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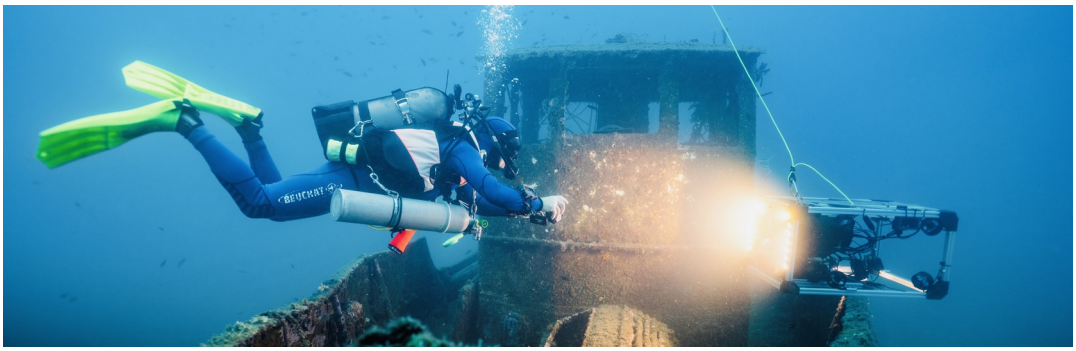
Ezzahra LOUKILI



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HARNESSING INNOVATION EFFORTS AND TECHNOLOGY TRANSFER: AN ANALYSIS OF THE CASE OF THE NATIONAL GENDARMERIE AND THE ÉCOLE DES MINES DE PARIS

When law enforcement agencies face complex challenges that require solutions that are both effective and expert-driven, partnering with private-sector and/or academic stakeholders to develop innovative projects is a particularly effective approach. Furthermore, the implementation of such collaborations is facilitated by the flexible mechanisms provided by the framework for innovative public procurement[1].

Such partnerships make it possible to combine the efforts and expertise of each stakeholder. When initiated by a public entity, however, that entity must ensure that it protects its interests by relying on a clearly defined strategy for maximizing value.

This paper analyzes the branding strategies of two public institutions, the National Gendarmerie and the École des Mines, through their collaboration on a co-development project[2], led by the National Center for Nautical Training (CNING), involving a Remotely Operated underwater Vehicle (ROV) to support underwater investigative operations. On the National Gendarmerie side, the Department of Foresight and Innovation (DPI) within the Transformation Service (ST), as well as the Agreements, Partnerships, and Intellectual Property Section of the Support and Finance Directorate (DSF), are supporting this innovative project in the areas of financing and contracting.

We begin this analysis by identifying the foundations of the commercialization strategies. We then highlight the convergence of the approaches adopted by the École des Mines and the National Gendarmerie, before examining the mutual benefits resulting from the partnership.

I) An Analysis of Value-Added Strategies in the Sovereign Sphere

We begin our analysis by clarifying the type of innovation considered in this article, as cooperation and commercialization strategies vary depending on the nature of the innovation (product, process, raw material, market, etc.). In this case, our discussion focuses on technological product innovation.

In the public sector, the commercialization of innovation efforts involves revealing and amplifying their value, particularly through spin-offs, commercialization, or technology transfer. The effectiveness of the commercialization mechanism enables the organization to position itself advantageously within the dynamics of technological progress and to sustain a virtuous cycle conducive to the self-financing of innovation activities.

1 The Gendarmerie nationale has several external funding sources for the development of its innovative projects and for experimental purposes. To meet its funding needs, the Transformation Service / Department of Foresight and Innovation primarily seeks support from the Defense Innovation Agency (AID) for co-development projects, or from the Innov'Achats fund through the Directorate of Performance Evaluation, Procurement, Finance, and Real Estate (DEPAFI) for other innovative contracts. Funding for the Participatory Innovation Unit, managed by the AID, supports participatory innovation initiatives by enabling any member of the defense or homeland security forces to receive up to 120,000 euros in funding for the development (or co-development with a private company) of an innovative project, subject to certain conditions and following selection.

2 Partnership agreement signed on June 24th, 2025, by Lieutenant General Laurent Bitouzet, head of the Gendarmerie nationale Schools Command (CEGN), and Mr. Godefroy Beauvallet, Director General of Mines Paris – PSL.

More generally, commercialization strategies encompass the protection and commercialization of the results of research and development (R&D) activities conducted as part of the technical development of a solution (new knowledge, know-how, prototypes, experiments). In particular, they involve seeking a partner capable of ensuring implementation when the actions required exceed the institution's capabilities, such as mass production or commercialization, and/or require specialized external expertise.

In order to fully capitalize on the invention's potential for application in various markets, whether public or private, it must be protected. Various mechanisms exist for this purpose: trade secrets, the Soleau envelope[3], patents and copyrights for software and lines of code.

Protecting an invention makes it possible, if the project is successful, to establish partnerships with companies that may be interested in commercializing it. These companies may then be entrusted with the industrialization and commercialization of the invention if they have the necessary production capacity and access to the target markets. The partnership that is established results in a transfer of innovation efforts, enabling a company to manufacture a new product or provide a new service. The transfer also allows the company to improve existing techniques and generate new knowledge. According to Jack Baranson, technology transfer refers to the transmission of knowledge that enables a company to manufacture a product or provide a service[4] [5]. According to Kurt Hoffman and Norman Girvan, this process should be viewed in light of three main objectives: first, the introduction of innovative technology through investment in new products; second, the improvement of existing techniques; and third, the generation of new knowledge[6] [7].

The resulting partnership takes different forms depending on the context, such as co-development, subcontracting, and licensing, and on the specific interests of each party. The parties thus establish decision-making criteria that they adapt to the circumstances at hand.

Thus, the choice of commercialization strategy can take various forms, depending on the organization's objectives, the nature of the invention, and the requirements of the industry[8]. Some of the most common methods include:

1. maintaining confidentiality, with R&D results used exclusively to meet operational needs;
2. allowing external parties to reuse the work, as part of an open innovation approach based on collaboration and the sharing of knowledge;
3. contributing to the development and use of an *open-source* solution;
4. technology transfer, through the establishment of a co-development partnership involving the sharing of risks and revenues.

Decision-making in R&D is characterized by a high degree of uncertainty (the risk of failure and the emergence of new disruptive technological opportunities)[9]. In this context, the innovation process requires a willingness to take risks. Within a partnership, the parties can manage this risk by identifying potential outcomes in advance and establishing mechanisms for sharing the value created.

The partnership is formalized through a cooperation agreement that provides for the sharing of resources in terms of scientific and technical expertise and skills, and that is tailored to the specific characteristics of the parties, particularly when intangible assets are involved.

Value creation management thus becomes a key factor in the success of innovation initiatives: in the short term, through sound contractual arrangements that protect the interests of all parties; in the longer term, it determines the sustainability of the process and its long-term financial viability. This challenge is all the more pressing for public sector actors, who face significant decision-making constraints that can slow down the momentum of value creation.

II) An approach to professional development through job rotation shared by the National Gendarmerie and the École des Mines

3 The Soleau envelope is a legal mechanism designed to enable the depositor to establish proof of prior existence for the creation of an invention, know-how, or literary or artistic work on a specific date, without conferring any industrial property rights.

4 BARANSON, Jack. Technology Transfer Through the International Firm. *American Economic Review*, *American Economic Association*, vol. 60(2), p. 435-440, 1970.

5 VUTSOVA, Albena, IGNATOVA, Olga. The role of public-private partnership for effective technology transfer. *Applied Technologies & Innovations*, vol. 10, n° 3, 2014, p. 83-90.

6 HOFFMAN, Kurt, GIRVAN, Norman. *Managing international technology transfer : a strategic approach for developing countries*. IDRC, Ottawa, ON, CA, 1990.

7 VUTSOVA, Albena, IGNATOVA, Olga, *op. cit.*

8 Government Objectives: Benefits and Risks of PPPs. World Bank Group, *Public-Private Partnership Resource Center.* Available via: https://ppp.worldbank.org/overview/ppp-objectives [viewed in april 2026]

9 KOSCHATZK, Knut, STAHLECKER, Thomas (publishers). *Public-private partner ships in research and innovation: Trends and international perspectives*. Fraunhofer Verlag, 2016.

The National Gendarmerie's strategies for enhancing its capabilities are directly aligned with its innovation imperatives. Operating in a constantly changing environment, marked by the rise of networked forms of organized crime and the proliferation of new criminal methods facilitated by digital technology, the institution must continually adapt its methods of operation, and this requires innovation.

The imperatives of innovation are reflected in the achievement of objectives, the maintenance of technological superiority over the adversary, the securing of operations, and the ability to keep pace with societal changes.

R&D efforts in the sovereign domain of internal security can be directed toward laboratories and centers of expertise within the agency, as well as external public laboratories (such as a partnership with the Curie Institute in the field of volatile organic compound analysis), and small and medium-sized enterprises (SMEs) and large corporations.

The homeland security ecosystem, which shares a common network of small and medium-sized enterprises and manufacturers with the defense sector, offers numerous opportunities for private capital, which, in turn, plays a decisive role in the current wave of technological transformation.

The transfer of sovereign R&D activities (security and cybersecurity technologies) to external actors is a key pillar of the National Gendarmerie's commercialization strategy. To this end, several levers are being utilized: partnerships with dual-use SMEs or industry players, licensing, co-development, and subcontracting.

The development objectives and the nature of the invention guide the commercialization strategy and help identify stakeholders likely to be interested in exploiting the solution or technology in question. Commercialization generally leads to a request for collaboration, risk sharing, and revenue sharing. The success of these collaborations depends largely on the upfront definition of clear and balanced sharing terms.

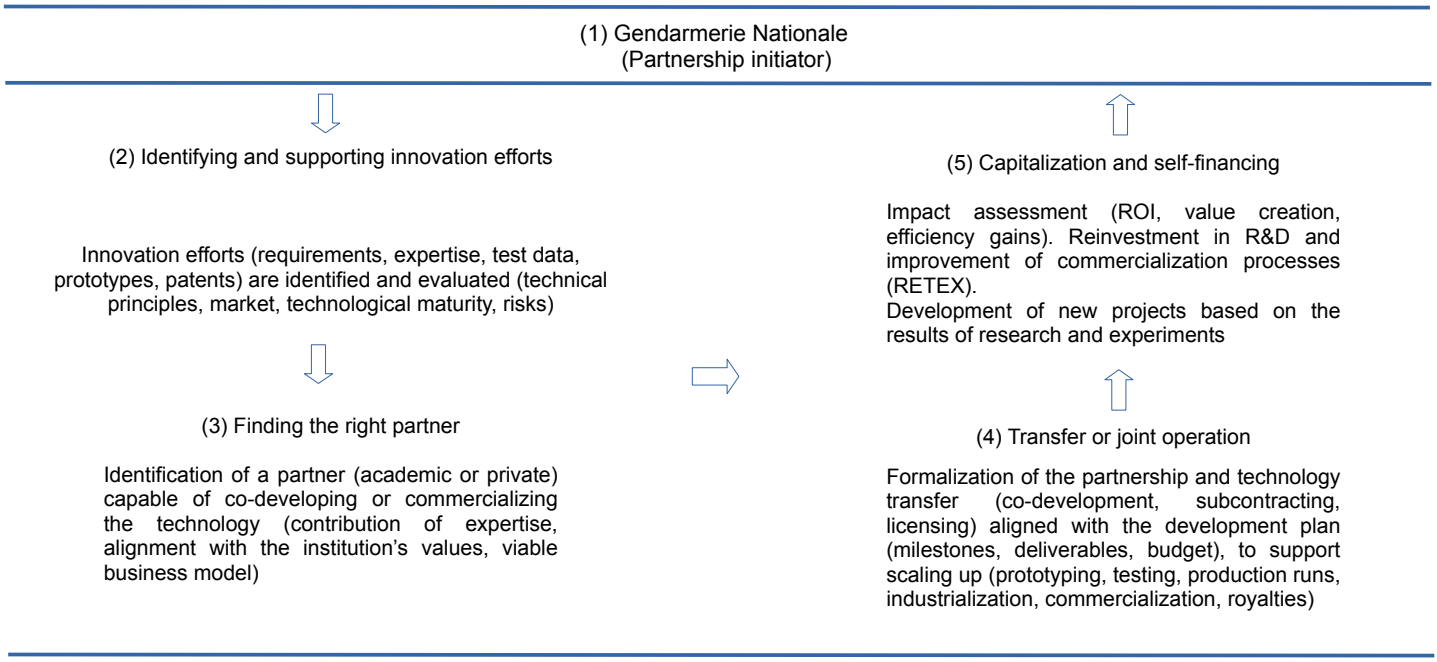

Figure 1. Partnership process between the National Gendarmerie and industry focused on technological innovation

In the same vein, the École des Mines also prioritizes a commercialization strategy based on technology transfer. Operating under the supervision of the Ministry of Industry, its mission is to support France's industrial development.

As soon as an innovation shows commercial potential, it is intended to be transferred to the market. The focus is thus on creating value for the School, but also on the macroeconomic impact, amplified by the multiplier effect of positive externalities resulting from dual-purpose or multisectoral research.

This strategy is based on a three-step evaluation process. When the value is not immediately apparent, a feasibility study is conducted to determine whether a market exists and what form it takes. If the assessment is positive, the preferred approaches are licensing, industrial contracts, and the creation of *spin-offs*[10]. Academic publication is not an end in itself: priority is given to creating value, accompanied by a fair return on the investments made in R&D.

"*The ability to capitalize on an innovation also requires that it be adequately protected, particularly through confidentiality, in order to preserve its economic potential.*"[11] If neither commercialization nor patent protection is possible, then publication is the preferred option.

10 A *spin-off* is a company that originates from public research or the technical research and development efforts of a public institution. The goal is to commercially exploit the invention through technology transfer.

11 GUARNIERI Franck, Research Director at the Center for Research on Risks and Crises (CRC) at Mines ParisTech – PSL in Sophia Antipolis.

Situation	Strategy
Identified market	Immediate commercialization (licensing, partnerships, *spin-offs*, startups)
Not immediate potential	Valuation and Protection (Patent/Trade Secret)
No valuation possible	Publication

Figure 2. The École des Mines' career development options

A patent application is considered only when an economic analysis, based on a favorable cost-benefit ratio, justifies it. In practice, patents are also used as a monitoring tool to identify existing technologies and ensure *freedom to operate* (FTO), in order to prevent any infringement of intellectual property rights. This vigilance is particularly essential to avoid "any technological contamination," especially when integrating components subject to U.S. regulations with extraterritorial reach, such as the "*Export Administration Regulations (EAR)*" and the "*International Traffic in Arms Regulations (ITAR),*" in the context of co-developing solutions for law enforcement agencies or industry players in the sector.

III) A mutuel benefit of co-development

Partnerships between public entities, private companies, and academic institutions, with applied research infrastructure serving as a key component of innovation systems, represent a mutually beneficial driver of development.

In this type of collaboration, the public institution plays a dual role: it acts both as the initiator of the solution, adopting an entrepreneurial approach, and as the financier of its development, much like a "venture capitalist." In return, it benefits from a functional solution that is precisely tailored to the needs it has identified and defined.

Private companies, for their part, benefit from a clear and context-specific articulation of public needs, which can be directly translated into market opportunities. They simultaneously gain access to technological advancements and a diversification of their product and service offerings.

As for academic laboratories, these collaborations foster a culture of applied research that enables them to generate knowledge and showcase their work through concrete, practical outcomes.

The success of such a partnership, however, depends on meeting certain requirements. It is essential, from the outset, to secure intellectual property rights and obtain the necessary guarantees. Furthermore, the terms of reference must be precise and actionable, incorporating detailed functional requirements. The structure of the partnership and the allocation of rights also depend on a rigorous assessment of the potential market.

Beyond the parties directly involved, the benefits of co-development extend to the economy as a whole. These positive effects translate into enhanced national competitiveness at the macroeconomic level. Indeed, partnerships around innovative projects foster cross-sector collaboration, the convergence of expertise, and job creation. They also contribute, in line with the work of Didier Lebert, to reinforcing the central role of companies and regions within global technology networks, in connection with their cognitive specializations, their strategies for exploration and commercialization, as well as the dynamics of knowledge flows[12].

Ezzahra Loukili *is responsible for open innovation processes and scientific and technological partnerships at the CRGN and is a COFRA doctoral student in economics at the Applied Economics Unit of ENSTA - I3 - CRG École Polytechnique - CNRS (UMR 9217).*

Translated by Second Lieutenant Joshua JAMES

12 LEBERT, Didier. *Essais sur la théorie de la dominance économique*. Economics and Finance, Université du Littoral-Côte d'Opale, 2020.