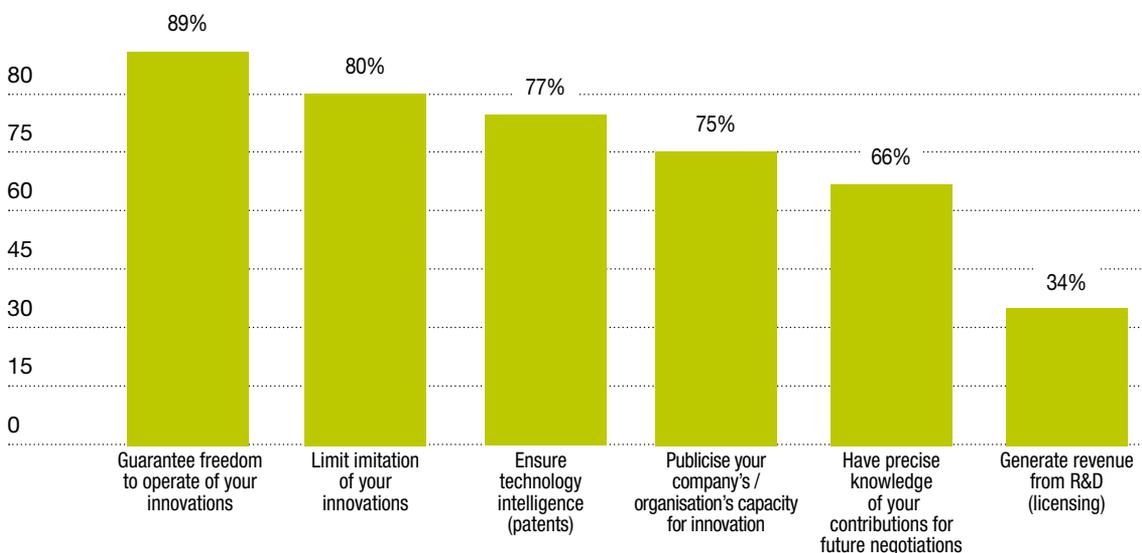
## The issues of intellectual property

The main issues that are sought to be solved through the implementation of a structured IP management policy are:

- To guarantee the freedom to operate of the innovations generated. 89% of respondents consider this issue as a priority.
- To limit the imitation of their innovative products and/or services. This statement is all the more true in light of the growing influence of products and services originating from countries that have little respect for IP.
- To produce technology intelligence. A substantial number of entities acknowledge that their patent intelligence activity is more or less regular, with the intention of either identifying competitors, or new innovations that may be useful in their line of business. In this case, technology intelligence also serves to identify new potential partnerships (see part 2.7). IP and technology/business intelligence feed each other: In-depth analysis of the state of the art and of the competition is a prerequisite to any decision concerning IP matters. Reciprocally, patents represent an unrivalled source of technology intelligence.

## WHAT ARE YOUR KEY ISSUES IN TERMS OF INTELLECTUAL PROPERTY?

(several answers possible)



It is important to note that these issues may differ within a single structure. For example, certain departments may be active in areas that facilitate licensing, while others not.

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Concerning licensing, a practice that is tending to expand, we can observe two levels of objectives depending on the maturity of this activity:

- Level 1: licensing revenues must cover IP expenditure (team activities and renewal fees).
- Level 2: revenues must finance other R&D projects. This second level supposes high licensing volumes.

In order to generate financial returns from IP, the new function of “monetisation engineer” is emerging. Certain respondents have created such new positions in their organisations but acknowledge certain difficulties in finding suitable candidates with the necessary training and experience to fulfil the objectives of this emerging role.

Another growing trend is the growing number of structures that use IP as a method of publicising their capacity for innovation, either to financial markets, or to current/future employees. For start-up companies and SMEs, this communication is an important issue. For them, IP represents an intangible asset that can be used to seek funding from investors.

### **Intellectual property occupies an increasingly strategic position in organisations**

IP is no longer seen as a support function kept separate from general management. Traditional patent portfolio management now has to integrate commercialization issues and the discovery of strategic innovations (for example business intelligence via patent intelligence), which represent major areas of development for the businesses and organisations we met.

In general, two solutions are adopted to bring the IP function closer to management instances:

- The IP department is attached to a member of the general management via the technical department or the legal department.
- Patent/IP committees are chaired by a member of the general management, generally the technical director or the R&D director.

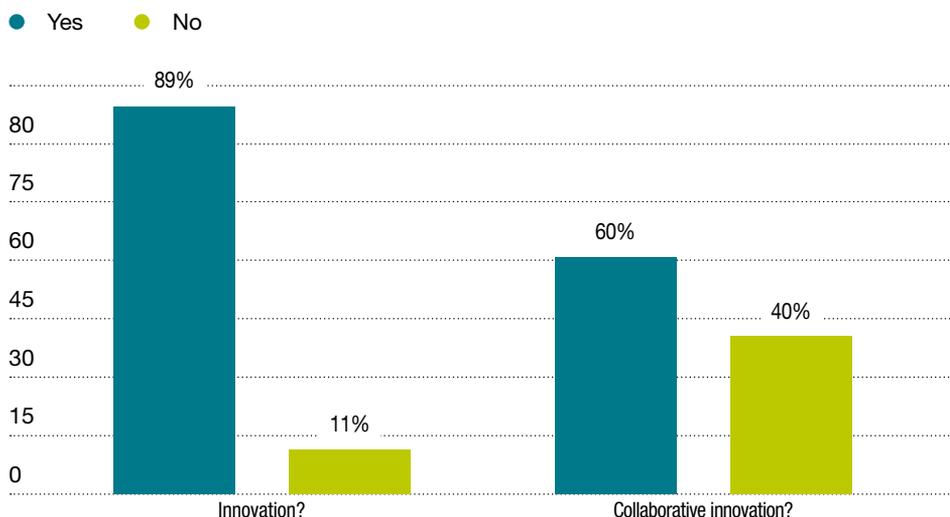
Moreover, we note that for a great many businesses, the IP department is one of the functions where staff levels have grown over the past few years, a sign perhaps of the strategic importance that the IP management activity has taken on.

### **The implementation of a function dedicated to collaborative innovation is an increasingly popular practice**

Of the structures we interviewed, 60% declare that they have a function dedicated to collaborative innovation, and 89% say they have a function dedicated to innovation.

### WITHIN YOUR BUSINESS/ORGANISATION DO YOU HAVE A FUNCTION DEDICATED TO MANAGING:

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The creation of the Innovation Manager function is a relatively recent trend in business and illustrates the rising awareness of the strategic nature of innovation.

This function first appeared in organisational structure charts a few years ago, but still covers a wide variety of fields of responsibility.

Often, the managers of other functions also wear the innovation hat (IT system manager, director of strategy, purchasing director, etc.). A few rare businesses have actually clearly defined the role, the resources and the responsibilities of such a function, and have assigned a dedicated person to it.

It is also often the case that in these structures we find a collaborative innovation manager. This responsibility is sometimes considered akin to the strategic partnership department, which unfortunately only covers a portion of the issues at hand.

For the most progressive businesses, the role of a collaborative innovation department may cover the following points:

- Identification of potential partners outside of historical or traditional partnerships for the industry concerned.
  - Assistance in the implementation of collaborative projects.
  - Management of partner relationships.
  - Development of collaborative tools that improve the efficiency of collaborative work.
  - Understanding and adaptation of IP management strategies to the different possible scenarios for collaborative innovation (with academic partners, suppliers, customers, competitors, etc.).
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We observe that a collaborative innovation department does not necessarily need to be big, but that it needs to participate in defining the orientations to adopt in order to support enterprise strategy, based on the ecosystem in which it is active.

### **For innovative SMEs, intellectual property is strategic, but they often lack the human and financial resources necessary to manage it effectively**

As mentioned earlier, one of the essential conditions for good IP management within SMEs is above all the awareness of the CEO, along with the time and resources that they decide to allocate. Of course, this culture must be shared with employees. In the vast majority of cases, the size of the IP portfolio and the annual number of IP filings do not justify the creation of a formal internal structure to deal with these questions. The use of IP attorneys and external assistance is often the case.

On this matter, we must also underline the existence of several possibilities of public support: IP pre-diagnoses proposed by the INPI, financial support proposed by OSEO for the filing of a first patent application, eligibility of IP spending for awards from the national competition for aid in the creation of innovative technology companies, research tax credit (CIR), and public co-financing programmes for innovative projects. With these multiple possibilities, the first difficulty for SMEs is to ensure clear visibility and good understanding of all the existing opportunities for assistance.

### **The strategic place of IP must be acknowledged at all levels of the organisation**

Understanding of the strategic nature of IP is not homogeneous at all levels of any organisation, whether public or private. This can be felt in the degree of maturity of interviewees on the subject when we get closer to the operational echelons, where most often the youngest employees are active.

Historically, IP management is still too often associated to a legal function and is considered an “administrative” hindrance by operational personnel in the field.

Nonetheless, good IP management requires excellent understanding of the strategic issues that affect the company/organisation and its markets. These skills require the involvement of versatile profiles and wide knowledge of the business, which is not always the case with younger personnel.

One of our respondents, an ex-legal director of large groups, acknowledged that for a young company attorney, an assignment to R&D support was not considered to be the most “prestigious” of postings, as opposed to an assignment to support commercial activities.

The rising awareness of the eminently strategic nature of IP should contribute to change this situation and enable businesses to attract the best technical and legal talents to this function.

## 2.6 Develop an innovation culture shared with partners

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### Overview

As in other legal areas, robust IP management depends on a visible paradox: efficient management of the very formal, legal framework associated to IP matters must be accompanied by the construction of a relationship of trust between partners, which is informal and subjective. In practice, development of a joint culture is a decisive advantage in overcoming obstacles and generating understanding in situations where a mere legal approach cannot provide a suitable response on its own. This supposes, not only that each stakeholder has developed its own IP and innovation culture, but also that mutual and reciprocal knowledge between partners is sufficient to render IP negotiations painless.

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### **A lack of knowledge of the partner is often an obstacle to collaboration and becomes firmer in the negotiation of ownership of intellectual property rights.**

Trust between partners is a major condition for efficient collaborations. This trust can only be earned over time. Partners come to understand each other and gain clearer insight of their respective objectives, especially in terms of IP.

However, new partners have not yet had the time to develop this mutual knowledge. In this respect, one particular initiative seemed particularly interesting to us. A large French group took the decision to propose training for its internal staff and external partners, in order to develop a common understanding for future collaborative projects. Training sessions have now existed for over three years, covering theoretical and practical aspects of IP. These sessions enable role play in real-life situations (e.g. simulated negotiations with a supplier, a customer and a research organisation). During the role play, multi-disciplinary teams comprising buyers, technical project managers and legal staff interact to find out how the other team functions.

The results of this initiative are noteworthy: the group has seen fewer obstacles when developing partnerships and project managers are more likely to call the IP department to assist.

The following case study, concerning the Iseult programme, is characterised by the fact that the partners involved had no previous knowledge of each other. It illustrates certain best practices to adopt in this situation.

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## Consortium

### Iseult programme

#### Stakeholders involved

##### Guerbet

French group founded in 1926

Medical imaging, expert in research and development of contrast media

1,400 employees

€378 million sales in 2011

##### Siemens

German group founded in 1847

High tech, industry, energy and health, medical equipment

430,000 employees

€76 billion sales in 2010

##### Bruker

German group founded in 1960

Scientific instrumentation, (magnetic resonance, X-rays), pre-clinic MRI and spectroscopic lab equipment

5,400 employees

€1.3 billion sales in 2010

##### CEA

Atomic Energy and Alternative Energies Commission

Public scientific research body

Low-carbon emission energies, information and health technologies; very large research infrastructures (TGIR), defence and global safety

15,867 employees

Budget €4.3 billion in 2012

##### University of Freiburg

German public university founded in 1457

Medical physics, radiology, simulation

18 research centres

## *What are the context and objectives of the project?*

The aim of the Iseult programme is to **improve the diagnosis of neurological pathologies using high-field MRI**. Two lines of progress have been identified: magnetic resonance imaging (MRI) procedures and contrast agents. The aim is to enable early detection of Alzheimer's disease, strokes and brain tumours.

The project was initiated in 2006 for a 10-year period. It brings together **five stakeholders who had never worked together before**, two French (CEA, Guerbet) and three German (Siemens, Bruker and the University of Freiburg). On the French side, Guerbet is the leader of the research programme financed by OSEO Innovation.

The contributions from the partners are **highly complementary**:

- Guerbet developed new contrast agents for MRI molecular imaging suited to high magnetic field applications.
- The CEA, at its NeuroSpin research centre in Saclay, developed a very high MRI system (11.7 T) that is unique in the world.
- Siemens and the CEA developed the specific instrumentation and image analysis tools required to use the contrast agents produced by Guerbet under the Iseult programme.
- Bruker, Siemens and the University of Freiburg developed the instrumentation and image analysis tools required for the 7T imaging systems, to make them more accessible in clinical routines.

Through this programme, the partners receive **financial support from the French state** (via OSEO Innovation) **and the German state** (via the BMBF, Ministry for Research and Education). On the French side, the programme budget amounts to €110 million, 50% of which is provided by the French state (€35 million for Guerbet and €20 million for the CEA) and 50% by the two entities themselves. The German contribution amounts to €15 million.

## *What were the characteristics of the collaboration as regards intellectual property?*

The initial contact was made in 2006, at a time when French-German R&D projects were receiving strong encouragement. The first discussions centred on the scientific objectives and the possible funding methods.

The **funding request** was submitted in the first quarter of 2006 and was approved mid-year. The subsequent negotiations concerning a **consortium agreement** started in late 2006. A **member priority clause** was inserted: in the event of an exclusive licensing or sale of a new product generated by the Iseult research by a partner, the other partners would be granted priority for the commercial use of the product.

The consortium agreement binding the five partners was signed in May 2007. Intentionally short (17 clauses, nine of which principal clauses; 10 pages), it covers the issues of intellectual property in a global approach and enables the possibility of concluding more specific **bilateral consortium agreements**.

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Guerbet and the CEA signed such a 50-page consortium agreement in April 2008. It set out the rules concerning the ownership and commercialization of IP, as well as non-disclosure clauses. The foundations of the **future licensing contracts**, dependent on the progress in research, were therefore laid down.

A specific clause was inserted: in the event that patents generated by the programme were not used, **OSEO would be able to offer them to a third party**. Guerbet and the CEA nonetheless retained the possibility of refusing licensing to this third party on justified grounds.

A consortium agreement was also signed between the CEA and Siemens, integrating the intellectual property dimension. This agreement was more difficult to achieve (12 months of negotiations, with one meeting a month) as the activities of these two stakeholders show greater similarity. The areas in which their backgrounds overlapped were numerous, which required long discussions between the partners.

Since the project started, **Guerbet has filed four patent applications and the CEA has filed 15**. As the domains of each partner were clearly defined, no patent applications were filed under joint ownership. Consequently, the use of the patent is granted to the applicant. Where necessary, the partners have priority access.

### *What lessons and best practices can be drawn from this collaboration in terms of intellectual property management?*

Effective and efficient negotiations depend on having **strong knowledge of partners**. Amongst other things, this serves to establish the relationship of trust required to ensure a successful outcome of any collaborative project. Extensive understanding of each other's respective fields of expertise fosters good communication between research teams. Moreover, it is important to have **a complementary and multi-disciplinary negotiation team**, so that partners understand each other's issues (example of the team created by the CEA: R&D project, manager, commercialization manager and legal counsel).

To reach an agreement, the CEA and Siemens decided to **segment their ultimate objective** (very high field clinical MRI system) into **several technical subsystems**. For each of the segments, it was decided that the partner with the most background would undertake the research for this segment and would own the results generated.

During the upstream project phases, it is hard to define the potential for use of the research work. It is therefore important to **sequence negotiations** between partners concerning intellectual property:

- At the start of the programme, define the fields of use for each part and the associated intellectual property rights (i.e. molecular science vs. apparatus to implement the science).
- During the programme, and depending on the results obtained, clarify the licensing modes adopted (base and calculation of fees).

The funding structure for a project has a definite effect on work schedules. It was necessary to obtain the approval of the European Commission to release the funds. It is therefore important for project partners to anticipate these limitations and to share a **joint, realistic schedule**, notably by anticipating the European Commission notification lead times.

To ensure a successful outcome of the project, Guerbet implemented a **high level of integration between R&D and IP teams**, under the coordination of the programme manager. The IP manager is extensively involved in monitoring the progress in research work, in order to take the decision to patent inventions when it is deemed necessary.

**Communication between project managers and research staff** was essential at the start of the programme. Customary work processes and habits were disrupted extensively:

- Need to provide regular communication on the progress in the project and its deliverables to OSEO.
- Mixed collaborative work between Guerbet and CEA on the latter's site.
- Project length and large number of research staff involved (over a hundred).

### *What were the benefits/results of the collaborative work?*

#### **Claire Corot, Guerbet**

*"By associating our skills with those of industrial partners and public research labs, we are now capable of using the potential of the MRI more effectively as a molecular imaging technique.*

*Through this programme, brain pathologies can be detected earlier and extremely precisely. The future belongs to imaging of the infinitely small, with highly sophisticated products that enable us to offer personalised medical diagnoses that are significantly more efficient for patient care.*

*In terms of intellectual property, the research results are fully satisfactory for Guerbet. At this stage, we have filed four patent applications. Without the funding provided, we could not have done such in-depth research nor mobilised such a wide array of skills."*

#### **Franck Lethimonnier, CEA**

*"Iseult enabled us to develop a revolutionary 11.7 Tesla MRI imaging system, which is currently in production. The scientific results are excellent: the work undertaken with the Iseult programme has enabled our research staff to publish several articles. Innovation is not lagging behind, with the filing of 15 patents, for which we are currently negotiating commercialization options.*

*The Iseult programme has enabled us to build relationships of trust with each partner, relationships that will serve as a basis for future collaborative projects."*

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## **In public-private collaborative work, the integration of partners is an efficient vector to build trust**

Throughout our meetings with private and public structures, several partners put forward cultural misunderstandings and divergent objectives as obstacles. To reduce this gap that could hinder the successful completion of collaborative projects, several best practices can be implemented.

Firstly, discussions between private and public research staff enable better understanding of the framework for work and the objectives of each partner (both on an organisational and personal level). We can also point out the benefits of funding doctoral students (CIFRE theses, for example), who may subsequently become full-time employees of private structures and contribute to forming long-term links between the public and private sectors.

Some private-sector engineers also teach, enabling them to remain in ongoing contact with the academic world.

A better cultural alignment that integrates understanding of partner issues should reduce the differences between the visions of private companies, often highly market-oriented, and those of research bodies, often more oriented to upstream research. These differences in standpoints can clearly be seen in negotiations concerning the commercialization of results under collaborative projects.

## **Successful relationships between SMEs and large groups requires a bond of trust between them**

The start-up companies and SMEs we met with often cited a lack of trust towards large groups, mostly due to the fear of being dispossessed of their know-how by much larger structures.

However, benefits can be reaped by such SMEs and start-ups through alliances and collaborative projects with large groups, for two main reasons:

- If patent protection is filed jointly, displaying the name of a large company on patents can be read as a measure of credibility, especially when seeking funds from potential investors.
- Large groups have more human and financial resources to deal with any legal proceedings initiated by a competitor against the small company.

In certain cases, the SME can be positioned as a supplier of a large group. We have observed that this type of collaboration is mostly focused on improving products. This is illustrated by the next case study, which presents the example of collaborative work between an integrator and its suppliers.

## Builder / Integrators and suppliers

### Structuring of an IP management programme

#### Stakeholders involved:

Alstom Transport	Partner stakeholders
French group	SME
World leader in railway industry	Suppliers
26,000 employees in 60 countries	Integrators
€5.3 billion sales	Engineering SME

#### *What are the context and objectives of the project?*

To deal with the rationalisation of R&D projects over the past few years, collaborative innovation has become a necessity to satisfy an ever-growing need for innovation.

Today at Alstom Transport, over 80 new innovative partnerships are created each year, mainly with SMEs and some large groups, the majority of which are not active in the rail transport industry (automotive, aeronautical). This orientation in the choice of partners aims to facilitate and speed up the definition of rights of use in distinct domains.

Several years ago, Alstom Transport decided to increase collaborative innovation projects with its suppliers and high-ranking partners (engineering SMEs and labs).

The result is that the volume of multiple stakeholders involved either directly or indirectly in complex collaborative projects rapidly led Alstom Transport to develop a highly structured approach to implementing these partnerships and the management of intellectual property.

To manage innovative partnerships, collaborative innovation projects and partnership contracts, the IP manager naturally assumed the role of conductor to coordinate this orchestra of participants. Around a hundred R&D / Sourcing project managers received in-depth training in setting up partnerships and in negotiating IP strategies, to make it easier to manage all the collaborative innovation projects.

The strategic position given to IP in collaborative projects received a huge boost from the technical and legal departments five years ago, which has enabled the company to achieve extensive maturity in the matter today.

## *What were the characteristics of the approach?*

**The approach featured four main orientations:**

### **1) Training**

- An intensive training programme on setting up partnerships, IP strategy negotiation and contracts was initiated three years ago. Today, almost 150 project managers have been trained.
- The training includes role-play exercises to simulate actual situations.
- Legal staff also attend training alongside other participants.
- Special effort is made to integrate partners into the programme so that they share the common language and culture concerning IP aspects.

### **2) Development and management of a community**

- Federating the technical, legal and IP functions was possible through the setting up and running of a community.
- Regular work by the members of this community enables better understanding and integration of the restrictions and issues of each function and facilitates the inclusion of IP issues well upstream in the project process.
- Legal officers are also members of the community to avoid a tendency to work in silos.

### **3) Definition of a structured process at the core of all project work concerning the establishment of partnerships, the definition and negotiation of IP strategies and conclusion of contracts**

- A structured process was documented, setting out when and how IP is involved for each step of a project. The process adopts a V-cycle or V-model\* approach as project managers often use this process model in project management. The process was then implemented as a workflow, using a collaborative platform accessible by all stakeholders in the company.
- Through this collaborative platform and the workflow organisation, each stakeholder is involved and knows when to take action. Communication with partners is managed and tracked in this framework.
- The collaborative platform also enables project managers to manage deliverables produced by the partnership and inventors to declare their inventions in order to evaluate and protect them.
- Management (all the way up to general management) has dashboard indicators to monitor the progress made on collaborative projects and the resulting innovations, so senior echelons can feel more involved.

### **4) Deployment of an awareness and award programme**

- As IP is placed at the heart of the innovation activity, actions to raise employee awareness are constant, through communication campaigns.
- An award programme has also been set up to reward virtuous behaviour.

**A work group steered by the IP function (which implies the deployment of an IP management approach in the company) enabled:**

- The definition of a general layout for the organisation, the creation of partnerships, the definition and negotiation of IP strategies and the conclusion of contracts for collaborative work and use of the results.
- The structuring of how relationships work between the stakeholders involved within the company and partners.

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\* See glossary

*“Passenger Comfort-Lighting” collaborative project, concerning materials, processes and components for energy-saving lighting systems.*

As an example, the following table illustrates the IP strategies deployed under this collaborative project.

	Collaboration			Deliverable
Programme	<b>OWN PROCESSES</b> <b>COATINGS</b> - Fibre - Fabric - LEDs - Connections - Other <b>ASSOCIATED PROCESSES</b>	<b>OWN PROCESSES</b> <b>PARTS</b> - Plastic - Glass - LEDs - Connections - Other <b>ASSOCIATED PROCESSES</b>	<b>OWN PROCESSES</b> <b>COMPONENTS</b> - Ceilings - Bays - Doors - Baggage racks - Other <b>ASSOCIATED PROCESSES</b>	
Partners	<b>Engineering</b> Alstom / Rank 1 engineering	<b>Suppliers</b> Alstom / Rank 1 supplier Alstom / Rank 2 supplier	<b>Integrators</b> Alstom / Rank 3 supplier Alstom / Rank 4 supplier	<b>Customers</b> Alstom / Operators
Contracts	Non-disclosure Collaboration License to rank 1 Eng.	Non-disclosure Collaboration	Non-disclosure Collaboration	Purchasing
Use	<b>Coatings suppliers</b> Rank 1 engineer or licensees	<b>Parts suppliers</b> Rank 1 supplier Rank 2 supplier	<b>Component integrators</b> Rank 3 supplier Rank 4 supplier	<b>Manufacturer</b> Alstom
	Outside Alstom domain of use	Within domain of use agreed on with Rank 1 engineering		Within Alstom domain of use

As indicated, Alstom decided to strategically develop collaborative innovation with its suppliers and high-ranking partners (engineering SMEs and labs).

In this context, a schematic layout was developed to explain the possible nature of contracts with each stakeholder involved in a collaborative innovation programme. This schematic plan specifies the principles concerning sharing the rights to use the innovations, licensing and commercialization that can be considered for each partner, according to their respective domain of use.

### *What lessons and best practices can be drawn from this collaboration in terms of intellectual property management?*

The structured approach enabled the involvement of IP well upstream in the process. It also facilitated cooperation between functions, which became better aligned on common objectives.

For Alstom Transport, this approach also improved its working relationships with suppliers, especially SMEs. By training them in its methods and by supplying a structured framework that presented its objectives in terms of use and/or licensing, IP strategies were much easier to negotiate and agreements much faster to finalise.

Each partner knows what it is possible to obtain in terms of use. Implementation of the collaborative work is then greatly facilitated.

The approach based on a collaborative platform and a workflow organisation enabled each stakeholder to play his part. The production of dashboard indicators suited to the needs of stakeholders encouraged greater involvement at all levels and strong appreciation of the performance of the collaborative innovation activity.

### *What future improvements are possible?*



**Gilles Chrétien, Director of IP and R&D Contracts, Alstom Transport**

*“The IP function works to make the platform accessible to partners in order to extend their involvement, improve the quality of work we do together and to share information and different contract versions.*

*In the very short term, the collaborative platform will enable us to structure and link information concerning partnerships, contracts, innovation and technology transfer, and later, financial data.”*

## 2.7 Use intellectual property as a lever to accelerate collaborative work

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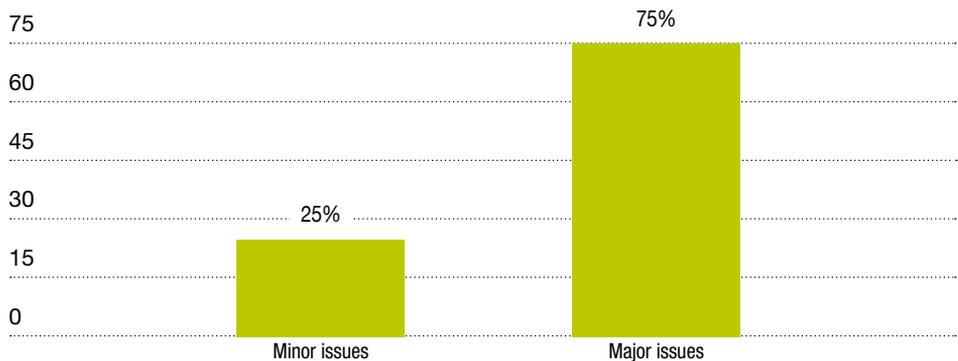
### Overview

Beyond the role of IP in terms of protection, what impacts can we expect with its reinforcement, especially from a structural standpoint, or at least in terms of the innovation capacity of a business? Several avenues of analysis have been identified, concerning visibility, identification, even the pre-qualification of potential partners, along with the formalisation and consolidation of each partner's position prior to any negotiation. These are all levers likely to stimulate collaborative projects.

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### IP AS A METHOD OF PUBLICISING YOUR COMPANY'S / ORGANISATION'S INNOVATION CAPACITY

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### IP is a lever for visibility of the company's or the research organisation's capacity to innovate

IP supports and speeds up collaborative work. For 75% of respondents, IP represents a major method of internal and external communication to publicise the capacity for innovation of businesses and other organisations. Amongst other things, this enables them to attract talent or to impress financial markets. The annual data supplied by the INPI on the number of patents published can be used to situate a business/organisation in relation to others.

However, it is important to note that these data are simply an initial indication of the capacity to innovate, for the following reasons:

- The data take into account patent published in France and not extensions to other countries.
  - Policies in terms of patent filings are very different and for the most part depend on the strategies of the business/organisation or its field of activity.
  - In general, innovation is not limited to just patentable inventions.
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## **IP teams are increasingly active in the selection of partners**

As we have just seen, IP represents a method of external communication and has a role to play in identifying partners. In practice, active patent intelligence can enable businesses to seek new innovations but also new partners.

Traditionally, the main way to identify potential partners remains the network of collaborative partners, geographical proximity, conferences and competitiveness clusters. More mature structures use IP. For example, patent listing sites represent a genuine pool of information. This trend is starting to develop in the entities we met with, as they underline the efficiency of this method, particularly in identifying new partners positioned on niche markets.

## **A patent is often a prerequisite to any collaboration**

In the context of collaboration between a start-up company and a large group, it is often mandatory for the start-up to have patented know-how or expertise before any discussions are initiated. It is a way to bring credibility to the product or service, while disclosing an initial portion of the start-up's know-how.

Large groups also wish to avoid any risk of litigation at a later time concerning the respective contributions of partners, in the context of a possible collaboration. The existence of one or more patents filed by the start-up therefore enables the background for each partner to be defined more easily, especially if the collaborative project is not pursued after an initial discussion phase.

# CONCLUSIONS AND RECOMMENDATIONS

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Throughout this study, we have seen that collaborative innovation has an increasingly larger role in the strategies of private businesses and public organisations. This trend is not without impact on the IP function, which must evolve to accompany this movement more efficiently and to eliminate the obstacles that are customarily associated to IP by R&D professionals.

In this spirit, hereafter we propose a few avenues that were proposed during our interviews with the participants in this study, complemented by our own thoughts and experience, in order to ensure that IP is an effective lever for the development of collaborative innovation.

## **Construct a collaborative innovation approach aligned with strategic ambitions and shared with the highest-level decision-makers**

Collaborative innovation is rapidly growing. Stakeholders are innovating with a growing number of partners that are increasingly distant, in terms of size and sector.

In this context, efficient players are those who know how to formalise and share a clear ambition for collaborative innovation. The strategy of openness has a long-term perspective and can fulfil measurable objectives.

The efficiency of their collaborative innovation approach is based on their capacity to compare three dimensions:

- Strategic ambition (differentiation through costs / products / deadlines).
- Availability of internal resources and know-how.
- Skills and know-how already present on the market.

If the first two dimensions are relatively under control, the third is subject to permanent change. In this context, agility is a key success factor for the implementation of a collaborative innovation approach. In this respect, IP may play the role of a catalyst in the identification of partners.

Furthermore, for stakeholders active on several markets, the exercise of building a collaborative innovation approach must take into account the diversity of these markets. Stakeholders must be able to assess the risks and benefits of sharing their technical knowledge with potential partners, for each domain where they are active.

In this way, those stakeholders who have implemented structured approaches seemed to us the most able to develop breakthrough innovations and avoid sterile collaborations.

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## **Think of IP as a strategic function; give it its proper place in the organisation**

We have often seen that IP teams are still under-involved in the upstream phases of development processes. For the most part, they become active during the negotiation phase, in a support and expert-consultant role.

Nonetheless, the most progressive players have assigned their IP teams a more strategic role. They also see the teams as business intelligence agents, one of the roles of which is to identify potential partners and areas for innovation.

We have observed that this movement is accompanied in parallel by reflection on the part of stakeholders concerning the hierarchical positioning of the IP function. In this respect, we noted that some interviewees demonstrated a frequent desire to ramp up the visibility of this function by positioning it at an N-1/N-2 level under general management. This accentuated visibility can be characterised by enhanced performance requirements and the implementation of more forceful management approaches.

## **Foster the development of new skills and the valorisation of IP practitioner career paths**

Today, the growth of collaborative innovation implies new expectations from IP practitioners. They must confirm their status as the linchpin between technical and legal participants — with ever more stringent requirements concerning efficiency and lead times.

For this reason, expectations in terms of technical skills, a project culture and a capacity to take action in complex environments today seem more essential than ever before.

It is therefore vital to devote thought to the evolution of IP professions. This reflection must firstly take a close look at the initial and ongoing training offered, to integrate this issue of versatility. The most effective players have recently adopted this kind of approach.

But another lever must also be pulled: the creation of worthy career paths for IP talents. Gateways must be created between IP and the range of internal partners (R&D, legal, strategic intelligence, but also marketing, purchasing, etc.), in order to boost multi-disciplinary skills and dialogue capacities.

This perspective can be considered for high-potential profiles, with the intention of boosting the organisation's IP culture among its future managers.

What is more, the implementation of suitable professional career path management processes offers career perspectives and attractive packages to the best talents.

## **Boost the commercialization of innovation within the ecosystem through proactive IP**

Throughout our work we have noticed that a large number of public and private structures want to boost the commercialization of their innovation activities through proactive management of their patent portfolio.

If this desire appears to be globally positive for the development of collaborative innovation, it may in certain cases turn out to be a source of obstacles during the upstream project phases. In particular we noted this in the context of certain public-private relationships, where the desire of one of the stakeholders in the collaborative project to own exclusive rights of use is a blocking factor for their partner.

Nonetheless, overall we note a predominance of win-win partnership approaches, wherein compromises are found in terms of domains, regions or durations of use. The capacity of stakeholders to commercialize their IP assets generated by the collaboration at a later time is an additional lever to attract project funding.

Better understanding of the issues of each party by the stakeholders involved in a collaborative innovation project also seems to us to be a prerequisite to productive and hassle-free negotiations. We hope that this study, which attempts to present a panorama of the issues and approaches adopted to ensure efficient and effective IP management by stakeholders from varied origins, will contribute to this knowledge and thereby facilitate later dialogue on the matter.

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## Develop operational gateways between public and private stakeholders

Our discussions with IP practitioners underlined the fact that collaborative innovation between public and private stakeholders remains hindered by several problems of cultural incomprehension and divergent objectives.

Multiple institutional initiatives have been undertaken to overcome such obstacles in the last few years (competitiveness clusters, IRT, Carnot Institutes, SATT, etc.). Even if their creation demonstrates the desire to extend cooperation between the public and private spheres, it seems to us somewhat premature and untimely to make a full assessment.

Throughout our interviews for this study, we have nonetheless observed some operational levers in parallel that offer interesting responses:

- The dialogue between private and public research professionals serves to create better understanding of the work framework and objectives of each party.
- The funding of theses by businesses, an old but efficient practice, fosters understanding of the limitations and issues for industry by young research professionals.
- For private researchers, the development of training activities enables them to maintain regular contact with the academic world.

We feel that these practices have often enabled more efficient handling of IP issues as they boost mutual confidence and help avoid tension and incomprehension.

## Integrate a time value in IP objectives

IP negotiations must no longer be an obstacle or hindrance to collaborative innovation. The more systematic integration of IP teams in the innovation process from the outset would, in the opinion of all those participating in this study, speed up negotiations between partners.

Today, time to market (TTM) is a key competitive factor for all businesses, and IP management must no longer be seen as a brake, whether wrongly or sometimes rightly, to the collaborative innovation process.

It is also vital to select the right partner(s) according to the stakes and to be conscious of each stakeholder's limitations and issues.

In this perspective, the ability to rapidly finalise agreements with partners must be identified as one of the purposes of the IP function and be subject to performance measurement.

## Create win-win relationships of trust between small structures and large groups

Start-up companies and SMEs must be aware of the many benefits of undertaking collaborative projects with large groups. Amongst these benefits, we can mention two main ones: displaying the name of a recognised partner on jointly owned patents can be seen as a measure of credibility (especially in a fund-raising perspective); large groups also have substantial human and financial resources to deal with possible patent litigation by competitors.

Nonetheless, a relationship of trust must be created for the start-ups and SMEs to overcome their fears of being dispossessed of their know-how. Various levers are available to help them overcome these fears, including:

- Set up a framework for negotiation to protect the interest of each partner (in particular the domains of exploitation for the start-up or SME).
- Within large groups: create a function responsible for relationships with start-up companies and SMEs, with perfect knowledge of the limitations and requirements of these partners; in parallel develop an internal policy to ensure balanced and sustainable management of such relationships.
- Within start-ups and SMEs: apply rigorous management of IP practices and contractual relationships.
- Integrate trustworthy intermediaries, as Orange did by developing an ideas competition, with the support of a trusted third party to select projects.

## Use external aid when the structure lacks human and financial resources to manage IP

More specifically in start-ups and SMEs, the relationship with IP depends on the awareness of the CEO to such matters. In general, these structures do not have a department or even an employee fully dedicated to IP management. The lack of an IP function is associated with sub-critical size.

In this case, it is important for the director to invest his own time in this matter, by creating an efficient entourage of consultants and external public or private support. Start-up companies and SMEs can also make use of private structures such as IP attorneys or IP consultants.

Smaller companies that have made the choice to invest in this approach enjoy a great number of benefits:

- Increased value of their company in the eyes of investors.
  - Enhanced capacity for technology intelligence through efficient use of patent databases.
  - Capacity to identify and implement strategic partnerships with large groups that will assist the start-up/SME to grow.
-

## Develop new tools to accompany the development of collaborative innovation

When using efficient tools, IP can be a strategic lever in support of collaborative innovation. During our work, we identified several types of innovative (in a broad sense) tools that seemed particularly well suited:

Workflow management tools are creators of efficiency, as they enable IP users to manage IP actions according to the phase of the collaborative project. At each stage of the project, they can define the prerequisites for IP management and ensure that the right participants are involved. The implementation of this type of tool also helps to define the indicators used to assess the collaborative innovation activity. It therefore becomes possible, as certain of the practitioners we interviewed have done, to produce operational dashboard performance indicators that offer end-to-end visibility of the innovation process and can identify blockages likely to impact performance at an early stage.

Mapping tools also support the growth of collaborative innovation. Amongst these tools, certain provide “innovation density” calculations that can be used to evaluate the concentration of patents on a given topic. They offer a vision of the types of stakeholders active in these domains and can integrate a geographical dimension. Such tools enable the identification of interesting partners, occasionally outside the traditional ecosystem, for a collaborative innovation.

Another solution consists in using network mapping tools, which by analysing applicants or co-applicants over a given time frame, produce data that can be used to:

- Map networks of stakeholders and technologies.
- Detect trends.
- Ensure strategic, scientific, competitive and commercial intelligence.
- Identify new partners.

Collaborative platforms (Hypios case study, page 23) favour the collaboration of innovative stakeholders with their ecosystems. By playing the role of intermediary, these platforms enable the creation of relationships with networks of individuals on specific innovation themes. Today they are enriched with semantic analysis tools that enhance their pertinence and efficiency.

These last types of tools offer innovation stakeholders the ability to identify partners far removed from their natural ecosystem (from a sector-oriented or geographical standpoint). They are therefore formidable catalysts for collaborative innovation.

We can therefore see that the place of IP in the innovation process is evolving rapidly, as the associated strategic issues are increasingly well understood by the stakeholders concerned. The growing importance of collaborative innovation has widely contributed to this increased awareness. We consider that this fundamental trend will generate a repositioning and a major evolution in professional activities that encompass IP management and the role that this management must play in the economic growth of public and private organisations.



# APPENDICES

<b>Appendix 1</b>	Collaborative innovation: the main theoretical foundations	P. 104
<b>Appendix 2</b>	Glossary	P. 115
<b>Appendix 3</b>	List of people interviewed and quoted in the study	P. 118

# Collaborative innovation: the main theoretical foundations

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## Appendix 1<sup>9</sup>

### Introduction

The need to innovate in all sectors is prevalent in both managerial and academic literature. In a time of economic crisis, R&D is one of the functions that usually manages to escape major budget cuts, in particular because it enables the future development of the company on its markets (PwC, 2010).

The idea that the existence of innovation, and the value that it can generate, depends on links forged with other partners in the company's environment is increasingly powerful. Studies on innovation capacity demonstrate that the success of an innovation is, up to a certain point, dependent on the number of sources and the intensity of dialogue with these sources throughout the innovation process (Herstad et al., 2008; Fey and Birkinshaw, 2005; Laursen and Salter, 2006; Sachwald, 2009). Similarly, the possession of an extensive patent portfolio is no longer proof of a competitive advantage that can be transformed into innovations on the market and raise barriers to entry, thereby offering an immediate advantage to the large company with a substantial R&D budget (Chesbrough, 2003).

In future, the choice of opening the innovation process to the company's immediate community should become more widespread. The principal questions that companies and innovation stakeholders have to ask themselves are:

- What does collaborative innovation encompass?
- Who do we select to innovate with?
- How to implement collaborative innovation?

Community Innovation Surveys (CIS) revealed that between 2002 and 2004, a quarter of French companies with over 10 employees in industrial, commercial and services sectors had generated innovations at least once (Sachwald, 2009). In 40% of cases, these innovation processes were based on cooperative work.

In principle, work on collaboration in innovation activities does not distinguish between results and processes. Collaborative innovation exists as soon as a collaboration appears (e.g. in the form of joint filings of patent applications or a collaborative platform), without any assumption concerning the results. It is this meaning that we feel should be used. Moreover, definitions referring to open innovation, a term increasingly used to describe practices that involve external intervention in the innovation process of a focal company, also insist on the collaboration process itself: “[...] *the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and to expand the markets for external use of innovation, respectively.*” (Chesbrough et al., 2006: 1).

A fairly wide consensus exists in published literature to affirm that sources of innovation today — and even more so in the future — are in part outside the traditional borders of the enterprise. Hence the current taste for open source or collaborative innovation, which are markers of this evolution (see the work of H. Chesbrough [2003] on open innovation and for a more focussed approach, that of E. von Hippel [1988], who even then insisted on the need to closely involve potential customers in the innovation process, i.e. to adopt a co-development process). Nor is collaborative innovation the fief of industrial manufacturers, as it also concerns services (Vallat, 2009).

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9. The authors of this article, Benoît Demil and Xavier Lecocq, are professors of business strategy at the University of Lille 1. The full article and the associated bibliography are available on the INPI website: [www.inpi.fr](http://www.inpi.fr)

Stakeholders in innovation are converging towards the idea that innovation will increasingly feature participants from outside the company, with more complex innovation processes and higher skill requirements (Futuris, 2009; Herstad et al., 2008). It therefore will become impossible for one single company to envisage being able to manage and develop all the technologies it wants to incorporate in its products, especially in complex high-tech sectors, where multiple independent inventions converge and are blended in products, as is the case in Information and Communication Technologies (WIPO, 2011). Friedman (2005) supports the idea that on their own, even the most agile companies cannot keep up with the pace of innovation that is required today. Ketchen et al. (2007) use the expression “innovation gap” to describe the distance between a company’s level of internal innovation and the required level of innovation in its sector of activity. For these authors, collaborative innovation can fill this gap.

The **reasons** put forward to explain this use of collaborative innovation are either **negative**, in response to restrictions, or **positive**, associated with the search for opportunities. Negative reasons can be **internal**: restriction of R&D budgets and major financial risks associated with innovation, internal resource limits; or **external**: competitive pressure, growing complexity of service demanded by customers, shorter product life cycles on many markets, high uncertainty surrounding technologies and markets. The positive reasons include the fact that it enables the company to grow by generating more innovative projects and by improving its success rate; it speeds up time to market for new products, like in mass-market electronics; it generates innovations that match customer needs and uses more closely; it standardises technology in a sector, such as computing or IT, notably through licensing agreements. It creates value from internal R&D efforts outside the company sphere and thereby generates revenues, coordinates efforts between producers of complementary goods or enables access to complementary skills (BearingPoint, 2010; ESCP Europe/Accenture, 2011; Futuris, 2009; Noteboom et al., 2007; PwC, 2008, 2010; World Intellectual Property Report, 2011). As companies that do the most collaborative work are those that devote a larger part of their R&D budget to innovation, it is probable that these collaborations are more aimed at increasing the opportunities generated by these innovations than limiting the cost of the innovation (OECD, 2010).

Multiple factors are known to facilitate collaborative work. Firstly, information and communication technologies (Web 2.0, social networking and document-sharing platforms) enable companies to deploy platforms that interact outside the company or internal sites to raise employee awareness. They seem to play an essential role in the recent surge in collaborative innovation, notably via electronic platforms that simplify remote work and/or with several, even unlimited participants, as is the case with certain crowdsourcing platforms. In addition, the internationalisation of innovation sources offers many more opportunities for partnerships around the world than in the past (WIPO, 2011). Nonetheless, studies show a preference for local collaborations. Lastly, the institutional factors identified by Link and Siegel (2007) facilitate inter-organisational collaborations, especially in terms of innovation. In this case, three factors can be highlighted:

- The growth in investment in public-private partnerships (PPP), in particular incubators, SME-development programmes or competitiveness districts and clusters.
- Relaxed laws on the concentration of activities, which facilitate collaboration.
- The development of regulations that encourage the disclosure of technologies produced by public research efforts.

## Definitions of collaborative innovation

According to Miles, Ketchen, Miles and Snow (2005), Ireland et Snow (2007), “Collaborative innovation is the creation of innovations across firm (and perhaps industry) boundaries through the sharing of ideas, knowledge, expertise, and opportunities.” This very wide-ranging but synthetic definition enables the integration of partner companies, public institutions or even individuals outside the company into the collaborative innovation processes.

For the OECD, collaborative innovation excludes simple subcontracting of R&D and concerns innovation processes in which partners actively participate in the project to develop an innovation<sup>10</sup>. Nonetheless, we can consider that the border is not as clear as in the case of outsourcing R&D, as in general the company that contracts out its R&D retains the internal skills that enable it to integrate and evaluate the production of its subcontractor, and in this respect there is inevitably a minimum of active participation on the part of the subcontracting company. What is more, outsourcing R&D still represents approximately 10% of total R&D expenditure, a figure that varies according to the country and sector (Sachwald, 2009). The profile of French companies that outsource their R&D the most corresponds to that of companies who do the most collaborative work with public partners and make the most investment in R&D. This tends to show that collaborative work and internal absorptive capacities (Cohen and Levinthal, 1990), go hand in hand and that the outsourcing company does not just use its partners. These absorptive capacities enable an organisation to recognise the information and knowledge that will be useful to innovation, to incorporate them in its own processes and use them in its product/service offerings. In conclusion, it seems abusive to use to ignore the outsourcing of R&D as part of collaborative innovation.

The broad OECD definition can encompass various phenomena such as: **traditionally**, alliances concerning R&D projects that developed during the 1980s, and seem to have reached a peak in the middle of the 1990s (WIPO, 2011), whether they take the form of consortia, joint ventures or patent pools. These alliances include formal cooperation projects with competitors, suppliers or any complementary company in terms of skills. **More recently**, crowdsourcing (use of community volunteers on a problem submitted by an innovator) and open source (shared use of computer program source code to enable collaborative developments) and **more widely**, a collaborative process that results in the sharing of results on the basis of resources that themselves are shared, innovation with current or potential customers — co-innovation (E. von Hippel, 1988).

We can ponder the possible fundamental differences between recent forms and more traditional forms of collaboration. The new forms make use of organisations (universities and labs, businesses of various sizes, from start-ups to multinationals, from the consultant to the supplier or the customer, not forgetting competitors) **as well as individuals** (generally experts in their domain). In this way, IBM organised an Innovation Jam in 2006, bringing together around 150,000 participants for a period of three days, during which they generated 46,000 ideas. A certain amount of these ideas were subject to further development. Another difference is that we are leaving behind forms of collaboration that are based on contracts and formal structures, for **less controlled dialogue and relationships**.

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10. The Oslo Manual, which lists the OECD indicators and definitions in terms of innovation, explains: “*Innovation cooperation involves active participation in joint innovation projects with other organisations. These may either be other enterprises or non-commercial institutions. The partners need not derive immediate commercial benefit from the venture. Pure contracting out of work, where there is no active collaboration, is not regarded as cooperation. Cooperation is distinct from open information sources and acquisition of knowledge and technology in that all parties take an active part in the work.*” (OECD, 2005, p. 90)

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More widely, if hierarchical forms could be prevalent in inter-enterprise relationships, notably in the case of subcontracting or outsourcing, relations with user communities, practitioner communities or potential customers may no longer be hierarchical. There is therefore a real specific nature to these new concepts. Lastly, the number of innovation partners has grown and we now speak of an **innovation network or ecosystem**, to refer to a pool of partners rather than bilateral relations.

Certain authors assimilate open innovation with collaborative innovation (e.g. ESCP Europe/ Accenture, 2011, p. 31; Futuris, 2009). Open innovation is an expression that has been assigned several meanings. Firstly, it refers to a general paradigm shift, moving integrated (in-house or closed-model) research within an organisation over to a more relational and open mode for innovation processes (Chesbrough, 2003). Even if we can doubt that businesses have never had a completely closed model (Huizing, 2011), the growing use of the term accompanies a genuine, larger openness to stakeholders in the surrounding ecosystem. Next, not all authors understand the same thing concerning the concept of open innovation. Broadly defined as the action of exchanging knowledge with stakeholders outside the organisation to irrigate internal knowledge (Futuris, 2009), the concept can effectively be considered akin to collaborative innovation.

However, other authors assign a more specific content to the concept. In this framework, open innovation in its extreme version would be the fruit of collaboration with non-selected partners (as long as they add value to the project) and would concern undefined subjects (ESCP Europe/ Accenture, 2011). It would therefore oppose the more traditional partnership-based innovation where the partner is selected (for example because we have collaborated with them in the past), just like the purpose of the innovation (according to the priorities of the enterprise) (ibid. p. 32). That said, open and collaborative forms of innovation (e.g. in open source) are adopted by submitting problems to communities, which may possibly be closed and restricted (for example, limited to customers).

Another concept approaching that of collaborative innovation is proposed by Peter Gloor (2006), who defined collaborative innovation networks (and not collaborative innovation) as: *“A COIN (collaborative innovation network) is a cyber-team of self-motivated people with a collective vision, enabled by the web to collaborate in achieving a common goal by sharing ideas, information, and work.”* It is therefore a network that makes intensive use of information technologies to dialogue and develop new knowledge, to reach a common goal. This network may include customers and suppliers, which in the end makes it akin to a collaborative innovation process. But for Gloor, it is above all the use of the Internet which sets apart the team in its method of functioning and which creates a specific network structure through direct contacts. This structure is similar to open innovation as it infuses external knowledge in the organisation. Still, the COIN can be purely internal to an organisation, without bringing in external partners.

So in light of the variations in the concept of collaborative innovation that we have presented, it seems reasonable to retain the OECD interpretation of the term collaborative innovation and not to assimilate it with forms that the innovation process can take via collaborative networks that use information technology, co-development with peers or communities, or a wider openness to partners or on projects. Effectively, these concepts tend to move away from the traditional forms of collaborative innovations based on formal agreements between enterprises, especially with suppliers.

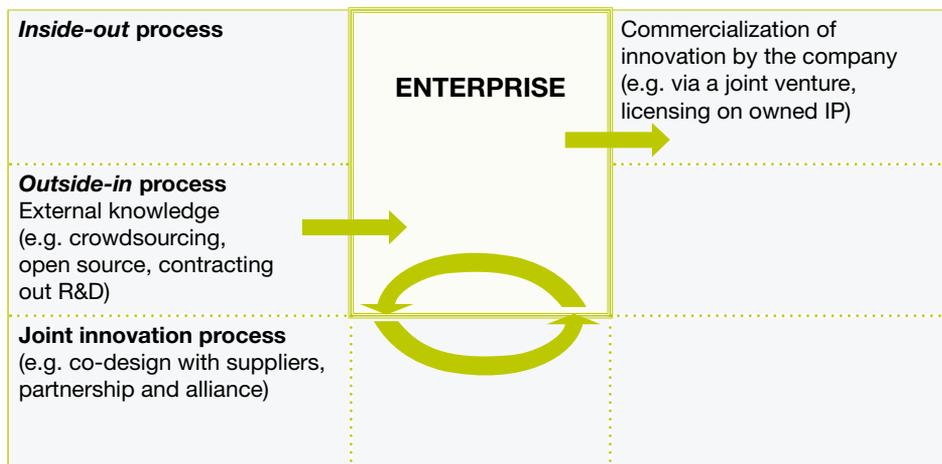
In the end, we can in general assimilate collaborative innovation and open innovation, as the latter seems to have taken over from the former starting in the mid-2000s, following the success of Henry Chesbrough's publication. Although some practices of open innovation, such as the full acquisition of businesses (e.g. takeover of a biotech company by a pharmaceutical) or technology scouting, which consists in setting up an intelligence network to identify emerging technologies (PwC, 2010), are more at home in an outside-in open innovation approach, they cannot be considered as genuine collaboration on innovative projects.

In our opinion, collaborative innovation infers the involvement of three different processes. Nonetheless, current literature focuses on two of the three — the inside-out and outside-in processes — rather than on joint processes, probably because these forms seem new in relation to the more traditional forms of alliances or partnerships (which probably remain the most widespread [PwC, 2008]) and because they seem dominant in the collaborative processes. We consider that each of these processes always involves interaction and dialogue between the enterprise and external parties, but that these discussions are more extensive in the case of joint processes.

To sum up, the scope of collaborative innovation encompasses three processes identified by Gassman and Enkel (2004):

- **Inside-out process:** the enterprise does collaborative work to put the innovation it has developed internally on the market, in particular through the sale or licensing of its ideas. This process mainly concerns the commercialization of enterprise IP.
  - **Outside-in process:** the enterprise uses external stakeholders (in priority: customers and suppliers) to develop an innovation internally, using the knowledge that the external parties provide. This process mainly concerns the production of IP.
  - **Joint innovation process:** the enterprise collaborates interactively with partners, resulting in an exchange of knowledge to develop an innovation; this is notably the case with companies that have complementary skills or subcontractors. In these practices, we observe joint research programmes (38.5%) and given or received contracting-out (38.7%), making up the majority of collaborative innovation activities (Sessi, 2005). This joint process may concern both IP production and commercialization: it serves to avoid being limited to a purely transactional vision of collaborative innovation.
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### THREE TYPES OF INTERACTION IN COLLABORATIVE INNOVATION PROCESSES (GASSMANN & ENKEL, 2004)



### FREQUENCY OF IMPLEMENTATION OF COLLABORATIVE PRACTICES IN INNOVATION PROCESSES (ENKEL, 2011)

n = 159	Average use from n1 (not at all) to n5 (high level)	Intensity in use
<b>Outside-in process</b>		
<b>Integration of lead user</b>	<b>3.24</b>	<b>45.90%</b>
<b>Integration of customers of suppliers</b>	<b>3.98</b>	<b>70.30%</b>
Inter-industry innovation	2.93	27.10%
Ideas platforms	2.85	27.40%
Online brainstorming sessions	1.94	13.50%
<b>Creativity workshops</b>	<b>3.22</b>	<b>44.90%</b>
<i>Crowdsourcing, customer communities</i>	2.24	19.30%
Attentiveness to messages	1.83	8.80%
<b>Inside-out process</b>		
<b>Commercialisation by other companies (joint venture, network)</b>	<b>3.15</b>	<b>44.00%</b>
Spin-offs, Management buyout	1.74	8.60%
Enterprise creation	2.11	14.10%
Commercialisation of technologies on new markets	2.39	21.70%
Investment in other companies	2.25	17.50%
<b>Joint development</b>		
<b>Development with customers and/or suppliers</b>	<b>4.01</b>	<b>73.60%</b>
Development with other companies (same sector or other sector)	3.24	44.70%
Development with universities and research institutes	2.79	32.50%
New cooperative business model	2.25	19.60%

The quantitative and large scale measurement of collaborative innovation meet with difficulty in the protection of innovations, which is traditionally done in two ways: businesses rely on a patent or more informal means such as trade secrets or fast time-to-market. Current literature shows that in reality, enterprises commonly mix different approaches in their protection practices (Herzfeld et al., 2006). For this reason, an unquantifiable part of innovation work does not result in the filing of patents and therefore is not included in public statistics.

## Who do we collaborate with?

The stakeholders in collaborative projects are varied: universities, suppliers, specialised sub-contractors, customers, competitors. Certain studies also include employees (e.g. BearingPoint, 2010). But if we adopt a coherent vision of collaborative innovation — based on interaction with external partners — it is preferable to focus on external partners, **at the forefront of which we find customers and suppliers** (in more than one case out of two in France), and to a lesser extent, competitors, consultants, universities and public organisations (De Backer et al., 2008). More precisely, in France 65% of enterprises declare that they innovate with their suppliers, 50% with their customers, 36% with competitors, 26% with higher education establishments and 18% with public research bodies. The predominant role of customers and suppliers in collaborative innovation is also confirmed by Enkel (2011). In general, businesses prefer to innovate with organisations that are not their direct competitors (PwC, 2008).

**Size seems to be a discriminating factor in collaborations** (Herstad et al., 2008; Huizing, 2011). Large companies — no matter the country — are the principal partners of universities and public organisations, rather than SMEs. As Ireland and Webb (2007) underline, large companies can also mobilise the knowledge and resources of promising start-ups in which they invest via a venture capital fund for example. Lastly, a large company within a group structure undertakes over 40% of its collaborative projects with entities within the same group (Sessi, 2005).

Current literature presents the difficulties encountered by SMEs in terms of collaborative innovation: difficulty to create and maintain a network, difficulty to develop IP and enforce their IP rights. SMEs that form relationships with foreign partners are few and far between. These observations are to be associated with the lower investment by French SMEs in research and their lower product innovation activities (Guellec et al., 2010). However, for start-ups in high-tech sectors that lack the additional assets necessary to bring the innovation to market, the use of collaborative practices such as licensing agreements is a widely-used solution (Teece, 1986; Pluvia Zuniga et Guellec, 2009).

**The geographical dimension is also revealed to be important** in collaborative innovation. Therefore companies will often give priority to filing patents with partners who are geographically close and speak the same language (De Backer et al., 2008; Guellec and Van Pottelsberghe de La Potterie, 2001). Collaborations with foreign partners nonetheless vary according to the country. In general, the smaller the country, the more its businesses establish cooperative projects with international partners in order to innovate (Sachwald, 2009). This is particularly the case with countries in Northern Europe (Guellec et Van Pottelsberghe de La Potterie, 2001). In Finland or Denmark for example, between 2002 and 2004, around 16% of innovation partnerships were undertaken with partners outside these countries. By way of comparison, this figure is only 7% in Germany and France. Although international collaborative work is growing, within a large international group it is often done internally.

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## The benefits and drawbacks of collaborative innovation

### **The expected benefits of collaborative innovation vary according to the sectors of activity.**

Collaborative innovation can in certain sectors fulfil the need to closely associate customers in new products (like in the chemical sector), or the need to co-design innovations with suppliers (like in the automotive industry or the telecommunications industry, between operator and equipment supplier). In certain sectors with complex technologies, such as biotechnology and information technology, collaboration is almost obligatory. Other sector-specific elements can also influence collaborative processes (Germeraad, 2010). Some types of innovation need very long development phases before a prototype is available, alongside long time-to-market phases (often due to requiring approval from state authorities), as is the case in nano-technologies or biofuels. These technologies are often borderline breakthrough technologies. In general they feature partnerships with public authorities and public research organisations. Sectors in which the battles between different architectures take place, like in IT, Internet, semiconductors or telecoms, also require close cooperation between multiple partners.

The benefits of collaborative innovation also depend on the type of enterprise. Ketchen, Ireland and Snow (2007) put forward the idea that for SMEs, collaborative innovation can preserve creativity and flexibility while limiting the drawbacks associated with a small size. For large companies, collaborative innovation serves to explore opportunities outside their traditional domain, while continuing to benefit from the advantage of their size in terms of structuring of activities and efficiency of operations. Collaborative innovation can therefore contribute to strategic renewal for large companies. Each type of enterprise using collaborative innovation therefore tends to reap different benefits and according to Ketchen et al. (2007), this serves to offset the drawbacks associated with a given size. A third type of benefit of collaborative innovation originates in the need **to sustain a regular flow of innovation**, to avoid being left behind by the competition or falling into an inertia that harms performance over the long term. In this way collaborative innovation serves to respond to the challenges of sectors where technologies have short life-cycles, such as information technologies and Internet, by speeding up TTM. Collaborative innovation also facilitates on-going evolution by limiting the risks of organisational inertia (Ireland and Webb, 2007).

In any case, as noted by Ketchen et al. (2007), it is not a question of saying that collaborative innovation serves to produce better innovations than a traditional, internal and proprietary approach. It may however supplement in-house innovation by an enterprise, in order to reach the level of innovation needed in the sector, or to achieve specific strategic objectives. Nevertheless, collaborative innovation does not just offer benefits. Collaborating with one or more partners may cause an enterprise to create less value for itself than through a proprietary approach for an internal development (Demil and Lecocq, 2003). Ketchen et al. (2007) point out that if collaborative innovation serves to produce regular innovations by limiting the gap between potential internal innovation and that required on the market (innovation gap), it sometimes generates weaker performance than internal innovation because it implies sharing the value created.

Amongst the other difficulties indicated for this type of collaboration, several are recurrent: problems associated with different cultures between partners, the identification of suitable partners (for example in the case of licenses [Pluvia Zuniga and Guellec, 2009]), the free-riding behaviour of one of the partners, even an attempt to appropriate the innovation, the development of sufficient and reciprocal trust, the deployment of internal processes that are congruent with the notion of openness and partnership, such as the maintenance of internal R&D skills (Weil, 2010) or a successful cross-discipline linkage between several functions (R&D, marketing, supply chain, etc.) (ESCP Europe/Accenture, 2011).

## IP in collaborative innovation

Several reports or studies (e.g. European Commission, 2002; or McNerney, 2009), show that in collaborative R&D projects, IP matters are underlying to each phase of the innovation process. It therefore seems important to consider IP ex ante collaborative innovation (McNerney, 2009, speaks of “background”) and IP ex post collaborative innovation (“foreground”). The background and foreground include information, materials and knowledge, not only the elements likely to receive formal protection. However, a collaborative innovation project may also generate know-how or knowledge that is adjacent to the project. McNerney calls such parallel developments the “sideground”. These developments must be carefully handled by the partners to avoid any conflict.

**The question is therefore not just to protect IP but to manage it before, during and after the project.** McNerney (2009) recommends that partners should not stick with the standard clauses of collaboration contracts, but modify them so that they suit the IP objectives and strategy of each partner.

IP is closely linked to collaborative work with partners as it serves to alert partners to the internal skills and know-how of the other and to negotiate with them (Pénin, 2011). In this way, not only do patents help protect ideas, but they also facilitate the exchange of ideas and technologies, by safeguarding the knowledge owned by an IP owner while enabling them to disclose information about this knowledge. In the same way, many licensing agreements are drafted as cross-licensing agreements (Pluvia Zuniga and Guellec, 2009). Within the paradigm of open innovation, **IP is at the heart of enterprise strategy** and serves to access other technologies and commercialize IP on other markets (Ayarbe and Chanal, 2011).

Although collaborative innovation is more focused on value creation and new products or services, IP also participates in sharing this value. Effectively it determines how the value created by the partnership will be distributed between the stakeholders and the risks of IP theft or counterfeiting (PwC, 2010). To do this, businesses set up partnership contracts, consortia or joint ventures dedicated to R&D. Partnership or consortium agreements must include the rules of operation for the research to do and all questions concerning the use of the research results. Insofar as it is possible, partners must foresee how to distribute the costs and revenues associated with the use of IP, commercialization and use of the innovation, distribution of results, transfer of ownership, the right to grant licenses, non-disclosure clauses concerning the details of the research undertaken, both between partners but also with each employee working on the project. The European Union lists the major themes to cover in a memorandum of understanding that precedes a consortium agreement between parties involved in FP7 (Seventh Framework Programme for Research) projects:

- Internal organisation and management of the consortium: technical contribution from each party, technical resources made available to the project, schedule of tasks to complete for each partner, expected contributions, project management and designation of committees, their composition, role, nature and coordination.
  - IP management: non-disclosure agreements, background, use of IP generated or acquired in parallel to the project (sideground), appropriation of results, legal protection of results, commercial use of results, publication of results.
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## The current challenges for collaborative innovation

As we come to the end of this panorama, we could be tempted to propose some possible avenues of thought for the future and the challenges facing collaborative innovation in the coming years, as it seems to have become a durable feature in enterprise practices (PwC, 2010). These avenues represent issues to consider for practitioners and research professionals, public decision-makers and consultants. We should nonetheless keep in mind that today collaborative innovation is in the throes of a trend effect and that businesses are incited to present their practices as open, given the attention paid to this matter (WIPO, 2011).

## Better understanding of the risks inherent in collaborative processes

Currently, the rush for open innovation may cause some to lose sight of the risks involved in these practices. Yet they remain very real. For example, including the customer in an innovation process (Enkel et al., 2005) may generate a risk to the reputation of the company if its partner turns out to be a failure or can cause an innovation to be limited only to a niche market. Similarly, the risks associated with the protection of know-how or the disclosure and protection of sensitive information are very real. One possible avenue to manage these risks is to **systematically formalise any collaborative innovation projects**, but few businesses seem to have implemented such an approach (PwC, 2008). The systematic signature of non-disclosure agreements prior to any negotiation or of contracts defining the IP rights on an R&D activity is essential. In all cases, Schopke (2009) suggests that agreements should recognise the divergent interests of partners rather than immediately supposing that they have common objectives. Lastly, it is also important to assess the risks associated with divergent interests of partners or with their cultural differences, and in particular timescale perceptions (McNerney, 2009).

## An organisation capable of efficiently managing dialogue with external parties

The organisation of collaborative work is set to become a genuine key skill for businesses (PwC, 2008). This skill refers to the concept of an absorptive capacity introduced by Cohen and Levinthal (1990), which defines the skills that will enable an organisation to identify, assimilate and integrate knowledge from outside the organisation. These capacities are closely linked to the organisation's internal capacities and the knowledge that it has developed through its own R&D. Patents filed by a company facilitate open innovation by enabling it to coordinate with other partners (Pénin, 2011). These absorptive capacities also require the deployment of intelligence tools and collaborative methods, as well as the management of relationships between partners (PwC, 2010). A company that wishes to collaborate with others must, for example, be capable of taking less than a month to produce cooperation agreements and licensing agreements, so as not to hold back the innovation process (Germeraad, 2010). The difficulty to overcome, from an internal standpoint, is the need **to organise extensive cross-discipline cooperation between functions** such as R&D, marketing, legal and supply chain, in order to produce a coherent structure for collaborative innovation projects. Moreover, inside-out and outside-in approaches may be different in terms of the skills that they require. However they both require that company personnel, both in R&D and other support functions, direct their attention to the applications of the technologies to import or export. Over and above the cross-discipline skills needed in this process, companies must not lose sight of the need for **global management of open innovation**. Innovation and knowledge are subject to accumulative effects. Decisions concerning a specific project may never be disassociated from decisions that affect other projects (Herstad et al., 2008).

## Manage tension between short term and long term collaborative work

Large companies prefer sustainable forms of collaboration which reduce transactional costs and enable each partner to learn about the other in detail (Futuris, 2009). Nonetheless, at the same time, collaborative innovation requires a permanent openness to the business environment and extensive flexibility to integrate new potential partners. Organisations must therefore learn to **reconcile the operation of a network of stable partners with more ephemeral forms of cooperation**, by using occasional business transactions.

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# Glossary

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## Appendix 2

### Corporate venture capital

Corporate venture capital represents a venture capital fund owned by a large group. The aim is to invest in promising start-up companies.

### Crowdsourcing

A form of outside-in collaborative innovation, crowdsourcing is the use of know-how and idea contributions from external individuals through collaborative platforms. Collaborations with end customers may also be included in this form of collaborative innovation. However, they are not part of this study.

### In-licensing

In-licensing strategies serve to use a partner (through a licensing contract) to share resources and costs associated with developing and bringing a product to market. They are often used by pharmaceutical labs in the development of new medicines.

### Intellectual property

(Definition proposed by the World Intellectual Property Organization)

Intellectual property refers to creations of the mind: inventions, literary and artistic works, and symbols, names, images and designs used in commerce.

IP is divided into two categories:

- Industrial property, which includes patents (protection of the technical aspects of an invention), trademarks (protection of names, slogans, logos and other distinctive signs), industrial designs (protection of ornamental aspects) and geographic indications.
- Literary and artistic property, which includes copyright (protection of creations such as novels, poems and plays, films, musical works, drawings, paintings, photographs and sculptures) and rights related to copyright (rights of performing artists in their performances, producers of audio-visual recordings and radio and television broadcasters).

### Joint ownership of patents (Article L 613-29 of the French Intellectual Property Code)

Joint ownership of a patent application or of a patent shall be governed by the following provisions:

- Each joint owner may work the invention for his own benefit subject to equitably compensating the other joint owners who do not personally work the invention or who have not granted a license. Failing amicable agreement, such compensation shall be laid down by the First Instance Court.
- Each joint owner may take action for infringement for his own exclusive benefit. The joint owner who takes action for infringement shall notify the other joint owners of the action that has been brought; judgement shall be deferred until such notification has been proved.
- Each joint owner may grant to a third party a non-exclusive license for his own benefit subject to making equitable compensation to the other joint owners who do not personally work the invention or who have not granted a license. Failing amicable agreement, such compensation shall be laid down by the First Instance Court.

However, the draft licensing agreement must be notified to the other joint owners accompanied by an offer for transfer of the share at a specified price.

Within three months of such notification, any of the joint owners may oppose the granting of a license on condition that he acquires the share of the joint owner wishing to grant the license.

Failing agreement within the time limit laid down in the foregoing paragraph, the price shall be laid down by the First Instance Court. The parties shall have one month from notification of the decision or of a decision on an appeal to forego the sale or the purchase of the joint ownership share, without prejudice to any damages that may be due; costs shall be borne by the renouncing party.

- d) An exclusive license may only be granted with the agreement of all the joint owners or by the authorization of the court.
- e) Each joint owner may, at any moment, assign his share. The joint owners shall have a right of pre-emption for a period of three months from the notification of the intended assignment. Failing agreement on the price, such price shall be fixed by the First Instance Court. The parties shall have a period of one month as from notification of the judgement or, in the case of an appeal, of the decision, to forego the sale or the purchase of the joint initial share, without prejudice to any damages which may be due; the costs shall be borne by the renouncing party.

## Joint venture

A joint venture is a business entity co-created by two or more partner organisations. It is a capital-oriented form of sharing resources, which often enables businesses to generate growth on markets or technologies that are adjacent and complementary to their own products.

## Know-how

(INPI definition)

Know-how refers to technical information that is secret, substantial, identified and can be transmitted.

## ROI, or Return on investment

ROI is the ratio of earnings or losses on an investment to the amount invested (generally in the form of a percentage). It is sometimes referred to as yield.

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## TRL, or Technology Readiness Level

(According to the DGA strategic defence and security research and technology plan, DGA 2009)

TRL is a scale used to assess the level of maturity reached by a technology. This scale was developed by NASA to manage the technology risk of its programmes. It initially featured seven levels, but since 1995 features nine.

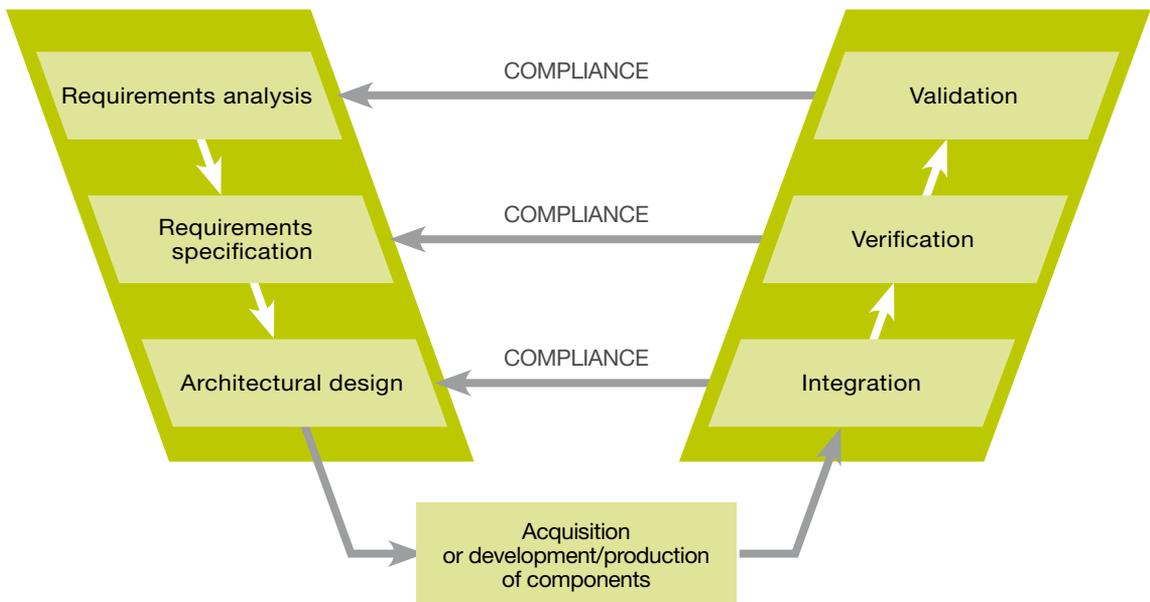
Since then the TRL scale has been adopted by many domains, particularly by the defence industry, with the same principal objective of managing technology risk in programmes, although with some minor tweaks (replacement of the notion of space with that of operational environment).

## TTM, or time to market

TTM is the time necessary to develop and prepare a new product/service for introduction to the market.

## V-cycle

The V-cycle or V-model is a system-development process model in the form of a V. It was initially the standard for software development in the 1980s and has since become a standard in many industrial domains. It comprises different phases used to break down the complex approach associated to the development of complex systems.



V-cycle model of development activities.

Source: FIS (Association française d'ingénierie système)

# List of persons interviewed and quoted

## Appendix 3

Structure	People interviewed and quoted in the study	Function
Alstom Transport	Gilles Chrétien	Director of IP and R&D Contracts
Armines	Pascal Iris	Director
CEA	Jean Therme	Director of Technology Research
CEA	Franck Lethimonnier	Research professional
CEA-LETI	Pierre-Damien Berger	Research professional
Dassault Aviation	Bruno Stoufflet	Director of Advanced Business and Scientific Strategy
Guerbet	Claire Corot	Scientific Director
Hypios	Alain Risbourg	CEO
Orange	Luc Savage	Director of IP and Commercialization
Pernod Ricard	Patrice Robichon	Scientific Advisor
Ryb	Marc Palomares	Technical Director
Safran (Group)	Michel de Crémiers	Director of IP
SEB (Group)	Hubert Kiehl	Intellectual Property

We wish to thank all these people, whether we have quoted them in our study or not, for the precious time they spent with us in order to share their experience in matters of intellectual property management within collaborative innovation projects..

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# Collaborative innovation and intellectual property

*Best practices*

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In this document, collaborative innovation is understood to be when a business or research organisation actively participates in projects with other stakeholders from outside the entity, but where this participation is not limited to a strictly financial contribution.

Beyond the trend effect, collaborative innovation is now a major lever to reinforce the innovation capacity of businesses and research organisations, enabling them to access new skills and control their costs in uncertain markets. This is why the INPI Observatory for Intellectual Property (OPI) wished to devote thought to the management of intellectual property within the framework of collaborative innovation practices.

Opening up to collaborative work brings with it certain risks and the need for a cultural shift. Of these risks, the first is the management of intellectual property. A collaborative innovation approach generates several key IP-related challenges for the partners involved, including:

- How to define the scope of collaboration?
- How to manage IP rights and know-how existing prior to the project?
- How to attribute IP created through collaborative work to partners?
- How to distribute the ownership and use of the IP generated?
- How to manage the strategic issues that differ according to the nature of the stakeholders?
- How to put a value on the contributions of partners?
- What is the right moment to determine the value of these contributions?
- How to manage the future value of the results of the collaborative work and distribute the potential gains?

This document provides an assessment of technology-oriented collaborative innovation practices and of the management of intellectual property matters. It also identifies some keys to improve the practices, both in businesses and research organisations, in order to make intellectual property a lever for collaborative innovation projects.