AMCHAM FRANCE

Innovation

AmCham - 12 propositions to reinforce French competitiveness internationally

SUMMARY

Introduction - An environment conducive to innovation

Continue to capitalize on France's many strengths in innovation

France has major assets that can position the country as a world leader in innovation, including the excellence of the research ecosystem and the amount of available funding.

France is among the most efficient in the world for primary research.[1] The number of scientific publications, their influence (impact rank and Nobel Prize winners), and the number of patents filed demonstrate the quality of research in France

- 7e •France is seventh in terms of scientific publications, **third at the European level**
- 4e •Rank of the impact of French publications
- 7e •Countries in terms of number of patent applications (6.6% of patent applications in 2018), 4th in Europe
- 4e •World place for its number of Nobel Prizes (9 scientists in the last 20 years)
- 2 •Mathematics rank with 14 Fields medals, Abel Prize awarded to the Frenchman Meyer in 2017

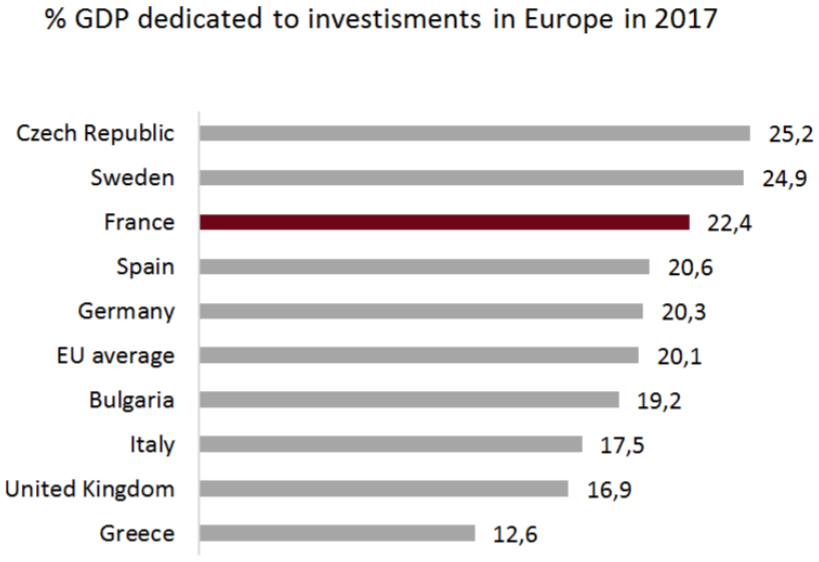
"France has major assets that can position the country as a world leader in innovation"

- 200 •Universities and colleges and higher education institutions
- 13000 •PhDs awarded per year
- 1M •Engineers in France
- 38000 •New engineers (just graduating) each year
- 260 •Researchers (thousands)

These excellent results can be explained first and foremost by high quality infrastructure and teaching, with 200 universities, higher education institutions, and research organizations. France ranks 10th in the world in terms of research infrastructure and 11th in the world in terms of human capital and research, according to the Global Innovation Index.[2] France's schools and universities are regularly mentioned in international rankings.French higher education brings together 260,000 researchers and one million high quality engineers, forming an incredible talent pool. The high rate of foreign PhD students and researchers, significantly higher than in Germany and the United States, also illustrates the strength of French research[3].

In addition, the amounts invested in innovation are significant. Previously only dedicated to primary research, the national research strategy now also largely integrates industrial research. In terms of investment in public-private research, France is a European Union champion[4].

Since 2010[5], the French State has bolstered innovation through its €57 billion Future Investment Program. This program promotes research and highlights the need to modernize companies by financing innovative and promising investments across the country, with co-financing for each



project[6]. The third wave of this project (PIA 3 - 2016) pursues these objectives through financial support of €300 million in 2018 and 2019 for research and development projects on key themes. Recent state actions in favor of investment are also very encouraging:

1

Commitment to promote innovation, reflected in the **Great Investment Plan 2018-2022, endowed with 57 billion euros[7].**

2

The creation of the Innovation and Industry Fund, endowed with €10 billion from the privatizations included in the government's Action Plan for Business Growth and Transformation, will allow €200 to 300 million per year to be invested in disruptive innovation and to create the Innovation Council.

3

Implementation of a strategic Artificial Intelligence plan will propel France into the world leaders in this field (1.5 billion euros over a five-year period).

4

A single inter-ministerial fund, the Horizon 2020 program (time period: 2014-2020) supports projects throughout the innovation chain and aims to streamline financing for growth.

This policy is well structured, through institutions such as BPI France, which provides financing for innovation programs and helps companies to obtain financing. Likewise, some economic measures such as the research tax credit (RTC) allows companies to access reimbursements for research and development expenses.

PROPOSITIONS & OBJECTIVES

- Accelerate the commercialization of innovation
- Simplify the funding ecosystem
- Encourage innovation via a new culture of public procurement

Accelerate the commercialization of innovation

Strengthen development through a proactive regulatory policy

While France is now the 3rd largest European economy, it only ranks 10th when it comes to innovation, according to the Global Innovation Index 2018 (an index that focuses on innovation as a driver of growth[8]).

One of the major challenges for France regarding innovation is the development stage, specifically the commercializing innovation.[9] While 5 French schools are among the top 15 European business schools, including HEC in second place and INSEAD in third place, France is unable to capitalize on the resources at its disposal to improve its development capacity. Moreover, even if research is largely supported through infrastructure and by the many available funds, public policies have not been adapted to truly support the development of innovation and its large-scale commercialization.

This gap between research funding and commercialization funding also explains the proliferation of start-ups with short-lived cycles, as they can find themselves disconnected from the world of industry. French regulation often seems to be disconnected from the very rapid cycle of innovation. According to the Global Innovation Index, France ranks 20th in terms of the quality of regulation, i.e. in terms of how it helps to promote innovation.

France's slow and process heavy regulation has a negative impact on time-to-market, as it is too long compared to the pace of research[10] and is usually longer in France than in other European countries. Having difficulties to bring a product into the market eventually jeopardizes companies' impulse for innovation research itself, since a product may become technologically obsolete even before it can be widely disseminated.

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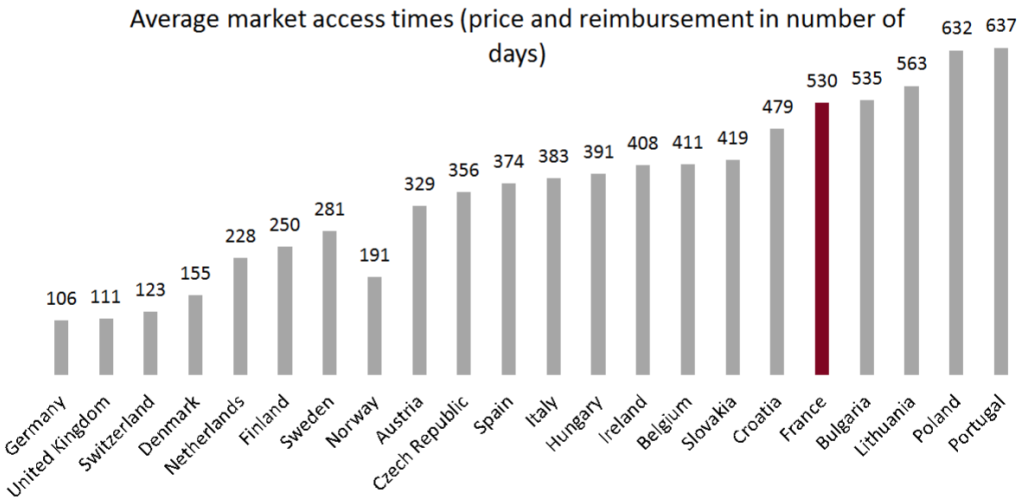
Rank	Business School	Country
1	London Business School	UK
2	HEC Paris	France
3	Insead	France/Singapoure/UAE
4	University of Saint Gallen	Switzerland
5	Iese Business School	Spain/US
6	Bocconi	Italy
7	IMD Business School	Switzerland
8	Essec Business School	France
9	Rotterdam School of Management	Netherlands
10	Oxford : Said	UK
11	ESCP Europe	FR/UK/DE/ES/IT/PL
12	Warwick Business School	UK
13	Cambridge : Judge	UK
14	Edhec	France
15	Esade	Spain

Hydrogen trains are a striking example of an innovation delay due to excessively stringent standards. While France has all the advantages (large French companies are at the forefront in this field with companies like Air Liquide, Alstom, Engie and Total, alongside high-performance SMEs such as SymbioFCell, and an extensive rail network[11]), this type of train will only operate in France in 2022. They have run in Germany since 2018. Likewise, France is severely behind schedule when it comes to marine wind turbines, mainly because of excessively long litigation delays related to their operation[12].

The decision-making cycles in France are proven to be longer than elsewhere. The pharmaceutical industry provides a good example. While the awareness and political will to remedy this situation are real, the average time to access the market for medicines in France is still 530 days, compared to a European time limit of 180 days. The delays in France have increased since the 2013-2015 period, when the average access-to-market time reached 460 days. Today, France is 18th, far behind Germany where the time required to make a product available after obtaining a European marketing authorization is 106 days. Progress had been made on this point with the introduction of Temporary Use Authorizations (TUAs), which allowed patients with serious or rare diseases without adequate therapeutic options to obtain early access to a treatment that had not yet obtained a market authorization.

However, recent reforms of this system have significantly reduced its



competitiveness for pharmaceutical companies, which have less incentive to use it (stacking of regulatory regimes).

Moreover, authorities almost systematically apply existing measures to new technological developments before the creation of any new regulations. When innovation is incremental, this method of taking innovation into account is simple, fast, and appropriate. However, as soon as innovation results in a major technological disruption, it is confronted with an inadequate regulatory framework, with legal gaps or even regulatory misinterpretations that harm both the innovator and the consumer, and even sometimes the public authorities.

"The decision-making cycles in France are proven to be longer than elsewhere"

Similarly, the precautionary principle is sometimes used arbitrarily. In the phytosanitary field for instance, suspected endocrine disruptors are subject to the precautionary principle in the same way as proven endocrine disruptors, whereas some aliments that are naturally (without the intervention of industrial processes) rich in endocrine disrupting substances are not subject to specific regulations.

The Villani report on artificial intelligence published in March 2018 recommended promoting ethics in the application and adoption of all technologies. Moreover, it proposed creating an open ethics committee dedicated to digital technologies and AI.

While the goal is to create a long-term, overarching strategy, the short-term recommendation was to focus on economic and industrial challenges in partnership with sectoral committees. The recommendations that come out of this independent committee should help researchers, economic, industrial and State actors to make technology related decisions. This process could also be used by regulatory authorities to better adapt to the complexities of innovation.

PROPOSITIONS

OBJECTIVES :

Favor short decision-making cycles to align with the time-to-market of other European countries, adapt existing regulations to the emergence of breakthrough innovations.
Define a framework outside of the usual approval processes for the precautionary principle to ensure the safety and protection of citizens while allowing them access to the latest technological advances.

RECOMMENDATION FOR ACTION :

Adapt regulations to allow the latest innovations to enter the market more quickly and anticipate the framework for future innovations, particularly in the field of technology.

- For example, the NHS in the United Kingdom has adapted to the changing ecosystem by creating standards of trust and foreseeing the increased complexity brought about by the arrival of AI. Its long-term plan is a health system structured by digital technology with a framework of trust to facilitate patient use. It aims to anticipate questions that professionals and patients may have about clinics, technology, data, and personal security.

In specific cases, particularly in that of breakthrough innovation, allow an exception to the precautionary principle:

- Introduce regulatory sandboxes - widely used in the United Kingdom in fintech, these are test grounds for new business models that are not protected by current regulations or supervised by regulatory institutions. They are particularly relevant in the high-tech world, where there is an increasing need to develop regulatory frameworks for emerging business models. The objective of these regulatory sandboxes is to adapt compliance with strict financial regulation to the growth and pace of the most innovative companies, in a way that does not stifle the fintech sector with rules and ensures consumer protection. Largely used by startups, this solution is particularly appropriate for future data technologies, especially around automation and privacy.
- Reduce administrative delays in declaration and authorization with the introduction of emergency procedures, which in certain situations make it possible to speed up requests.

Support innovation

Simplifying the ecosystem, from financing to innovation

The Research Tax Credit (RTC) mechanism is a major French asset to support innovation. Implemented in 2004, it has enabled a growth of 4 times more foreign investment projects between 2008 and 2018. R&D spending by foreign companies increased by 67%. Beyond their impact on growth, R&D activities create highly skilled, high value-added jobs throughout the country[13].

However, the operating times of the research tax credit are not always adapted to the life cycle of small structures. Indeed, the need for companies to mobilize funds before obtaining the RTC are a consistent obstacle during crucial periods in their development. The time required to obtain a refund is generally 4 to 9 months but can in some cases be up to several years (through the initiation of tax audits, or by considering the application for reimbursement of RTC as a contentious request for which the corresponding time limit is 6 months from the receipt of the complete file)[14]. As a proof of the impact of the excessively long repayment periods of the RTC, a private company, NEFTYS[15], recently began offering pre-financing of the RTC (cash-flow). Similarly, BPI France also refers companies to private financers who offer this type of solution[16].

While the substantial increase in innovation support measures since the 2000s has led to a significant improvement in France's performance, the ecosystem has also become more complex. While the State and its operators managed nearly 30 national schemes in 2000, this number increased to 62 by 2016 not including the various mechanisms managed by local authorities.

PROPOSITIONS

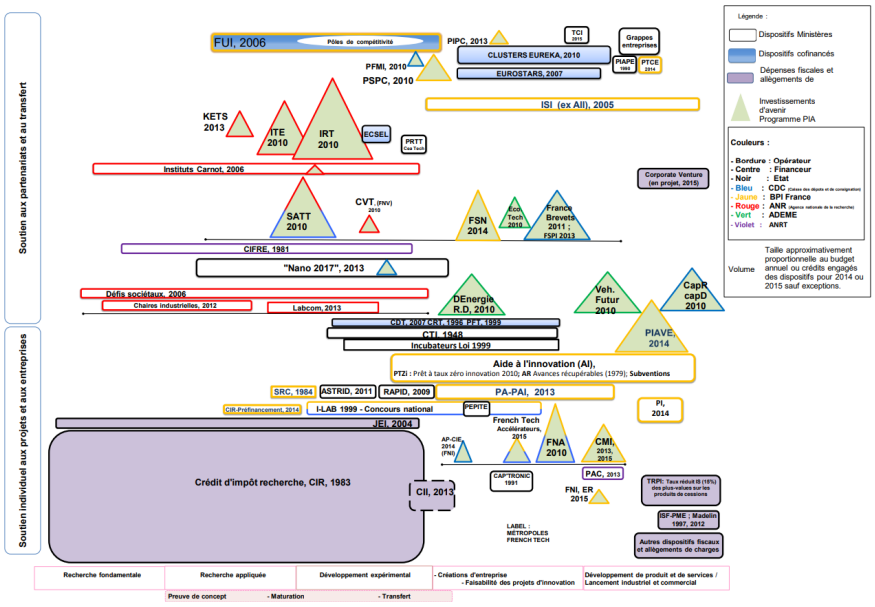
OBJECTIVE :

Safeguard the Research Tax Credit and work towards synchronizing payments with R&D spending.

RECOMMENDATION FOR ACTION :

Accelerate payout of the RTC so that the cash advance does not represent an obstacle to investment in innovation. This measure could consist of a gradual transformation of the RTC into cost allowances. This program could start with start-ups and SMEs and later expand to bigger companies.

The overabundance of options pictured here makes the landscape hard to understand, redundant, and sometimes results in ineffective use of public funds. This is particularly concerning for foreign investors in France, who have more difficulty understanding these administrative complexities. This complexity also applies to the use of European funds , for which France is lagging behind its European competitors. H2020 shows that France could use this aid more often; for the H2020 Proof of Concept 2018 call, France received 4 grants, while the United Kingdom hold the first place with 13 grants, followed by Italy on equal footing with Spain (8 grants) and the Netherlands (7 grants)[17]. In this respect, it is also noteworthy that the access of non-French companies to the filières (official sectoral industrial networks defined by the French government) appears very limited. Innovation in France is linked to the organization of sectors in filières, notably when it comes to obtaining European funding, hence the necessity for the filières to be more inclusive of foreign companies.



It is key to continue the work the State has initiated to simplify the innovation a landscape, particularly the changes made since the creation of BPI France in 2012. France should aim towards making a greater amount of information accessible to potential investors. For instance, competitiveness clusters have made it possible to overcome difficulties linked to an ecosystem that was previously fragmented. This simplification should also go hand in hand with the establishment of public-private partnerships or at least a grouping of public and private actors.

PROPOSITIONS

OBJECTIVE :

- Simplify and facilitate the understanding of the innovation funding ecosystem , particularly for foreign investors.
- Assist foreign investors in obtaining innovation grants..

RECOMMENDATION FOR ACTION :

- Create a digital portal bringing together all information on existing innovation grants with their characteristics, target audiences, step by step processes, and the corresponding contact point. This information should also be available in English.
- Maximize the use of European funding by supporting companies through application processes

A model State for innovation

Encouraging innovation by creating a new culture of public procurement

Beyond the various innovation subsidies, the State should make an additional effort to use innovations through public procurement and regulated markets such as the drug market. Indeed, the dispersion and success of innovation presupposes that partners and clients - both public and private - are "consumers" of this innovation. The creation of a market is the best way to stimulate the development of an innovative ecosystem where authorities evaluate innovation in all its dimensions rather than exclusively based on cost.

The pharmaceutical industry showcases the difficulty to grasp the full complexities of innovation especially in the drug reimbursement processes. **The evolution of the health technology assessment system in France has been problematic for several years. The current system does not allow for uncertainty, a factor inherent to innovation, and thus blocks potentially promising therapies where there is a lack of required data available. This issue is the direct consequence of the need for consistency in a dual evaluation system that takes both the medical benefit and the added medical benefit of the drug into consideration. Also, because drugs to treat long-term diseases are reimbursed in full regardless of medical benefit, this system is losing relevance. When negotiating prices, open data encourages the emergence remuneration models for drugs based on their impact on quality of life.**

Similarly, according to the European Commission's 2018 report, France ranks only 13th in terms of digital public services, lagging behind both regarding the number of digital services and the progress of the technologies used (especially in comparison to Finland or Denmark). This problem is due to a heavy administrative burden for government procurement procedures around ICT infrastructure. These procedures focus mainly on the price, overshadowing other important criteria such as progress in innovation or respect for the environment.

The State could use the latest ISO standards to promote better CSR practices in the definition and evaluation of innovation in the procurement process.

Finally, in addition to helping businesses grow through public procurement, the State can help innovative companies by offering them assets to enhance their value through data. Public data has a great value and making it available costs almost nothing.

Moreover, it is essential to include innovations developed by foreign companies in public procurement. If these innovations do not fall within the scope of strategic protected sectors as defined by law, French institutions should be able to reap their benefits. For example, by over-implementing a 2014 directive on the protection of national heritage, France has made all electronic documents (e-mails, etc.) fall into a category of "national treasures", which means that they cannot leave French territory. Interpreted literally, this would mean that French administrations would not be able to use cloud solutions offered by foreign companies. The Government has not yet followed through on their promise to reverse this provision.

PROPOSALS

OBJECTIVES OF THE PROJECT :

- Transform public procurement decision processes to encourage innovation by taking total cost of ownership into account in the purchasing decision.
- For areas not considered as strategic sectors by the PACTE law, open innovation projects to all companies in France, without any exclusion of origin.

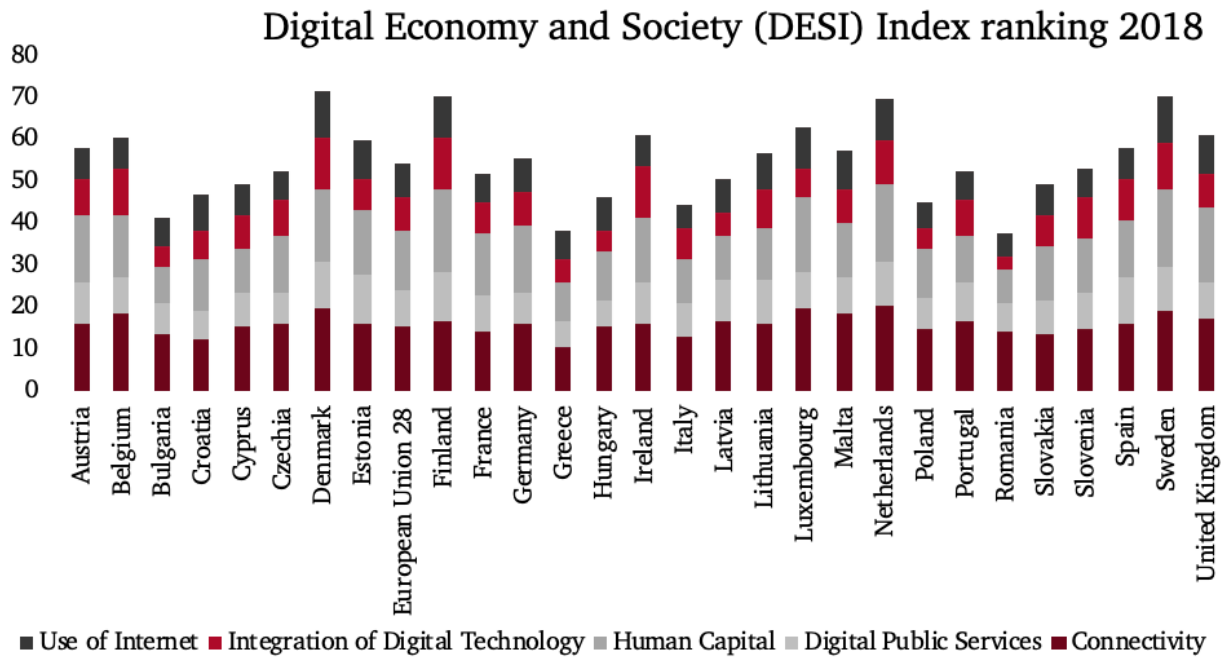
RECOMMENDATION FOR ACTION :

- The decision-making factors determining public procurement (such as those defined by French Network and Information Security Agency), include a systematic multi-criteria approach that also takes into account innovative and sustainable aspects of technologies, including:

- the quality of innovation, its degree of progress
- environmental protection by moving towards State certification of the ISO 20400 standard
- the management of uncertainty, with the ability to use foresight, while requiring strong counterpart measures from manufacturers.

- Establish guidelines and training to ensure that these criteria are considered. Do not exclude any foreign infrastructure/company. Open all sectors to all actors based in France to guarantee the representativeness and efficiency of the development capacities available for the country.

Similarly, the State could encourage SMEs to digitize further. SMEs represent 50% of employment in France and 80% of employment outside metropolitan areas; it is therefore essential for the culture of innovation to be encouraged within all economic structures in France. SMEs continue to use the IT tools acquired 10 or 20 years ago but have little experience in online sales, the cloud or robotization. This observation is reflected in a study carried out by BPI France based on the results of a survey of 1800 SME and mid-cap company managers. The most worrying aspect according to BPI is that SME managers still too often confuse digital transformation of their company for the mere digitisation of tools and processes. The digital transformation of companies is a major economic and societal challenge for France, which in 2018 was only 18th in the EU according to the DESI indicator, the European Commission's index on the digital economy and society. The digitalisation of SMEs could be helped by the representative bodies of industry. For example, France Chimie has just signed a partnership with Accenture to advance the digitization of SMEs in the chemical industry; this type of initiative could be replicated in other sectors.



Nonetheless, several government proposals are underway, including the Great Investment Plan (€4.4 billion to make the State more tech-savvy and agile and €4.9 billion to accelerate the digitization of the health system) and a change in the State procurement department's direct objectives, which includes attract innovation as one of its priorities. We must encourage the State to continue its evolution into a driving force for innovation.

"In addition to helping businesses grow through public procurement, the State can help innovative companies by offering them assets to enhance their value through data. Public data has a great value and making it available costs almost nothing"

France has adopted a national action plan for the 2015-2020 period, which aims at achieving environmental (30%) and social (25%) objectives in public procurement by 2020 -with ambitious recommendations on energy performance (100%) and "end-of-life" (80%). AmCham calls on the French authorities to be more ambitious in the implementation of these objectives.

In 2018, the Ministry for Ecological Transition published a non-binding charter to encourage local public authorities to communicate and report on their commitment to sustainable procurement; the objective is currently for 60% of local public authorities to commit to this charter by 2020. The authorities signing the charter will also have to adopt a three-year implementation plan for sustainable procurement. AmCham calls on public authorities to sign and commit to better consider the environment and climate.

In France, the share of public contracts awarded based on criteria other than cost only increased from 5% to around 15% between 2015 and 2017 according to the 2018 Single Market Scoreboard for Public Procurement.

Notes

[1] DG Trésor rapport 2018 sur l'investissement
[2] Publié conjointement par l'OMPI, l'université Cornell et l'Insead, cet index évalue les capacités et les performances de 126 pays en matière d'innovation.
[3] L'INNOVATION EN FRANCE Indicateurs de positionnement international (2016) - Coordination interministérielle de l'Innovation et du Transfert
[4] https://static.latribune.fr/991682/statista-investissement-2017-pays-de-l-ue-secteurs-public-et-prive-eurostat.png
[5] https://www.latribune.fr/technos-medias/20131011trib000790084/xavier-niel-a-sciences-po-la-france-est-un-paradis-fiscal-.html
[6] http://www.planbatimentdurable.fr/pia-3-8-nouveaux-appels-a-projets-sont-lances-en-a1207.html
[7] ANNEXE AU PROJET DE LOI DE FINANCES POUR GRAND PLAN D'INVESTISSEMENT
[8] Publié conjointement par l'OMPI, l'université Cornell et l'Insead, cet index évalue les capacités et les performances de 126 pays en matière d'innovation.
[9] https://www.economie-magazine.com/dossier-22-industrie-france-chiffres.html (constat à partir de l'état de l'industrie)
[10] https://www.economie.gouv.fr/entreprises/depot-brevet-inpi (30 mois environ pour obtenir un brevet à partir de la date de la demande)
[11] http://www.leparisien.fr/economie/allemagne-le-premier-train-a-hydrogene-entre-en-exploitation-17-09-2018-7891488.php
[12] https://www.usinenouvelle.com/article/pourquoi-la-france-n-a-aucun-parc-eolien-offshore-au-contraire-des-autres-pays-europeens.N740474
[13] http://observatoire-du-cir.fr/media/observatoire-cir-2017/
[14] https://www.innovatech-conseil.fr/delais-de-remboursement-du-cir/
[15] https://www.neftys.fr/avance-fonds-cir.html
[16] https://www.bpifrance.fr/Toutes-nos-solutions/Prets/Credits-de-tresorerie/Mobilisation-du-CIR
[17] http://www.horizon2020.gouv.fr/cid137509/resultats-du-3eme-tour-de-l-appel-erc-proof-of-concept-2018.html