

End-of-Probationary-Period Evaluation Report

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 by 22nd December 2015, 1 p.m. (Paris time)

Full title of the IDEX	PSL Research University
Key words	
Start date End date	
IDEX website	www.univ-psl.fr
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Institution leading the project (Project leader)	Name: PSL Research University Type of institution : FCS
Date of writing	December 2015

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SUMMARY

In 2010-2011, sixteen of the most prestigious French higher education and research institutions¹ joined forces in order to create a world-class integrated research university with a concerted academic policy, a complete educational offer from undergraduate through to doctoral level, and a strategy to promote valorisation and knowledge dissemination.

PSL Research University is up and running. Given a projected ranking of 25th in the world², it has progressively secured an ever stronger footprint in the European research space: its share of the total ERC grants awarded increased by more than 25% from 1.7% in 2010 to 2.2% in 2014³. The number of applications for PSL master's degrees has also increased by 40%, while the number of start-ups created has more than tripled since 2012 to reach 21 in 2015.

IDEX has been instrumental. In the field of research, it has been a driving force together with the Labex as an incentive to develop a common signature policy. It has triggered circa 100 new research projects that have stimulated academic creativity while also strengthening the links between the teams of its member institutions. The University's IDEX and the Labex projects have also been the means of implementing an ambitious recruitment policy by offering competitive research conditions that have attracted both promising and established researchers together with top international master students: 245 PhD students, 271 post-docs and 11 world-class researchers. PSL's teaching has equally benefitted from the creativity and innovation stimulated by calls for proposals. A number of highly innovative degree programs, unprecedented in the French academic landscape, have been developed, such as the multidisciplinary undergraduate degree (CPES) that combines the best of the French "prep classes" (CPGE) and university systems or the pioneering doctorates at the intersection of research and either artistic creation (SACRe) on the one hand, or engineering (ITI) on the other hand (cf. 1.5.3). The university has also developed a pioneering knowledge transfer team (cf. 1.5.4). It has also forged strategic international partnerships with some of the world's leading universities such as the University of Cambridge (cf. 1.5.8).

The University has also elaborated shared development strategies for all its member institutions in the fields of digital, knowledge dissemination and the modernisation of campus life. A particular focus has been given to the implementation of a common digital strategy which is instrumental for the university integration and the development of lasting synergies between member institutions. Endowed with a budget of €13m and overseen by a dedicated vice-president, a Digital Development Plan was elaborated in 2014 to equip PSL with the innovative infrastructure, digital solutions and computing services that it needs to realise its ambitions. Finally, PSL has developed a Real Estate Development Plan to build "smart campuses", facilitate circulation between them, and negotiate improvements with the City of Paris.

These achievements have been made possible by the setup of a governance model and a legal structure adapted to PSL's needs. Since the Foundation could not legally be conferred degree-granting competences, PSL's members made use in 2014 of the legal status known as the "ComUE" (*Communauté d'universités et d'établissements*) in order to enjoy the full range of

¹ CNRS, INRIA, INSERM, CNSAD, CNSMDP, Collège de France, Ecole Normale Supérieure, ENSAD, ENSBA, ENSCP Paris Tech, ESPCI Paris Tech, Fondation Pierre-Gilles de Gennes, Institut Curie, Institut Louis Bachelier, Observatoire de Paris, Université Paris Dauphine

² According to a simulation of the Shanghai Ranking by Docampo, Egret & Cram, *Scientometrics* 104, 175 (2015).

³ The figures for 2015 are not final but are even more favourable thus far.

powers granted to institutions with university status.⁴ The doctoral degree has been completely transferred to the University and a progressive transfer is ongoing at undergraduate and master's level to guarantee a coherent and structured degree portfolio. Significant competence transfers to the University valorisation structure are underway (1.5.4 and 2.5). The governing bodies are now fully operational, giving PSL an indisputable academic and democratic legitimacy. The President and his senior management team (Vice-Presidents and Deans) play a major role in giving impetus and coordinating actions within the university. The central role played by the Council of Members, which includes the research organisations, guarantees the involvement of PSL's communities. Finally, PSL's members have set up an operational governing structure to ensure the implementation of policy orientations.

These major evolutions have meant overcoming significant hurdles, but they have also encouraged the development of a consistent learning-by-doing approach. In particular, the drawing up of statutes required major work to ensure that they conformed to legislation while also preserving PSL's flexibility. The election of a new president in December 2014 also gave rise to intense debate that proved the solidity of PSL's governing bodies and reasserted the strength of the member institutions' shared commitment.

In what is proof of its attractiveness, PSL Research University has been joined by 8 additional leading HE institutions⁵ that share its core values and its transformative ambition. These new members have strongly reinforced PSL's scientific potential; and the impending association with the Pasteur Institute will give a further boost to the University's dynamics.

Unlike the traditional faculty model, PSL links HE institutions which are very often driven by an interdisciplinary ambition, and creates value out of it. It is equally characterised by the diversity of its members' academic cultures, and their uncompromising standards, each in their field. Thus shared values and cultural diversity are at the heart of the PSL dynamic: they give rise to academic opportunities but also trigger self-questioning and new visions. PSL is both a virtuous creative process between its institutions and a continuing impetus for their transformation.

PSL affirms the strength of this model and its irreversible drive towards greater integration. For the future, this original model needs to be enhanced and institutionalised in order to definitively position PSL Research University as a leader on the world stage.

In order to adopt the most efficient strategic means for implementation of its goal, PSL member institutions have committed themselves notably to continuously update their precise knowledge of the position of the University on the world market; to keep tempo with what's happening in the world while preserving their unique character; to be active in relations with the socio-economic sphere worldwide thanks to a carefully constructed network that may be activated rapidly; to identify the axes of research and innovation thanks to the collective and up-to-date intelligence of their ecosystem; to establish a governance model that favors the expression of ideas for added value by the different stakeholders both internal and external; to manage the available funding within a timeframe compatible with the development of research and innovation while taking into account the contingencies of the strategic partners (namely the State, companies etc...); to adopt a flexible operational structure making use of a management per project system and a mobilisation of the knowledge centers and ad hoc expertise; to capitalize on resources: to network all expertise, including functional expertise,

⁴ PSL Foundation has been maintained as a complementary tool for running the IDEX project. Its governing bodies are closely integrated with those of the university (joint presidency, the central role played by the Members' Committee, 60% of board members sitting on both boards).

⁵ The new members are the Mines Paris Tech, the lycée Henri IV, the Institut de biologie physico-chimique-Fondation Edmond de Rothschild, La Fémis, the EFEO, the EHESS, the ENC and the EPHE.

in all cases; give voice to all stakeholders notably the students; to spotlight and disseminate PSL's intellectual contributions through the development of an ambitious marketing and communication plan which involves actors from throughout the PSL community.

To achieve PSL's transformation model, which is articulated around two focuses, core mission and support functions, the University will utilise the following five generic levers:

The "evaluation and strategy" lever: PSL's foundational bottom up approach favours entrepreneurship and fosters a culture of innovation. It needs to be combined with a top down approach designed to strengthen the coherence of its vision and secure impact through strategic oversight, periodic evaluation of its academic potential, resources, organisation and processes; strategic dialogue (2.2); Key Research Programs (2.3); a global HR strategy and a corporate university (2.7). These measures cover PSL Research University as a whole and not only the IDEX projects.

The "innovation" lever: PSL is committed to creating value through innovation (collaborative research, knowledge dissemination, technological impact etc.) which will help to transform its activities in the fields of research, education and creation. This commitment will require ever-closer links with the socio-economic world. PSL thus strengthens the coherence of the role it plays in society and in the knowledge and creative economies (cf. 2.5), while embedding impact criteria in the evaluative and strategic processes (2.2) and developing an increasingly thematic approach to research (2.3) and teaching (2.4).

The "pooling/structuring" lever: the efficiency imperative will be met thanks to a Synergies Fund as part of a greater move towards the pooling of facilities, the structuring of academic potential, expertise and skills. Digital strategy represents a major area in which PSL will pool key computational and storage resources but also improve the student experience (cf. 2.4), enhance connectivity within the community (cf. 2.7.) and improve administrative efficiency (cf. 2.8).

The "networking" lever: PSL's openness should be twofold: internal and external. Internally, PSL will focus on improving circulation of students (cf. 2.4), academic and administrative staff (cf. 2.7) within PSL, encouraging exchanges between them, particularly through a PSL social network and a coordinated events calendar. Externally, PSL will develop its capacity to meet the expectations of society (cf. 2.4), reinforce its international strategy (cf. 2.6), incorporate external experts in a wide range of key processes (cf. 2.2) and develop the PSL Alumni network worldwide.

The "image and communication" lever: in spite of the many achievements to date, enhancing PSL's visibility remains a key challenge. PSL's priorities will be the following. 1) Rankings: PSL aims to be ranked internationally within the next two or three years. This is a key milestone. In order to ensure that PSL meets the required criteria, incentives are being introduced to accelerate the uptake of the common citation policy and the transfer of degree-granting powers to PSL. 2) PSL membership: Membership in the PSL community must be emphasised symbolically through PSL graduation ceremonies (cf. 2.4.), the recognition of "PSL Permanent Faculty" status (cf. 2.8.) and the systematic inclusion of the PSL label on all degrees. 3) Communication: Among other image building efforts, PSL Research University is to appear as the baseline of member institutions' logos, and PSL Permanent Faculty members will be encouraged to participate fully in public debate and decision-making (2.6).

1. Achievements

1.1. Taking account of the jury's recommendations

Jury's recommendation	Response given	Any commitment(s) made accordingly
Maintain a sustained commitment to build PSL as a single entity in four years	<p>In 2015 Paris Sciences et Lettres Research University became a university in the fullest sense of the term. It is a degree-granting institution (building on the policy already in place at doctoral level and for a number of undergraduate and Master's courses) and has instituted a common signature policy for publications. It has also defined and implemented an ambitious joint functional planning strategy, particularly regarding the University's presence on the international stage, the use of digital resources, the knowledge dissemination and real estate.</p> <p>To help in the running of the IDEX project, the University has decided to maintain the PSL Foundation for Scientific Cooperation, which, as a private institution, enjoys the greatest possible flexibility in recruitment and transfer to industry activities. The governing bodies of the University and those of the Foundation are closely linked (a joint presidency, a Council of Members that plays a central role, and 60% of the members of the Board of Directors sitting on both boards).</p>	<p>The member institutions have already transferred their doctoral degrees to PSL.</p> <p>They have committed to a progressive transfer of their remaining university degrees to PSL (cf. chapter 2). This transfer is to be implemented in cooperation with the other ComUEs in Paris so as to preserve PSL's existing cooperations with non-member partners.</p>

1.2. Changes in the project at the time of grant agreement preparation

The grant award agreement of the Paris Sciences et Lettres IDEX project in April 2012 included four modifications to the submission file, as shown in the following table.

Submission file	Grant award agreement	Reasons for this difference
A commitment to ensuring that PSL's doctoral schools all carry the PSL label , on the basis of a PSL charter, and that doctoral students in laboratories linked with PSL member institutions are affiliated with PSL .	A similar engagement in terms of labelling and affiliation, which also explicitly proposed that certain doctoral schools would have PSL accreditation and that doctoral students would be enrolled at PSL .	This reformulation was introduced in view of the creation of the EPCS PSL Formation and the quinquennial contract running 2014-2018. PSL has since been accredited for all of the doctoral schools within its jurisdiction and all doctoral students are enrolled at PSL.
An excellence perimeter covering 80% of researchers and lecturer-researchers, based on the evaluations of the AERES (A+ or exceptionally A) and criteria based on publications, international awards and transformation potential.	An adjustment of the excellence perimeter with the removal of the LEDa (economics).	The LEDa was evaluated by the AERES in 2009, shortly after it was created by the economics departments of Paris-Dauphine being brought together. On account of this evaluation, it was not possible to include it in the excellence perimeter for the 2011 IDEX project. Nevertheless, the development strategy of this new Laboratory (thematic structuring, governance, the creation of a UMR in collaboration with the IRD, a drive to produce high-quality publications, selective recruitment) bore fruit quickly, and the AERES gave the LEDa A+ and A evaluations for its different criteria in 2012. The LEDa has continued to progress since.
A structuring of research based on seven institutes organising the existing research units by disciplinary or interdisciplinary themes.	An adjustment of this structure with the creation of the PSL Schools, organised into major disciplinary fields (arts, humanities and social sciences, sciences, management and administration, engineering) and eight <i>graduate</i> research and teaching institutes (cooperative rather than administrative structures).	This evolution reflected a desire to clarify the horizontal structure presented in the submission file, which would have unnecessarily complicated the proper functioning of PSL's laboratories and member institutions by imposing new structures on them. An incentive-based approach was thus favoured to promote the creation of open collaboration, be it disciplinary or thematic, initiated by the research groups concerned.
A budget based on a request for €42.351m per year.	A revision of the budget in order to prioritise actions in a number of fields (notably IT and the graduate programme) while preserving the overall balance between research (49.2%), teaching (23.4%) and interdisciplinary projects (25.9%).	This revision was necessary in light of the 39.6% reduction in the budget allocated to the IDEX when compared with the amount requested.

1.3. Structuring and governance of the “Target University”

1.3.1. Constitution and structuring of the “Target University”

Has the “Target University” been created or is it in the process of being created?

From the outset, the ambition of PSL IDEX project was to create “**a world-class integrated research university**” with a concerted scientific policy, a common educational offer and a valorisation strategy in the broadest sense of the word (transfer to industry, collaborative research and knowledge dissemination). Boasting nearly 20,000 students, almost 4,000 researchers and around 200 laboratories, Paris Sciences et Lettres is founded on a number of principles shared by all its members: a selective admissions policy and individualised support for students, highly demanding courses, diversity of students profiles, continuous integration of research and education, integration of the strengths of its research organisations, increased internationalisation of structures and actors, and the development of multidisciplinary and transdisciplinarity. As such, placing research at the heart of PSL is crucial: it is both the starting point for thinking about the University's teaching offer and how to renew it, and the driving force behind innovation.

The Law on Higher Education and Research of July 2013 has provided an important opportunity to the project by creating the status of ComUE. The member institutions of PSL have taken advantage of this new legal status in 2014 to constitute themselves as a **university**

in the fullest sense of the term and a **degree-granting institution**. Its governing bodies are now fully operational and they have shown their capacity to both act decisively and adapt, as can be seen for example by the rapid integration of new members.⁶ The University has also created common services, which are both reactive and increasingly well integrated with member institutions' services, to implement their strategy in recruitment (1.5.2.), research (1.5.3.), transfer to industry (1.5.4.), international relations, student life and knowledge dissemination (1.3.2.), or indeed their real estate and digital strategies.

Four years on from the creation of PSL, the results testify to **an ever stronger commitment to the construction of the University** through multidisciplinary research projects, ever closer cooperation with the national research organisations which are fully integrated within its structure, degrees granted by the University, a diversification of the student community, an international development strategy and partnerships developed not by individual institutions but by the University as a whole. At the end of 2013 our Strategic Orientation Committee had underlined the ability of our teams in "learning by doing". This is all the more true two years later: rather than working from pre-established templates, PSL decision makers begin by experimenting, after which they evaluate and then institutionalise only insofar as it is necessary for the success of the project.

In 2011 the jury recommended that every effort be made to make PSL Research University a "single entity". This is now a reality, and the challenge at present is to see this process through to its end, particularly by ensuring the University's projected position of 25th in the Shanghai Ranking.

What institutional changes have taken place over the 4 years?

Following the Law of 22 July 2013, the members of the Foundation chose to establish PSL as a ComUE. The Collège de France, already a member of the Foundation (and as such at the heart of the University's research, teaching and knowledge transfer development), and the new structure have established a privileged partnership agreement, and its director sits not only on the Board of Directors of the Foundation from the beginning but he is also on the Board of Directors of the ComUE, now, as a qualified personality. The FCS was kept as a complementary means for managing the IDEX project.

During the last four years, PSL has been reinforced by **two waves of enlargement which saw the accession of new members** that share the fundamental values of the project as well as its structuring and transformative ambition. The founding members were first joined by the Mines Paris Tech, Lycée Henri IV, Institut de biologie physico-chimique (Fondation Edmond de Rothschild) and La Fémis, thereby reinforcing PSL's presence in the fields of engineering, biology and the arts while also giving it a stronger foundation for its activities at undergraduate level. The arrival of the EFEO, the EHESS, the ENC and the EPHE in 2014 considerably strengthened PSL's academic potential in humanities and social sciences, while also providing a solid basis for the PSL-Environment project, announced in 2011.

⁶ Prospects for the future development of this structuring model are discussed in chapter 2.

What competences are already exercised jointly?

All of PSL's member institutions **exercise jointly their competences in the fields of teaching, research, transfer to industry, international development, student life and the joint development of their campus**. The Council of Members plays a central role within the governance of PSL (cf. 1.3.2.) and the way it operates has been progressively reinforced. Its work is now prepared by a dedicated secretariat which facilitates the continuous dialogue between the president's office and the heads of the member institutions. The budget drawn up for 2016, for example, fully expresses the university's strategy, in that it is the result of numerous exchanges between the president's office, the vice-presidents' and deans' resorts, the member institutions and the common services of the University.

Beginning in 2013, the digitalisation of PSL's activities has been a particular focus of attention. While not much present in the 2011 IDEX submission file, digitalisation was quickly identified as being not only essential to the long-term development of longstanding synergy between members, but also the most urgent step to take. Following the formulation of the Digital Development Plan (with a commitment to invest €13m) and the creation of a work plan, a dedicated vice-president has taken up office at the end of 2015 with a clear mission: to accelerate the digital integration of the university (see appendix IX).

Beginning in 2012, the member institutions have also progressively put in place an operational governing system to add impetus to PSL's strategy of pooling resources at the administrative level. A **Conference of the members' Chief Operating Officers (COO), whose president is the University's COO**, now convenes monthly to advise the Council of Members through working papers prepared by working groups that bring together the members' directors in a range of fields, including human resources, IT, finance, real estate, communication and student life (cf. chapter 2 and Appendix VIII).

What competences are effectively transferred to the Target University?

The first move saw member institutions transfer the **running of the IDEX project** to PSL's governing bodies and common services, along with the development of strategic international partnerships, the running of teaching and research programs decided upon jointly, and part of their transfer to industry policies. In 2015 they transferred to the University their entire **doctoral degree-granting competence (See Appendix II)**. At **undergraduate and master's level, a gradual transfer process is underway** in order to take into account differences in tuition fees, the particular status of engineering degrees and the need to preserve courses offered jointly with other universities; but the dynamics of integration are already very strong as shown by the CPES' third year in economics, law, social sciences and maths, which takes place at Paris-Dauphine and includes students from ENS; or by the new PSL masters emerging from the Labex' teaching offer; or by the launching of a shared MOOC/SPOC offer in 2015 (see 1.5.3). The member institutions have also decided to transfer to PSL's common services competences in the fields of **knowledge dissemination**, the construction of an **IT and digital system** and the **modernisation of campus life**. The University also liaises with the national government for the signature of the multi-year site contract and with local authorities (the Île-de-France region and the City of Paris) for the signature of the State / Region framework contract (CPER).

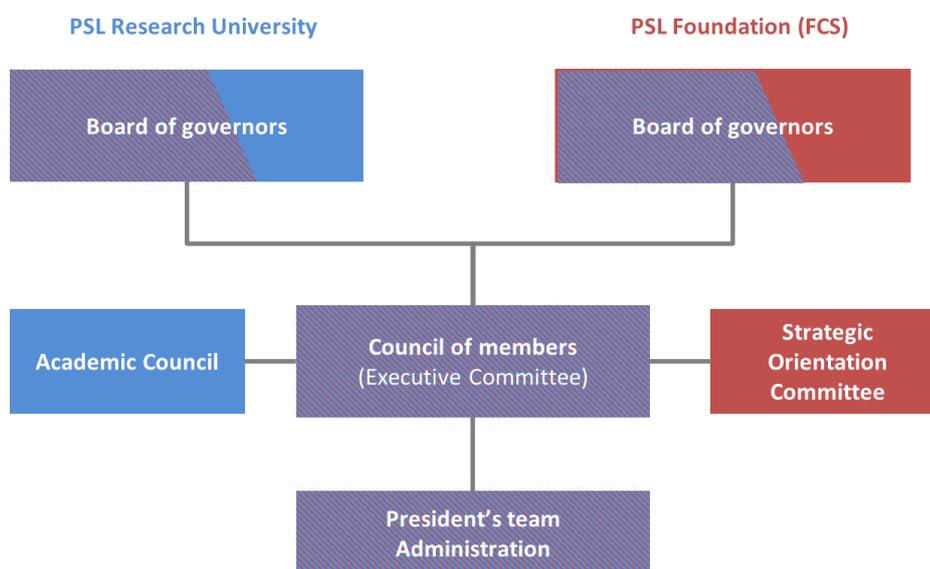
Will these competences be enhanced in the future?

These competences will be reinforced in the future as part of a continued drive towards greater integration in order to give the University and its members the means to realise their shared ambition. The means by which these competences will be reinforced are discussed in detail in chapter 2.

1.3.2. Governance

What changes have taken place with regard to project governance (and site governance if they are separate)?

The coherence of PSL's governance is guaranteed by the strong integration of its governing bodies. The policy of a joint presidency of the ComUE and the Foundation, strongly reaffirmed with the election of the current president in late 2014, guarantees an executive power with sufficient impetus. The same Council of Members is also placed at the heart of the governing structures of both bodies.⁷ Decision-making efficiency is ensured by the application of **majority rule** in all the university's councils, with only a small number of exceptions, most notably concerning the election of the president and vice-president of the University (cf. 2.9). The **collegiality of the governance** is guaranteed by the presence of representatives of the different member institutions in the University's main councils, which are characterised by the transparency of their deliberations and the rarity of the need to proceed to a vote.



The **Board of Directors** (CA) of the ComUE is composed of twelve representatives of member institutions, four qualified personalities, four representatives from business, local authorities and non-profits, and ten staff and student representatives. It meets at least three times a year and is primarily concerned with overall development, strategic planning, the organisation and running of the university, its teaching program, accession of new member institutions and the budget. The CA of the Foundation meets on the same day as the CA of the ComUE (they share 60% of their members) and it controls the use of IDEX funding.

Composed of 10 international academic figures, the **Strategic Orientation Committee** makes recommendations on the strategic orientations taken by the University. Its recommendations in September 2013 and October 2015 were instrumental in improving PSL's strategic project and adapting the procedures for its implementation at key moments (cf. appendices XI and XII).

Placed at the heart of the University's governing structure, the **Council of Members** brings together the heads of the member institutions twice a month, under the authority of the

⁷ Moreover, 60% of the members of the Boards of Governors of the University and the Foundation sit in both boards, once again guaranteeing coherence in PSL's strategic planning.

President.⁸ The Council of Members generally votes by simple majority, a unanimous vote being required only for the choice of the candidates recommended to the Board for president, vice-president or Dean. In practice, the Council very rarely proceeds to a formal vote, thereby ensuring it remains a driving force within the University.

Within the executive, the **President** presides over the Board and the Council of members, thereby playing an essential role in providing coordination and impetus. He is assisted by two vice-presidents, three Deans (of teaching, research and valorisation) and a COO, whom he brings together once a week within the Executive Committee (Comex). The vice-president is in charge of the sound running of the governing bodies, supervising the preparation of different councils and the implementation of their decisions. The digital vice-president is in charge of one of the major drivers of integration within the University as he presides over the steering committee of the Digital Development Plan. The Dean of research presides over the Research Council and coordinates the members' research vice-presidents and representatives of research institutions. In the same way, the Dean of teaching and the Dean of valorisation preside respectively over the Teaching Council and the Valorisation Council and coordinate their counterparts in the member institutions. Each vice-president or Dean can call on a number of different directors (finance, human resources, communication, international relations, research, digital strategy & student life, innovation & entrepreneurship), whose collective work is co-ordinated by the COO.

The **Academic Council** (CAC) acts in a consultative capacity to assist the Board. Its academic and democratic legitimacy is guaranteed by its make-up, as it both brings together PSL's different communities and offers a significant role to outside figures.⁹ While the Foundation was the only legal body of PSL, a Teaching Council and a Research Council were established, presided over by their respective Deans and composed of representatives of the member institutions. Due to the institutional development, these two councils now include representatives of the Academic Council. These two councils play an essential role in the preparation of dossiers before they are discussed and finalised by the Comex and then debated and adopted by the Council of Members, the Academic Council and the Board.

What are the main decisions taken jointly by the governing bodies in place?

The decisions taken jointly by PSL's governing bodies have covered the whole spectrum of academic life: not only the institutional evolutions described above, such as the **integration of new members**, the adoption of the **statutes of the ComUE** but also key decisions concerning research and education programs, knowledge transfer, the management of the University and campus life.

The election of a **new president** in December 2014 was a key moment in the trajectory of PSL Research University. The intense debates surrounding the election proved the solidity of its governing bodies and confirmed not only the principle of a joint presidency but also the depth of the member institutions' shared commitment.

Since 2014, the university has adopted several structuring strategies for its development over the coming years. The implementation of the CPES in 2012, the plan to support Paris-Dauphine's development at the bachelor level, the transfer of the doctorate in 2014, the emergence of PSL masters based on the Labex teaching or on coordination between member

⁸ Its composition is identical to the composition of the Steering Committee of the Foundation, since it was enlarged to include the Collège de France which now has a consultative vote as an associate member.

⁹ The Academic Council is composed of 120 members, including 12 representatives of the member institutions, 6 qualified personalities, 6 representatives from business, local authorities and non-profits, 60 representatives of researchers and lecturer-researchers, 12 representatives of other staff and 24 student representatives, following legal requirements.

institutions are the most substantial examples of decisions taken jointly in education; as is the launching of PSL Chimie, the reshaping of PSL Environnement or the decision to launch a new type of research programs in 2015, as far as the University's research strategy is concerned.

With the **signing of the site contract** in July 2014, PSL was able to state its ambition in clear and workable terms, while also gaining the support of the Ministry in ensuring its implementation. Similarly, with the adoption of the **Digital Development Plan** in October 2014 and the elaboration of the **Real Estate Development Plan** in 2015, PSL has instituted an ambitious development for all its member institutions.

1.4. Trajectory

This table was completed on the basis of the commitments listed in annex 4 of the ANR agreement. The percentage achievement is calculated with respect to the target at 4 years.

Operational commitments		Scale of achievement (%)	Initially planned date of achievement	Any difficulties	Explanation for the level of achievement and for any divergences
International performance	Maintain PSL's position among leading French institutions	100%	2015		After consolidating the data, PSL stands out as the top French university in a simulation based on the criteria of the Shanghai Ranking. It had committed to figuring in the top 3 of such a simulation after 4 years. This simulation also shows PSL's climb from 30 th place globally to 25 th between 2011 and 2015.
	The attractiveness of the course program	Objective reached	2015		Between 2012 and 2015, the number of international student applications increased significantly (from 7,152 to 10,035), as did the number of international admissions (from 2,267 to 2,477).
	The attractiveness of research and teaching projects	Objective exceeded	2015		There were 11 successful international applications for PSL chairs. The four-year target was only 4 such recruitments.
	Dynamism of new and existing international partnerships	Objective should be reached in 2016	2015		5 strategic partnerships have been created with institutions at the top of international rankings: the University of Cambridge, UCL, National Taiwan University, Hong Kong University of Science and Technology and the Technion. 3 are in the making: with EPFL (to be signed in February 2016), NYU and Columbia University (both to be signed before the summer of 2016). The four-year target was 6 international partnerships.
	Student mobility		2015		Between 2011 and 2015, 44 students received incoming grants funded by the IDEX and 48 PSL students received outgoing grants to study in PSL partner institutions.
	Increased dynamism of PSL research projects	Objective reached	2015		Between 2011 and 2015, 92 new ERC grants were awarded to PSL researchers, and PSL's share of the total ERC grants

					awarded increased by more than 25% from 1.7% in 2010 to 2.2% in 2014. ¹⁰
	A research dynamic based on a pioneering thematic approach to fundamental research	Objective exceeded	2015		Between 2012 and 2015, IDEX funding has been used to launch 58 calls for proposals on pioneering research themes (environment, engineering, theoretical physics, regulation theory, translational research in health). The four-year target was a 10% increase of the initial number of calls for proposals, whereas PSL has seen a 55% increase in the yearly number of calls for proposals over the last four years.
The attractiveness of the course program	The attractiveness of PSL degrees ¹¹	Objective reached	2015		The acceptance rate for PSL programs (CPES, ITI, SACRe and Pépité) is 15% in 2015.
	PSL's commitment to its social ambition	Objective exceeded	2015		In 2014, 44.6% of successful applicants for the CPES, the PSL undergraduate course, were holders of national grants attributed on social criteria (compared to the four-year target of 26%).
	Affiliation with PSL of the CPGEs of two partner high schools	Objective reached	2015		Paris-Dauphine reached in 2015 an agreement with the prep classes (CPGE) of four partner high schools. The French full undergraduate degree status (grade de licence) obtained by the CPES will strengthen this position.
	Success of the PSL undergraduate degree	Objective reached	2015		The acceptance rate for the CPES is between 8% and 9%, and the number of candidates is increasing year on year. 740 applications were received in 2014 for 60 places, and 843 for 75 places in 2015. The four-year commitment projected an acceptance rate of 5% but with a much lower number of students.

¹⁰ The figures for 2015 are not definitive but are thus far more favourable still.

¹¹ Number of students accepted onto PSL courses compared to the number of candidates, across all levels

	All Dauphine course programs (undergraduate and master's degrees) within the excellence perimeter	Objective reached	2015	The end of AERES evaluations.	The major overhaul of Paris-Dauphine's undergraduate program (mathematics, computer science, law, management, economics and social science) has had an impact on 3,500 students, who are now offered a more personalised and more international education (cf. 1.5.3).
	The complementarity of PSL institutions	Objective exceeded	2015		69 inter-establishments courses are currently offered to master's students at PSL. These multidisciplinary courses underline the synergy made possible by the complementarity of PSL's member institutions. The ten-year target was for only 10 such joint honours degrees.
	Impact of the doctoral course	62%	2015	The 2011 figures included all students in doctoral programs in which PSL is involved without considering that they might be enrolled in another ComUE.	As of September 2015, 1,234 doctoral students are enrolled at PSL following the opening of the Doctoral College, whereas a figure of 2,000 was projected in the four-year commitments: this automatic enrolment at PSL will become standard from January 2016, as emphasised in the doctoral charter. The 3,500 doctoral students of PSL's member institutions will be enrolled with the Doctoral College from January 2016.
Socio-economic impacts	Make PSL a leader in patent registration	Objective exceeded	2015		329 patents have been registered by PSL since 2011, representing around 100 a year, compared to the four-year target of 80 a year.
	Make PSL a motor for economic activity	Objective exceeded	2015		21 start-ups were created within PSL in 2014 and a total of 63 for the period 2012-2015. The four-year target was only 10 a year.

	PSL partnerships with businesses	Objective exceeded	2015		1 047 partnership contracts were negotiated with businesses in 2015. PSL has exceeded its objective by far, due to the number of partnerships contracted by Mines Paris Tech
	Expert assignments	Objective exceeded	2015		31 expert assignments were entrusted to PSL by public institutions or private organisms, whereas the commitment at 4 years was for 10 assignments.
	PSL's openness to society	Objective reached	2015		1,658 public events were organised within PSL in 2015, almost two thirds of which were regular events.
Effectiveness of the governing structure	Decision support system (DSS)	87,5%	2015		A first DSS was set up in 2014 and has been progressively developed since. It now includes 35% of indicators and dashboards, compared to 25% in 2014. The four-year target was however 40% coverage.
	PSL administration	50%	2015		50% of business processes are now included following the implementation of the PSL management information system, whereas the target was 100% after 4 years.
	PSL accounting	53%	2015		40% of costs are covered following the setting up of PSL tools for analytical accounting and management control, with an adjustment of this figure given that the management control system and its associated IT tools were not set up as planned in 2014 and 2015. 75% of costs should have been covered at 4 years.
	Increased pooling and delegation in a well-established framework of subsidiarity	Objective exceeded	2015		PSL members have pooled 11 actions, and 14 people from member institutions have been called upon as part of the Digital Development Plan (a 155% increase, compared to a projected 20% increase in 2011).

Knowledge dissemination	Bringing the digitalisation of collections up to standard	80%	2015		53,000 documents have been digitalised, thanks in large part to a 2013 PSL call for proposals, which represents 80% of the corpus initially identified. Numerous new resources have since been identified and are being digitalised to be put online by January 2016.
	Success of the digital campus	N/A	2015		471,332 resources were consulted by the community of students and researchers.
	Visibility of PSL on the internet	N/A	2015	The figures projected in 2011 for the PSL site were unrealistic.	The University's and the members websites' received more than 16 million unique visitors across the year, which is more than the 10 million expected in 2012.
	Use of PSL digital resources	Objective exceeded	2015		In 2015, lessons and conferences were downloaded 21.35 million times from PSL member websites. The target at 4 years was 4 million such downloads a year.
Campus life	Dynamism of PSL alumni networks	Objective reached	2015		In 2014 the agreement with PSL Alumni was approved by the Board of Directors. PSL Alumni, which brings together 11 member institutions alumni associations, has created a shared directory and developed mutual teaching courses. Within PSL alumni is a group of "direct PSL members" (PSL University Alumni) that includes graduates from the first PSL programs (CPES, ITI, PEPITE etc...)
	Student initiatives	N/A	2015		133 student initiatives were supported by PSL through three calls for proposals between 2012 and 2015.
	Reinforce the PSL spirit	N/A	2015		PSL is active in organising events bringing its communities together (<i>Student life days</i> , <i>PSL week</i> for engineering schools or <i>Interschools week</i> for the arts schools, <i>Webdothon 2015</i> , <i>PSL student societies day...</i>).

1.5. Other achievements

1.5.1. Transformational nature and added value

What are the major achievements of the IDEX and in what respects could they not have been achieved without the support provided by the PIA program?

The IDEX status has developed a real impetus for a **dynamic of greater integration and transformation** through joint activities between PSL's member institutions across all fields of activity. To quote the celebrated words of Robert Schuman, the university is being built through "concrete achievements which first create solidarity *de facto*". This dynamic is most clearly evident in **the development of a research strategy** that goes beyond a list of high-level collaborations (cf. 1.5.3 and 2.4.2) and in **the structuring of a comprehensive and coherent teaching offer** (1.5.3). It is also perceptible in the implementation of an **innovative valorisation model** (1.5.4) and **structuring partnerships with some of the world's leading universities** (1.5.8).

In what respect do the IDEX actions stem from a strategy that goes beyond simply funding and coordinating the operations carried out by the members?

The dynamic in place since 2012 has had profound impacts within its member institutions, examples of which can be seen with the CNRS's shift towards a site policy, the impact of the Labex on the reorganisation of research activity at the Institut Curie the ongoing restructuring of the EPHE or the art schools' progressive move towards a bachelor/master's/doctorate model. It has also given rise to new collaborations between its members including the close collaboration between the PSL pluridisciplinary undergraduate degree and Paris-Dauphine's undergraduate degrees, the 69 courses offered jointly by several member institutions, the world-class recruitments made possible by cooperation between the institutions, the creation of the PSL Fashion School to open in 2016 (ENSAD, Paris-Dauphine, Mines Paris Tech) or the development of a strategic dialogue between the different art schools, absent before their entry into PSL.

The role of the Labex in the structuring of the University must be specially emphasised here. Even if they were launched before the IDEX, they have played from the beginning an essential role in the construction of PSL as an integrated University (**For a detailed analysis see Appendix IV**). They have not only strengthened existing research cooperation such as between Collège de France, Institut Curie, ENS and ESPCI in what is one of the major assets of PSL worldwide – research at the interfaces between biology, physics and chemistry; they are also contributing decisively to an integrated cooperation with CNRS, INRIA and INSERM; they have been a multiplying factor as far as the number of PhD students and postdocs is concerned. Currently their role in the emergence of a new teaching offer at the master level is essential (for example, the ICFP Master's degree in Physics or the CogMaster in the Cognitive Sciences¹²). The Labex have been assessed in 2015 on their scientific achievements. In parallel, the University has launched a strategic dialogue with the Labex directors to prepare the post-2019 period (see 2.3.2).

Not only has an operational governing structure been established for PSL and the research and teaching activities are more strongly structured within each member institution, but members are beginning to make recruitment choices that take into account the expertise available and the possibilities for pooling within the University. For example, Mines Paris Tech made the decision to entrust its students to Paris-Dauphine rather than replace a retiring professor of finance. In

¹² Another example of transformation is the double impact of the IEC Labex dynamics on the cognitive sciences inside PSL: i. a strengthening of internationalisation; ii. The broadening of the research scope from social sciences to experimentation in neurosciences

September 2015, the Board of Directors decided to work from a consolidated PSL budget (IDEX + member institutions), which will structure the work of the COOs' Conference. Chapter 2 details the ways in which this strategy will be implemented (See also Appendix VIII)

1.5.2. HR policy and mobilisation of resources

What are the mechanisms for allocating the human resources?

Procedures for allocating human resources - The funding made available for the recruitment of lecturer-researchers and researchers by the IDEX has been **systematically allocated through internal calls for proposals (CFPs)**. The **Excellence Chairs CFP** was launched to recruit world-class researchers with an international academic reputation, while the **Young Teams CFP** sought promising researchers around whom to build teams of doctoral and post-doctoral students. Initially organised on an annual basis, they were modified in 2013 to become rolling calls for proposals in order to guarantee the reactivity required to seize recruitment opportunities as and when they arose. Finally, the **Structuring Research CFP** has allowed PSL to finance post-doctoral contracts in the selected projects (cf. 1.5.3). The selection procedures for these calls for proposals are based on **systematic external scientific evaluation**, most often an international one with two experts assigned to each project proposal. The projects are then ranked by the Research Council, with the list of selected projects being approved by the Council of Members and adopted by the Board of Directors. At the **PhD** level, the Doctoral College coordinates the allocation of contracts to the doctoral programs, whose selection procedures are based on calls for proposals.

The **Labex** also play a major role in the recruitment of researchers and lecturer-researchers within the IDEX framework, in particular with post-docs and PhD students (cf. table below).

Selection and recruitment procedures - The recruitment procedures of the IDEX measure up to the highest international standards and build on the existing practices of PSL's member institutions. Vacancies systematically give rise to a **call for proposals** published in both French and English. The evaluation and selection of candidates is based not only on the academic excellence of their resume and project proposal, but also on the project's suitability to the scientific objectives of the Labex or PSL research project. This process is generally carried out by an **external academic evaluation** based on two external expert reports (for the Excellence Chairs and Young Teams CFPs) or by the Labex Scientific Advisory Board. The directors of the PSL research project or the Scientific Committee of the Labex carry out the **pre-selection** of candidates and organise their **interviews**. The final selection of candidates is carried out by a collegial decision of the PSL Research Council or by the Labex Steering Committee.

All PSL member institutions can employ research staff recruited with funding from the IDEX or Labex attached to them. PSL HR department provides support for other types of recruitment, most notably of support staff, by preparing job descriptions and information on recruitment policy and pay, publishing vacancies, evaluating candidates and drawing up contracts.

What instruments are used to serve the talent management policy?

Doctoral students	
Recruitment procedure	<p>Methods implemented: Two different methods have been used to recruit doctoral students:</p> <ol style="list-style-type: none"> 1. A call for proposals for doctoral contracts: This is the main procedure for recruiting doctoral students working on subjects at the interface of different fields, who are therefore less easily funded by the doctoral programs, which tend to be disciplinary. The call is open to all candidates whose doctoral advisor will be a PSL researcher or lecturer-researcher and who will carry out their research in a laboratory administered principally by a PSL member institution. Candidates will also be administratively enrolled at PSL in one of the PSL accredited or co-accredited doctoral schools. The call is posted on the PSL website and sent to the member institutes for distribution to the concerned communities. The selection criteria focus on the relevance of the project and its innovative character, the quality of the team and doctoral advisor, the academic record of the candidate, their internships and placements, their motivation and the suitability of their past study to the project proposal. The selection following the first call was done directly by a prefiguration of the doctoral college. 2. The allocation of doctoral contracts to PSL accredited or co-accredited doctoral programs. In this case, the doctoral programs are informed of the number of doctoral contracts attributed by PSL. Each doctoral program launches a call for proposals, most generally on their website. The call is also sent to the thesis advisors who belong to the doctoral program. In some instances, the call is also distributed more globally through professional networks. The candidates are selected by a jury which comprises both PSL and external members. The candidates are generally interviewed; in addition to the quality of the curriculum and of the thesis topic, this interview allows the panel to validate the motivation of the candidate for research in general and for his topic in particular. It is to be noted that the missions of the PSL Doctoral College include the exchange and spread of good practice. The Doctoral College therefore sets the standards for the selection processes of doctoral students. <p>Developments envisaged: The two procedures will continue to be implemented. Another possibility could be to call on the Doctoral College when doctoral funding is allocated as part of a research call for proposals, such as senior or junior Excellence Chair calls. To date, funding for doctoral students was not possible within this framework.</p>
Type of contract (and name of employer)	<p>Methods implemented: Doctoral students are recruited by PSL on a fixed-term three-year contract. They are also administratively enrolled at PSL.</p>

Post-doc	
Recruitment procedure	<p>Methods implemented: Two different methods have been used to recruit post-doctoral students:</p> <ol style="list-style-type: none"> 1. A call for proposals for post-doctoral contracts: This procedure has been used particularly for recruiting “innovation post-doctoral students”, the aim being to facilitate the transfer of results to society at large through the creation of start-ups. The call was posted on the PSL website and sent to the different member institutes. Concerning the partnership between PSL and the ELAIA Fund, the jury included one ELAIA representative, the Deans of Research and Valorisation, scientific directors of the concerned PSL member institutes and an expert in computer science belonging to PSL’s Research Council. Projects are evaluated on the strength of the candidate’s CV and motivation and also on the strength of the potential for the transfer of identified results in the prospective host laboratory. Selected candidates were interviewed by the jury. 2. Funding of post-doctoral contracts within the framework of PSL-funded research projects, including the Labex. In this case, the recruitment procedure is directly overseen by the establishment in which the project leader works. Recruitment most often gives rise to a call for proposals which is posted on the PSL website and distributed through the appropriate professional networks. The jury essentially comprises members of the concerned laboratories, including external experts when needed. The baseline criteria include the quality of the candidate curriculum, of his publications and of the submitted research project. PSL is for instance launching with the Observatoire de Paris in 2016 such a program called “PSL Fellow in Astrophysics”. <p>Developments envisaged: The use of calls for proposals for post-doctoral contracts will be expanded. In certain cases, the member institution will be able to implement the recruitment procedure directly. PSL will ensure that the procedures are uniform and all respect certain regulations, such as the use of external experts.</p>
Type of contract (and name of employer)	<p>Methods implemented: Exceptionally, some post-doctoral students have been recruited directly by PSL. In most cases recruitment was made by the member institution hosting the post-doctoral students. In both scenarios post-doctoral students are recruited on a fixed-term contract for one or two years.</p>

<p>Remuneration policy</p>	<p>Methods implemented: The remuneration policy for post-doctoral students directly recruited by PSL has been approved the Board of the University. They receive a gross monthly income of between €2,500 and €3,500, depending on their CV. Post-doctoral students who lived abroad prior to their arrival at PSL can be eligible for a relocation allowance, at the discretion of the President of the University.</p> <p>When post-doctoral students are recruited by PSL member institutions then their own rules apply, subject to approval by the human resources department. Overall the remuneration is related to the experience of the candidate and to the international standards for the specific domain. As an example, the JRC (Junior Research Chair) recruited at ENS benefit from a salary above the French equivalent, the gross salary being about € 2,500.</p> <p>ESPCI: The salary is determined by the amount of funding, failing which the monthly salary is calculated on the basis of the average cost of a post-doctoral student recruited at the ESPCI.</p>
<p>Main recruitments</p>	<ul style="list-style-type: none"> - PSL: Johann Lussange was recruited by PSL as an innovative post-doctoral student in October 2015. Following undergraduate and master's degrees in physics at the University of Copenhagen, he obtained a doctorate in theoretical physics at the Université Pierre et Marie Curie. After obtaining a Certificate in Quantitative Finance, he carried out post-doctoral research at the Higher School of Economics in Moscow. His “innovation” post-doctoral contract, which he will carry out in the cognitive science department of the ENS, is designed to allow him to create a start-up based on a computational modelling tool to simulate a stock market with a multi-agent system in which each agent is an investor and market maker capable of reinforcement learning and endowed with a certain number of behavioural biases recently demonstrated in neuroeconomics. - ENS-ICFP: Michaël Köpf was recruited by ENS in September 2013, following his thesis in Münster and a first post-doc with Technion. As a theoretical physicist his speciality at PSL is soft matter. He focuses on the interplay of elasticity and biological function as a paradigmatic example for self-organisation of active materials. His research led him to establish numerous interactions with Institut Curie.

"Tenure track" actions or arrangements	
Recruitment procedure	<p>Methods implemented: In 2012, PSL launched a Junior Chairs call for proposals with the aim of allowing young researchers to create their own teams, for instance by providing their salary. Since 2013, the “Young Teams” call for proposals has been open all year long to take into account the different recruitment calendars of various fields. This new appellation was accompanied, until 2014, by a new selection procedure. Indeed, after a validation by the Research Council, the recruitment was financed by the member institution, and setting up the team was supported through equipment funding and/or postdoctoral positions. The procedure, supervised by the PSL Research Council, and implemented by the member institutions themselves, include the following steps: international calls for proposal with publicity in websites and international specialised journals; selection by a jury composed mainly of members from outside the recruiting institution, including a personal interview.</p> <p>Since 2015, a double procedure has been in place: the procedure in place since 2013 is still running, while in the other applications are made directly to the PSL Research Council which, in this case, evaluates them with help from external experts.</p>
Type of contract (and name of employer)	<p>Methods implemented: Depending on the recruiting member institution and the procedure used, the candidate can be recruited on a fixed-term or a permanent research contract. In both cases it is intended that the candidate should be recruited permanently at the end of the PSL-funded project.</p>
Duration of procedure	<p>Methods implemented: From 2013, it was decided that the call for this type of recruitment would be open all year long so as to meet the needs of different research communities. The main objective is thus to be reactive. The duration of the procedure for setting up a new team ranges between 3 to 6 months.</p>
Remuneration Policy	<p>Methods implemented: Up to 2015, recruitment was mainly carried out by the member institutions on the basis of the applicable salary scales depending on the candidates experience. For this category PSL has based its attractiveness not on an increased salary by rather by offering support in setting up a research team, thereby attracting the best young researchers.</p>
Career management	<p>Methods implemented: As most young researchers are recruited by member institutions, their career management is largely in line with the rules of the French public sector. Most generally the recruiting member institutions have set up procedures to track the development of the new team. For instance the Institut Curie¹³ has created a six-year support system that tracks the progress of research projects and allows young researchers to advance towards a senior post.</p>

¹³ The two young research team leaders Leila Périé et Silvia Fre were selected by an international jury which counted among its members experts from outside the Institut Curie, including representatives of PSL. Following this evaluation, they submitted an application for PSL funding and received PSL Young Team funding. Leila Périé’s research is at the interface of physics, mathematics and immunology, while Silvia Fre works on developmental biology, stem cells and cancer.

	<p>Developments envisaged: A specific support structure will also be set up by PSL and the member institutions in question to monitor career advancement at the end of the project</p>
Planned supporting resources	<p>Methods implemented: PSL's support for these recruitments is designed to facilitate the host establishment with the purchase of equipment required for the research project and the recruitment of personnel, particularly post-doctoral students, so that a team can be set up. Since 2013 the average support per team amounts to €140,000.</p>
Main recruitments	<ul style="list-style-type: none"> - Nicolas Baumard was recruited by the ENS in 2013 after being selected by the PSL Research Council. After obtaining a doctorate in philosophy and social science at the ENS in 2008, he occupied two three-year post-doctoral posts, one at the University of Oxford, the other at the University of Pennsylvania. The PSL tenure track procedure allowed him to return to France to carry out a research project entitled “The evolution of fairness by partner choice: an evolutionary approach”. His project was based on a collaborative effort between ENS, Collège de France and Paris-Dauphine. Having thus been awarded a PSL Chair, he was then recruited by the CNRS and now conducts his research in the cognitive science department at the ENS. - Çağlar Girit was one of the first two winners of the Young Teams at the Physics Institute of the Collège de France call in 2013. Laureate of the Lars Commins Memorial Award in Experimental Physics and following his doctorate in physics at the University of California, Berkeley, he was awarded an international Marie Curie International Incoming Fellowship to study for two years at Saclay. Thanks to PSL Young Team funding, he was able to acquire the equipment needed for his project, entitled “Josephson Junction Spectroscopy of Mesoscopic Systems”. He was recruited by the CNRS and now carries out his work at the College de France. - Alexei Ourjountsev was the other winner of the 2013 Young Teams at the Physics Institute of the Collège de France call. After a doctorate in physics at the Université d'Orsay and a two-year post-doctorate at the Max Planck Institute of Quantum Optics, he was appointed as a CNRS researcher and worked in the Institut d'Optique at Palaiseau. Thanks to PSL Young Team funding he has been able to finish setting up his laboratory and now leads a team working first-rate conditions at the Collège de France. The objective of his project is to develop a new technique to create efficient and coherent interactions between optical photons, required for many applications in quantum information processing, and it generates cooperation between Collège de France, ENS and Mines Paris Tech.

	<ul style="list-style-type: none">- Leila Périé was recruited as a research team leader at the Institut Curie following an international call for proposals launched in December 2013 and in 2014 was selected following the PSL call for proposals. After a doctorate at the Institut Cochin she completed two post-doctoral contracts, first at the Collège de France then at Utrecht University. With PSL Young Team funding she has been able to recruit her first post-doctoral student to assist her in her research. Her project will strengthen research at the interface between physics and biology and will lead her team to collaborate with ESPCI and IPGG.- Marie Manceau was selected following the 2013 PSL call for proposals. Following a doctorate in biology at the Université Aix-Marseille and five years of post-doctoral research at Harvard University, Marie Manceau was recruited in late 2012 as a research team leader at the Collège de France as part of an international call. With PSL Young Team funding she has been able to finish setting up her laboratory and now leads a team working first-rate conditions.
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High scientific and technical potential	
Recruitment procedure (notably composition and method of appointing the selection committee)	<p>Methods implemented: As with the Young Teams program, PSL's call for the recruitment of researchers with high scientific potential is open all year long.</p> <p>On account of the intention that recruitments should be prolonged after the end of PSL funding, the member institution in which the researcher is to be employed must also approve the application.</p> <p>In some cases recruitment was made possible by a partnership with the CNRS.</p> <p>Applications submitted to PSL are evaluated by at least two external experts (most often from abroad) before the project is submitted to the Research Council, which acts as the selection committee.</p>
Type of contract (and name of employer)	<p>Methods implemented: On account of the intention to make recruitments permanent, it has been decided that the host establishment chooses the nature of the contract. This has resulted in two types of recruitments: fixed-term contract and permanent position.</p>
Remuneration Policy	<p>Methods implemented: The remuneration policy is defined by the host establishment. Nevertheless, PSL funding can be used to provide a monthly bonus.</p>
Career management	<p>Methods implemented: Career management is designed to make the researcher's post permanent. Once this has been achieved, career management follows the framework of the French public sector.</p>
Planned supporting resources	<p>Methods implemented: As with the Young Teams program, PSL's support for these recruitments is designed to assist the host establishment in the purchase of equipment required for the research project and the recruitment of personnel, particularly post-doctoral students and research engineers, so that a team can be set up. The average support to a laureate project is slightly less than €200,000.</p>

<p style="text-align: center;">Main recruitments</p>	<ul style="list-style-type: none"> - Lydéric Bocquet was recruited to a PSL Chair as part of a partnership between the ENS and the CNRS to bring him to the ENS, whereas he was a visiting professor at MIT and a professor at the Université Lyon II. The funding that he received with the PSL Chair has allowed him to purchase the equipment required for his research work at the Laboratoire de Physique statistique at the ENS. Lydéric Bocquet has brought with him new research themes ranging from fundamental physics to valorisation through start-ups, while also taking charge of the ICFP master's degree in fundamental physics (supported by the PSL Labex of the same name). He has been awarded several prizes and awards: IUF, ERC, Friedrich Wilhelm Bessel price from the Alexandre von Humboldt Foundation, Prix Jean Protas from the French Académie des Sciences. This “high potential” recruitment saw PSL attract a world-renowned researcher, despite competition from MIT amongst others. His collaborations include teams from Chimie Paris and IPGG. - Olivier Henry was recruited to a PSL Chair in the Archéologie d’Orient et d’Occident research unit at the ENS, after having been a researcher at the Institut français d’études anatoliennes and director of excavations at the Sanctuary of Labraunda. His arrival at PSL allowed for the creation of the only scientific and technical platform for research of its kind in France. He also collaborates with Collège de France and Chimie Paris. - Gilles Saint-Paul was recruited to a PSL Chair at the ENS, as a professor of economics and as a researcher at the Paris-Jourdan economics research unit, where his work centres on a project entitled: “Economics and beliefs: bounded rationality and ideology”. He obtained his thesis at MIT and was awarded the Yrjo Jahnsson Medal in 2007. He collaborates with Collège de France. - Thanks to a PSL Chair, Ishac Diwan has joined the ENS as a visiting researcher and also works at the Université Paris-Dauphine. Having previously worked at the World Bank, at the ENS he carries out research focusing on the Middle East and on questions of political economy concerning ongoing social and economic transformations. - Elected professor at the Collège de France, Philippe Aghion received funding from a PSL Excellence program that allowed him to complete his project entitled “Institutions, Innovation and Sustainable Growth”.
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Number and funds totalled over the period	Doctoral students	Post-doc	Tenure track	High potential
Number of recruitments made solely with the IDEX funds	73	48	0	2
Funds devoted to these recruitments by the IDEX	€7,300,000	€5,527,489	0	€790,000
Number of recruitments made with joint IDEX/IDEX partners' investments	0	7	5	4
Funds devoted to these recruitments by the IDEX	0	€1,046,800	€724,475	€1,640,000
Number of recruitments made with joint IDEX/Labex investments	0	0	1	0
Funds devoted to these recruitments by the IDEX	0	0	€234,000	0

How are these instruments used to serve the strategic orientations of the IDEX?

The coherence between PSL's recruitment policy and the strategic orientations of the IDEX is guaranteed by the systematic use of internal calls for proposals to allocated funding for human resources, which ensure the academic excellence and innovative nature of selected projects while also strengthening collaboration between teams from across PSL member institutions, including the research organisations (every project proposal must involve teams from different institutions). The progressive launch of dedicated calls for proposals to structure research (cf. 1.5.3.) and the important role played by the Labex have also reinforced PSL's policy in this regard by focusing resources on its research priorities, just as 2015 saw the launch of the PSL Key Research Programs (cf. 2.4.2). Finally, the Excellence Chairs and Young Teams CFPs are used essentially to recruit foreign researchers and researchers from foreign institutions, thereby playing a major role in developing PSL and its members' international standing and making them more attractive on the world stage. PSL has succeeded in implementing coordinated recruitments, bringing together the strengths of the IDEX and its member institutions, among them research organisations, to offer attractive packages that allow researchers to build their own team of doctoral and post-doctoral students.

The experience gained on high-level recruitments has led PSL member institutions to share their practices and **lay the foundations of a real shared talent management strategy** based on a consolidated vision of their needs, an evaluation of opportunities for joint recruitments, and the coordination of their actions (2.8 and Appendix VIII). A learning-by-doing dynamic can also be seen at the PhD level, where the allocation of doctoral contracts has been carried out since 2014 in collaboration with the member institutions, who have all underlined the quality of the PSL internal discussion, as far as the repartition of PhD grants between the different doctoral schools was concerned.

It is probably too early to evaluate precisely the **leverage effects obtained by this recruitment policy in terms of external resources**, especially regarding European research projects and collaborative funding from local authorities and the economic world. Nevertheless, significant

results can be underlined, most notably regarding the number of ERC grants obtained and the doctorate. The share of PSL in the total of ERC grants awarded has indeed increased by more than 25% from 1.7% in 2010 to 2.2% in 2014.¹⁴ The strength of its internal dynamics has also allowed PSL to obtain an extra 75 doctoral contracts from the Ministry, and use IDEX and Labex funding to co-finance a further 53 doctoral contracts benefiting from outside financial support (from sources including COFUND, local authorities and businesses).

The university has developed a **differentiated recruitment policy for different levels of recruitment**. The Excellence Chairs and Young Teams calls for proposals were open exclusively to external candidates, in order to reinforce PSL's attractiveness to both promising and established world-class researchers on the international stage. At the post-doctoral level and doctoral level, however, PSL has chosen to base its recruitments on criteria of academic excellence and suitability to the host laboratories' research priorities. The publication and selection procedures of these calls for proposals (calls advertised internationally, interviews in French and English, including by videoconference) have nevertheless guaranteed widespread visibility and attracted numerous young foreign researchers. For example, almost half the post-doctoral students recruited by the Labex between 2012 and 2014 were foreign students coming from foreign institutions.

1.5.3. Research and training

What are the strategic lines with regards to research and training?

RESEARCH

Strategic lines - The first challenge facing PSL was the institution of its **common signature policy**, which has already seen the proportion of articles signed "PSL Research University" within its overall publications increase six-fold last year (from 4% in late 2014 to 24% in late 2015 - excluding the arts schools and new members); a Charter for the signature of scientific publications has been voted by the Board of Directors and is now being implemented by each member institution (See Appendix III). PSL's strategy in terms of research has been structured by two main principles: to reinforce the disciplinary strengths that form the basis of PSL's research and to foster the development of new research themes at the intersection of existing fields. The systematic implementation of this strategy has **strengthened research collaborations between the teams of member institutions that make up PSL**. This growing dynamic inside PSL, including, at all stages, the research organisations, has greatly contributed to the national and international reputation of PSL, as can be seen by the numerous **academic awards** won between 2012 and 2015 (65 ERC, 40 IUF and 134 prizes).

Mechanisms and procedures - Alongside the CFPs launched for recruitment purposes (cf. 1.5.2.), a Structuring Research call for proposals has been created to provide funding for highly innovative exploratory projects that bring together at least two PSL institutions. Projects are submitted to the Research Council and selected by the Council of Members on the basis of a systematic external scientific evaluation. Since 2012 this CFP has seen **110 research projects** funded, with **an average selection rate of around 30%**. The primary purpose of these projects is to stimulate inter-institutional collaborations, as for example, a research project on perceptive and cognitive processes in the digital world (ENSAD, ENS, Collège de France) or a project on integrated implants at the intersection of biology and physics (ENSCP, Institut Curie, Mines Paris Tech).

The **10 Labex-in-Idex** also play a central role in developing the research potential of PSL across almost all its academic fields (See Appendix IV concerning "The Labex and Equipex as part of the University's strategy: analysis and perspectives"). Since 2012 they have welcomed 214

¹⁴ The figures for 2015 are not definitive but are thus far more favourable still.

post-doctoral students, 48% of which are foreigners, and funded or co-funded 53 doctoral contracts. They have increased the international visibility of their teams and have been a major driving force in the structuring dynamic between the member institutions and the research organisations. The impact of the Labex attached to new members has been no less important, as with the Hastec Labex and even more so with the Corail Labex which made it possible for PSL-Environment to be given a new start. The PSL Dean of research has monitored and coordinated these projects by regularly bringing together their directors: the role of the Conference of Labex directors has proven essential for the exchange of good practices, the diffusion of these practices within PSL and the preparation of the 2019 Labex deadline. These exchanges have also led to the creation of the **Pépinière Labex** call for proposals with the CNRS, which is endowed with €600,000 and focused on the development of cooperation between the Labex and other PSL research teams and the consequent reinforcement of their role in a drive to greater excellence (cf. 1.5.9.). Some Labex-supported projects have also benefited from IDEX resources, such as the Student Centre for Space Research and Exploration (Labex ESEP).

The dynamic developed by the CFPs and the Labex (including the Labex FCD-Finance and sustainable growth led by Institut Louis Bachelier – see Appendix IV) go hand in hand with the development of an interdisciplinary approach, for example around the environment (PSL Environnement), or Data Science (including in a broader sense Digital Arts and Humanities; IT, Computing and Big Data). Five project proposals bringing together Mines Paris Tech, ENS, EHESS, Institut Curie and Université Paris-Dauphine are for instance currently being reviewed and will lead to the emergence of a very powerful research and teaching offer by PSL.

Learning by doing and the development of PSL Key Research Programs - The success of this approach to structuring research has generated a *learning by doing* dynamic and led PSL to set up a new phase since 2014. A broad reflection was first initiated to identify research priorities and **progressively structure a research strategy for the whole university**. Ten disciplinary and interdisciplinary working groups were formed to identify existing strengths, potential new developments and possibilities for action in their respective sectors. Overseen by the Research Council, this work culminated in early 2015 with the launch of **dedicated calls for proposals**: a. PSL Chimie; b. IT, Computing and Big Data (in connection with the growth in computational potential projected in the PSL Digital Development Plan and the Méso Equipex); c. Mesoscopic Biology; d. Social Sciences, Economics, Finance and Management.

In June 2015 this dynamic was reinforced by a Research Seminar that brought the PSL community together to discuss its research strategy, its implementation procedures and steering mechanisms in order to identify **PSL's research priorities**. Feedback on the IDEX calls for proposals has demonstrated their flexibility and effectiveness, but also underlined the need to go beyond its limitations in order to maximise PSL's structural impact on its research potential. The member institutions thus decided to develop an approach centred on the **creation of PSL Key Research Programs** around disciplinary or interdisciplinary sectors (cf. 2.4.2). This new instrument differs from the CFPs in that it marks PSL's political commitment to focus its resources on a limited number of research fields, reinforce their structuration and increase their international visibility. A first wave of proposals arrived in December 2015 and the first Key Programs will start early in 2016.

TEACHING

PSL's education strategy is centred on reinforcing **the excellence and coherence** of its teaching programs and the **capacity for transformation** within higher education in France. As outlined in the IDEX submission file, it has focused on promoting an educational model that encourages innovation and risk taking, is founded on **teaching through research, individual tutorials** and teaching in **small groups**, and capitalises on the distinctive characteristics of the member institutions.

Doctorate - The PSL member institutions have opted for a **complete transfer of their doctoral degree-granting powers to PSL**: as of the academic year 2015-2016, all doctoral students are enrolled at PSL and receive degrees bearing the title “PSL Doctorate prepared at [institution name]”. Founded in September 2015, the Doctoral College has adopted the Doctoral Charter and works to encourage the creation of transversal doctoral courses See Thesis Charter. Appendix II). At the same time, PSL has created 142 doctoral contracts with IDEX funding and secured another 75 contracts from the Ministry. The university has also created **innovative doctoral programs** that have helped to profoundly renew PhD methods and practices in France. Created in 2012 by a joint initiative between the five arts schools and the ENS, the **SACRe doctoral program** introduced a new type of doctorate closely linking artistic creation and research, hitherto absent from the French academic landscape. This initiative has had a major effect on the structuring of research within PSL, and a request for the creation of a research unit has been accepted by the Ministry in 2015. PSL is also building the **PSL-ITI doctoral program**, which aims at developing a culture of innovation among engineers and which started by the creation of a pre-doctoral cursus (cf. 1.5.9.). Another example is the **interdisciplinary doctoral program in cognitive science** created by the IEC Labex which also organised a Cognitive Science Forum in 2013 and 2014 to bring together PSL’s doctoral students and young researchers.

Master's - At master’s level, PSL has opted for a **strategy of progressive transformation** to coordinate the evolution of its different programs without compromising the wealth of collaborations established with external partners where pertinent. The creation of a PSL College of Masters is underway (cf. chapter 2) and the **first requests for accreditation of PSL master’s degrees** were made in October 2015 in two different fields (Energy; Material Science and Engineering) and an international master’s (Chemical Frontiers of Living Matter). These master’s courses will open in September 2016. This work has been further developed since 2012 by the **creation of incentive-based CFPs**, which have supported the creation of innovative multidisciplinary master’s degrees and inter-institutional disciplinary master's degrees.¹⁵ **Five PSL Labex** have also launched innovative master’s degrees (IPGG, DCBIOL, CeTisPhyBio, ESEP, ENS-ICFP). For example, the integration of laboratories within a new dynamic driven by the ENS-ICFP Labex led to the creation of an international master’s in fundamental physics taught in English that has proved highly attractive to foreign students (90 of the 233 applications came from abroad). These evolutions have greatly helped to **reinforce the international attractiveness of PSL master’s programs**, as evidenced by a 39.1% increase in the number of foreign candidates between 2012 and 2015, with a more selective admissions policy (from 31% to 24%).

Undergraduate - PSL has committed to a **profound restructuring of its undergraduate offer**. The objective is to pave the way for a radical transformation in French higher education by offering an alternative to both the French classes préparatoires and university undergraduate models. The stakes are high as a growing number of French high school graduates, looking for first-rate alternatives to CPGE, are leaving to study abroad at the undergraduate level. PSL has thus implemented a number of projects, all characterised by their **selective nature**, a **progressive specialisation** and an education based on **tutorials** and teaching in **small groups**.

Firstly PSL has invested almost €1.5m to **overhaul Paris-Dauphine’s undergraduate program**, which houses 3,500 students across mathematics, computer science, law, management, economics and social sciences. This ambitious project saw the creation of multidisciplinary degrees with progressive specialisation, an early introduction to the practice of research, the systematic use of tutoring and the development of SPOCs and flipped classrooms. It also saw the extension of the Equal Opportunities Program to 25 high schools in the Île-de-

¹⁵ One can mention the masters PISA (Innovative perspectives on the Sciences of Antiquity), Peace Studies, MASH (Mathematics, Learning and Human Sciences) Acting and directing, Energy or Material science and engineering, as well as the post-master course on Management for students in Arts and Literature (Paris-Dauphine and ENS).

France region (62 students recruited in 2014-2015) and the creation of degree courses adapted to students' needs. Finally it strongly reinforced the internationalisation of the program with the opening of degree-granting courses abroad (London, Madrid and New York), the creation of international scholarships and the extension of courses taught in English. The ever-growing number of applications for Paris-Dauphine's undergraduate courses bears witness to the success of this transformation.

Beginning in 2012, PSL has also created an entirely new type of undergraduate course with the **Multidisciplinary Bachelor Program (CPES)**, which was granted full degree status in 2015 and presently counts 238 students (cf. 1.5.9). The university is furthermore contributing to the **development of Bachelor's degrees within its arts schools** thereby leading the way in a field where no institution in France currently delivers an undergraduate degree. The PSL Design-Arts-Media (DAME) Bachelor degree is in its first year of existence at the ENSAD and a reflection is underway to create Bachelor degrees in Music (CNSMDP) and in Theater (CNSAD). Finally, the project of an **undergraduate offer for CPGE students** has advanced significantly in a new legal context.¹⁶ Indeed Paris-Dauphine has signed partnership agreements with the commercial and mathematical CPGEs of four major Parisian high schools, and partnerships between the CPES and scientific and humanities CPGEs are currently considered.

Online teaching: PSL members have also committed to **making lessons available to the public online** with the creation of nine MOOCs in fields as varied as finance, astronomy, philosophy and law. PSL has supported this drive by **equipping its members with the facilities needed to produce digital teaching resources**, with three fixed studios and two mobile studios shared by all members and which should enable PSL to produce around 20 MOOCs every year. Launched in 2013 with an internal PSL call for proposals, this initiative received financial support from the Ministry the following year. Finally a web-TV project will be launched under the lead of ENSAD in 2016.

Resource allocation procedures - Aside from the most fundamental structuring projects at undergraduate and doctoral level¹⁷, PSL has focused on **calls for proposals** as the means of **transforming its teaching programs** through a bottom up approach and instilling a new culture of evaluation in French higher education. For example, since 2012 three calls for proposals have been launched to help create original educational projects across all disciplines (teaching modules, inter-institutional weeks, equal opportunities and gender equality, innovative courses that allow PSL to restructure teaching, online courses and so on).

Continuing education – PSL's continuing education plan is being developed in addition to the current continuing education activities being carried out by its members, mainly Paris-Dauphine, Mines Paris Tech and ENSCP. The aim of the plan is to provide quality multidisciplinary solutions to the needs expressed by companies and professionals and to focus resolutely on digital solutions. PSL's objective is to avoid positioning itself on the declining and increasingly fragile traditional continuing education market in order to break ground in the area of digital or blended continuing education.

The plan should allow interested PSL members to develop an offer in continuing education in spite of a certain lack of know-how or financial and human resources.

¹⁶ The innovative approach first imagined in 2012 in PSL's IDEX submission file has become the standard legal framework following the Law on Higher Education and Research of July 2013, which requires CPGE students to enrol in a partner university to guarantee their higher education.

¹⁷ Some structuring projects such as the SACRe Doctorate or the overhaul of Dauphine's undergraduate program were the object of specific agreements (not calls for proposals).

For PSL, the structure of this offer will be built around two axes and one methodology:

- First, a 'premium' blended educational offering (i.e. residential and digital), aimed at C-level executives, which draws upon the combined competency areas of the different members of PSL. For example, PSL has launched the 'Institut de la responsabilité' whose aim is to train future executives in 'responsible leadership'. The program trained its first cohort in 2015. In the second half of 2016, PSL will launch the Institut des Hautes Etudes de l'Entrepreneuriat et de l'Innovation (IHEIE), a global program offer in which, for instance, high profiles will be initiated to entrepreneurship and innovation through sojourning in Shanghai, San Francisco and Paris.
- Second, an offering of certificate programs for all professionals in the form short courses and which are referenced with the RNCP (*Registre national des certificats professionnels*)
- A methodology: to work on the basis of the acquisition and development of skills and their enhancement over the long term. The main benefit of digital learning (besides the pedagogy and interactions) should be to allow for the measurement of the acquisition of skills over time as opposed to current training programs whose impact is only very rarely measurable.

In December 2015, PSL responded to a call for expressions of interest known as "Pilotes Formation Continue" proposed by the Ministry of Higher Education and Research following the Germinet report. PSL's project, which includes a strong emphasis on digital learning, was pre-selected by the jury on December 14.

Digital continuing education should allow for a major evolution of the university's business model by wagering on its ability to strengthen its ties with its alumni and to greatly enhance its brand awareness internationally.

	Themes	Number of researchers concerned	Number of students concerned	Funds allocated
Specific investment of the IDEX in research	Chemistry	118	N/A	€1,610,550
	Economics and Administration	76		€1,700,000
	Earth sciences and the Environment	20		€350,000
	Humanities, Arts and Social sciences	276		€2,861,382
	Mathematics/Computer science	22		€345,000
	Physics/Astrophysics	78		€1,962,045
	Cognitive science	22		€315,800
	Life sciences and its interfaces (ICGEX Equipex)	220		€3,588,455
Specific investment of the IDEX in training	Undergraduate	N/A	11,500	€4,087,071
	Master's		300	€3,031,025
	Doctorate		73	€7,300,000
Joint IDEX/IDEX partner investments	Chemistry	1,000		€35,576,000
	Economics and Administration	623		€25,328,434
	Earth & Life sciences	2,300		€22,884,000
	Humanities, Arts and Social sciences	1,200		€21,465,177
	Mathematics/Computer science	463		€20,477,975
	Physics/Astrophysics	1,126		€71,676,524
Joint IDEX/Labex investments	Economics et Administration	259		€6,000,000
	Humanities, Arts and Social sciences	562		€6,281,000
	Physics/Astrophysics	763		€12,000,000
	Cognitive science	200		€4,400,000
	Life sciences and its interfaces	1,200		€18,900,000

Joint IDEX/IDEFI investments	N/A	N/A	N/A	N/A
Joint IDEX/other PIA project investments	Economics et Administration	5	N/A	€2,393,077
	Mathematics/Computer science	5		€932,930
	Geosciences & Environment	17		€1,743,158
	Life Sciences & Interfaces	11		€8,756,164

PIA1 projects “In- IDEX” Projects	Key structural impacts	Synergies with the partners external to the Initiative	Other contributions of the project to the Initiative	Potential enhancement of the project potentiality by the Initiative
CelTisPhyBio (LABEX)	<p>The Institut Curie has been redeveloping its research structure around the three Labex.</p> <p>Alongside this, the Labex have also been behind:</p> <ul style="list-style-type: none"> - the purchasing of major equipment central to the development of the Institut Curie (DEEP) 	<p>A considerable number of international collaborations, including notably the Weizmann Institute, MIT, MBI Singapore, NCBS Bangalore.</p> <p>An International Chair to host researchers within the Labex for three to six months (MIT, the University of Turku in Finland, UCL).</p>	<p>The Labex put the Institut Curie at the forefront of research at the interface of physics and biology and of chemistry and biology, thereby prefiguring the IRIS program “Interfaces of living matter”</p> <p>Three other types of contribution: 1) PSL's visibility on the world stage, 2) publications, 3) new courses and workshops.</p>	<p>Potential support from the IDEX through calls for proposals (the ongoing “Labex interfaces” call, notably for a project submitted with the Collège de France, “MYOOCYTE”).</p> <p>Support also in the creation of a “New Team” (Leila Périé)</p> <p>Two other requests for “Starting Teams” funding submitted (pending evaluation).</p>
DCBIOL (LABEX)	<ul style="list-style-type: none"> - new interactions between Institut Curie and other institutions and structures (DEEP with the ENS, DCBIOL with the ESPCI and IPGG, CelTisPhyBio with the ENS, Dauphine and PSL Environnement). 	<p>Collaborations with six Labex outside the IDEX and integration within the European network Eurobiomed.</p>	<p>A new teaching program in immunotherapy developed within the framework of the IMOCA Industrial Chair.</p>	<p>Possible support from the PSL IDEX via the call for proposals “Labex interfaces” (pending evaluation) together with IPGG for research at the interface of microfluidics and immunotherapy.</p>
DEEP (LABEX)		<p>A considerable number of international collaborations.</p> <p>Numerous European projects and networks (for example Epigenesis).</p> <p>The launch of a twinning program with the Hubrecht Institute.</p> <p>Collaborations with the industry (for example Biogen Idec).</p>	<p>PSL's visibility on the world stage, through:</p> <ul style="list-style-type: none"> - numerous publications, - new courses and workshops, - Arts & Sciences initiatives (Experiments exhibition) - new project at the interface of biology and physics. 	<p>PSL support through:</p> <ul style="list-style-type: none"> - Starting Team (Sylvia Fre) - “Labex interfaces” projects (pending evaluation) one in collaboration with the WIFI Labex and another as part of an Arts & Sciences collaboration with the CNSM (National Music Conservatory).

<p>ENS-ICFP (LABEX)</p>	<p>The main structural effect of ENS-ICFP has been in developing a world-renowned centre for physics, leading to the upgrading of an existing international master's degree. The Labex also made it possible to bring together two PSL member institutions (the ENS and the Collège de France) to create a joint research unit. Finally, it initiated a collaboration between three PSL member institutions (ESPCI, ENS, Collège de France) for technical operations (sharing equipment such as cleanrooms etc.).</p>	<p>The Labex has developed major collaborations with the socio-economic world:</p> <ul style="list-style-type: none"> - numerous industrial partnerships: site visits (Schlumberger),, funding for the Institut Philippe Meyer, hosting of R&D researchers, - organisation of “Business Days” to develop understanding of industry and business, and facilitate school-to-career transition. 	<p>Contribution to PSL's teaching offer:</p> <ul style="list-style-type: none"> - one of the first fully international PSL master's degrees, - creation of a MOOC. <p>Other contribution: half-day course on MOOCs run by the directors of the Labex.</p>	<p>The Labex has benefitted from being in the IDEX with the recruitment of a world-class professor (Lydéric Bocquet) to an Excellence Chair.</p> <p>The Equip@meso Equipex has had a major impact on the structure of scientific computation, including for ENS-ICFP.</p> <p>Finally, 6 teams from the Labex participated in projects financed with IDEX resources through calls for proposals.</p>
<p>ESEP (LABEX)</p>	<p>ESEP has established a network of 9 research laboratories, including within the Observatoire de Paris and the ENS:</p> <ul style="list-style-type: none"> - joint responses to research calls for proposals, - joint doctoral advisors, - joint organisation of 5 thematic seminars and workshops, - a joint doctoral program (experimental PhD educational program) - Recruitment of a transversal systems engineer. 	<p>The laboratories involved in ESEP are spread across 5 ComUEs, 3 of which are IDEX. The links between them have been greatly strengthened. Specific collaborations have developed (the Curiesat and CERES Campuses, research placement exchanges for students on the inter-establishment OSAE master's course). A master's program focusing on nano-satellites has been created with a Vietnamese university.</p>	<p>Contributions to the PSL-ITI program “Spatial and Geoengineering”:</p> <ul style="list-style-type: none"> - directly involved in teaching during the pre-doctoral year, - proposed innovative courses, <p>Participation in the online teaching tool “The Science of Exoplanets and Planetary Systems”, with lectures and tutorials for students up until the end of their undergraduate degree.</p>	<p>PSL funding and support for the development of the CERES Student Space Campus.</p> <p>Support for the nano-satellites projects.</p> <p>In the future, the creation of a PSL-Space hub bringing together other laboratories on innovative projects, particularly nano-satellite projects originating in PSL member institutions.</p> <p>Involvement in the IRIS project “Origins of Life”.</p>

<p>IEC (LABEX)</p>	<p>The major structural effects have been through:</p> <ul style="list-style-type: none"> - A network structure across four PSL structures (the EHESS, the ENS, the CNRS, INSERM). - The development of links with Dauphine, the ESPCI and the Collège de France. - Collaborations with OSE (in which EHESS and ENS are partners) and Memolife. 	<p>Collaboration with the IAST Labex (Toulouse): 2 joint one-day workshops in 2015 Participation in the Cognition Foundation, which involves some fifty French laboratories.</p>	<p>Collaboration in two master's degrees (CogMaster and PhilMaster) which involve several PSL member institutions.</p>	<p>The Labex has developed in particular thanks to:</p> <ul style="list-style-type: none"> - the recruitment of Nicolas Baumard to an Excellence Chair, - 3 doctoral grants, - PSL funding for 3 research projects involving IEC.
<p>IPGG (LABEX & EQUIPE X)</p>	<p>The IPGG Labex and Equipex have been the means of structuring activities around microfluidics. The diversity of its applications gives the IPGG Labex a central role in PSL's scientific policy, as several member institutions have already collaborated with it (ENS, Institut Curie, Collège de France, ESPCI) as well as a PSL Labex (DCBiol). A strong start-up culture (12 start-ups created since 2011, representing 75% of French start-ups in microfluidics) which help to structure PSL's strong valorisation/innovation dimension.</p>	<p>IPGG has forged links with circa 50 international partners.</p> <p>Innovative partnerships such as the collaboration with Prem-up for the use of microfluidics in non-invasive diagnosis for new-borns.</p>	<p>Contribution to PSL's teaching offer:</p> <p>@</p> <ul style="list-style-type: none"> - the creation of a “Microfluidics” M2 (second year of a two-year master's course), - creation of a study theme as part of the PSL-ITI pre-doctoral year. <p>A major increase in PSL's potential for valorisation and innovation.</p>	<p>The IDEX has already developed IPGG's potential by supporting it in preparing a project proposal to be submitted to the European Horizon 2020 program.</p>

<p>MemoLife (Labex)</p>	<p>Participation in the elaboration of an ambitious project to develop an ENS-PSL-Curie-Pasteur Medicine / Science track which is an important development axis for PSL.</p> <p>Participation in 3 structuring projects:</p> <ul style="list-style-type: none"> - Review of the teaching in biology offered at the ENS, Institut Curie, Collège de France, ESPCI, and IBPC; - Mapping of the biology Ph.D. community within PSL; - Discussions on the implementation of a "Biology" doctoral program. 	<p>N/A</p>	<p>N/A</p>	<p>Research policy of PSL funded:</p> <ul style="list-style-type: none"> - 15 structuring projects, for 2 years with other teams outside of MemoLife but inside of PSL, - 5 PhD students for 3 years, - 1 Starting Team for 3 years. <p>In total, the researchers involved in MemoLife through PSL applications raised a total of 2 million euro of funding.</p>
<p>TransferS (Labex)</p>	<p>The main structuring effect of the Labex is the greater interdisciplinary collaboration across research centers in different institutions (ENS, Collège de France). This translates into an important amount of publication of books from the research community.</p>	<p>Partnership with Fudan University for exchanges of students and professors.</p> <p>Organization in 2013 of the first InterLabex meeting - Strong ties with several Labex programs outside of PSL.</p> <p>The Labex teams are described as "structuring" for several fields at the national level (arts, linguistics, archeology, anthropology of contacts).</p>	<p>International visibility through the Fudan partnership and international scientific activities.</p> <p>The Labex set up a "digital humanities" pole which can benefit all the SHS teams of PSL.</p>	<p>The PSL Index has been essential to the project, notably through :</p> <ul style="list-style-type: none"> - Attribution of an Excellence Chair (Olivier Henry) - Organization of the Humboldt in partnership between PSL and TransferS. <p>In the future, TransferS will have an important role in the Global Studies IRIS, in partnership notably with EHESS and EPHE (pre-selected).</p>

<p>WIFI (LABEX)</p>	<p>Development and structuring of the Langevin Institute : creation, within PSL, of the only research center on wave phenomena which combines acoustics and optics.</p> <p>Aside from the strong link between fundamental and applied research, WIFI develops, through its activities, a research culture in line with innovation and entrepreneurship, part of the PSL DNA. This culture is present within ITI, flagship program of PSL, which was initiated by M. Fink, PI of WIFI.</p> <p>Strengthening of the relations between several PSL members: ENS, ESPCI, Institut Curie.</p>	<p>WIFI developed its research in the medical field through the Equipex Ultrabrain and in close partnership with ICM. WIFI then partners with over 20 hospitals in France. WIFI also has collaborations with teams of other IDEX. For instance, a project on the discovery of rare species in collaboration with MNHN (Sorbonne Universities).</p>	<p>Participation in the ITI training program.</p> <p>Strong involvement (organization and participation in funding) in two four-day international summer schools.</p>	<p>Two major valorization operations carried out thanks to PSL support:</p> <ul style="list-style-type: none"> - Creation of the Light-On company. - Management of a patent for a new concept of “machine learning”.
<p>BEDOFIH (EQUIPE X)</p>	<p>The availability of data on high frequency financial activity since 2000 facilitates interactions between various PSL teams (economics, law, management...).</p>	<p>BEDOFIH enables strong synergies with several partners outside of the IDEX: HEC, Université Pierre-Mendès-France (Grenoble), LPSC (Grenoble).</p>	<p>The commercial exploitation of the data produced by the Equipex represents an important potential contribution to the IDEX.</p>	<p>The valorization activities developed within PSL will be useful to BEDOFIH in the process to commercialize its database. From a broader perspective, BEDOFIH can fit in a general trend to structure the field of Data Science within PSL (ongoing call for proposals and IRIS).</p>
<p>EQUIP@MESO (EQUIPE X)</p>	<p>Strengthening of internal collaborations through :</p> <ul style="list-style-type: none"> - Steering committee including representatives of 4 PSL members. - Meeting of users within PSL. 	<p>N/A</p>	<p>Goal to provide a powerful computing facility to all the PSL members (115 users already had access to the Equipex upon request).</p>	<p>Request for financial support from the IDEX to acquire supplementary equipment (pending).</p>

<p>ICGEX (EQUIPE X)</p>	<p>Strengthening of the collaboration between Curie and ENS via the Equipex for :</p> <ul style="list-style-type: none"> - Better integration within the France Génomique network - Research project (genomic study on single cells) which led to the mutualization of equipment (C1 for Curie, Biomark for ENS) and organization of an INSERM workshop on the sites of Curie and ENS. 	<p>Several collaborations have been carried out within the France Génomique national network for scientific and technical advances.</p>	<p>The NGS platform of the Institut Curie, developed through the Equipex, is open to all PSL laboratories and researchers.</p> <p>Existence of a close partnership with the company HiFiBio (ESPCI).</p>	<p>N/A</p>
<p>PLANA QUA (EQUIPE X)</p>	<p>PLANAQUA benefits from important national visibility. Several laboratories have already presented applications.</p> <p>The unifying dimension has been further heightened by the launch of the artificial lakes research platform and the analysis of key physico-chemical and biological components of model ecosystems requiring the interaction of a large range of laboratories and disciplines.</p>	<p>Historic partner of UPMC and Paris Sud University.</p> <p>Integration of Planaqua within national networks such as RenSEE and ANAEE France, and within international networks (ESFRI ANAEE – Europe project, which aims to bring together for the first time the large test facilities on ecosystems in Europe.</p> <p>Projects with Imperial College, Arizona State University, I3 European project.</p> <p>Planaqua is part of the CEREEP-Ecotron network with the Foljuif Ecotron.</p>	<p>Planaqua infrastructures are regularly used by PSL members.</p> <p>Besides, they are used for the training of students of PSL institutions.</p>	<p>The launch of PSL calls for proposals and the set-up of PSL Environment represent an important development potential for the Equipex.</p>

<p>Paris-en-resonance (EQUIPE X)</p>	<p>Major involvement of several PSL members in the Equipex: ENS (project bearer), Collège de France, Institut Curie, IBPC.</p>	<p>The Equipex includes several external partners: Institut Pasteur, UPMC.</p> <p>Besides, the Equipex is part of the national network « IR RMN-THC », which gathers users from all over France.</p>	<p>The equipment (notably the 800 MHz spectrometer) is available to the whole PSL research community.</p>	<p>As for other Equipex, the question of sustainability beyond the PIA funding has led to consider concrete valorization projects. The expertise of PSL will prove valuable.</p>
<p>ULTRABRAIN (EQUIPE X)</p>	<p>The Equipex has had a major impact on ESPCI: it has enabled the transition from pre-clinical to clinical research in brain therapy.</p> <p>ESPCI now boasts a structured team of 7 people on the project, heightening its appeal and opening new research avenues for ESPCI.</p> <p>The Equipex had a structuring role for the relations between ESPCI and Institut Curie.</p>	<p>The main external partner is ICM, but the project has also gathered a community of over 20 hospitals in France.</p> <p>Ultrabrain has also developed partnerships with industrial groups to design ultrasonic sensor technologies and with the Bettencourt Schueller Foundation, which contributed €1.7 million.</p>	<p>The Equipex takes part in PSL training activities as it contributes to PSL-ITI through courses on focalized ultrasound therapy.</p>	<p>The Idex will increase the potential of the project, notably through the possibility of recruiting high level PhD students via PSL courses.</p>

PIA1 projects <u>PSL as Partner</u>	Key structural impacts	Synergies with the partners external to the Initiative	Other contributions of the project to the Initiative	Potential enhancement of the project potentiality by the Initiative
FCD (LABEX)	<p>The FCD Labex has made it possible to restructure and develop the ILB (organisation and professionalisation), notably with the move from 11 to 19 Academic Institutes.</p> <p>PSL is the IDEX with which it has pursued its most important collaborations and also the IDEX on which the ILB's activities have had the most impact (19 out of 45 Chairs at the ILB have been created with Dauphine).</p> <p>ILB has acquired genuine expertise in developing collaborative research, which can be applied on a large scale within PSL to become a major factor in driving its development.</p>	<p>The external academic institutions with which FCD has forged links are primarily TSE (Toulouse) and the ENSAE (Saclay). FCD's policy of developing external partnerships has mainly focused on building ever stronger links with the world of business: the Labex has led to a growth from 20 to 45 Business Chairs and from 40 to 80 partner businesses.</p>	<p>FCD also contributes to PSL in the following ways:</p> <ul style="list-style-type: none"> - Simple Assessments (support for launching high-risk projects), including two for Dauphine. - Two MOOCs created, thereby developing PSL's global reach (francophone Africa, especially North Africa) 	<p>At least three PSL projects present a strong potential for developing and strengthening collaborations with FCD:</p> <ul style="list-style-type: none"> - Analysis of Transitions program (IRIS), - PSL Mathematics, - PSL Environment.
First-TF (Labex)	<p>Although the Labex covers several ComUE and IDEX projects, it has important structuring effects on PSL through the strengthening of the convergence of various laboratories and Equipex projects within which PSL is involved (MIGA, REFIMEVE).</p>	<p>Very effective synergies within 5 ComUE (PSL, Sorbonne Paris Cité, Université de la Côte d'Azur, Université Bourgogne-Franche Comté, Sorbonne Universités), particularly between SYRTE (SU) and LKB (PSL).</p> <p>Synergy with other Equipex, such as Oscillator-IMP (UBFC)</p>	<p>Support for emerging projects, leverage effect to raise more important funds for certain projects, support for pre-maturation and technology transfer as well as for the creation of new courses (OBSPM : « Temps et Horloge »).</p>	N/A

<p>OSE (Labex)</p>	<p>Important structuring and development effect in terms of publications and rankings. As such, it has reinforced the position of PSL as a major actor in the field of economics.</p> <p>Strong ties between EHESS and ENS within OSE foster internal cohesion and structuring in the field of economics within PSL.</p>	<p>OSE fosters synergies with external partners within OSE (Paris 1, ENSAE...).</p> <p>To be noted is a strong partnership between ENPC and PSL on economic research as witnessed by a specific agreement.</p> <p>The integration of EHESS as a member will shift the gravity center closer to PSL.</p>	<p>The contributions of OSE mainly involve international visibility: publications, international scientific events, presence in the American job market.</p> <p>OSE has also supported training within the Idex through Masters in Public Policy and Development (PPD) hosted by EHESS.</p>	<p>Idex has added value mainly through recruitments:</p> <ul style="list-style-type: none"> - Gilles Saint Paul with an Excellence Chair ; - Philippe Aghion's arrival with a Program of Excellence, which enables promising interactions with OSE. <p>Two projects involving OSE (a MOOC and a « structuring project » hosted by ILB) have been funded by the Idex.</p>
<p>Dynamo (Labex)</p>	<p>Close ties with two PSL units: the chemistry units of ENS and Collège de France. IBPC also develops a converging vision with the other PSL labs.</p>	<p>The Labex involves three Idex programs : PSL, Sorbonne Universités, Sorbonne Paris Cité.</p>	<p>N/A</p>	<p>N/A</p>
<p>France Génomique (Infrastructure)</p>	<p>Structuring of the field within PSL as all PSL members can access the infrastructure.</p> <p>Strengthening of the relationships of the institutions and the two main research bodies involved: CNRS and INSERM.</p> <p>Strong ties with ICGEX.</p>	<p>France Génomique gathers the majority of French sequencing and bio-informatics platforms within a consortium which includes CEA (project bearer), INRA, Institut Pasteur, and CERBM-GIE (Strasbourg).</p>	<p>N/A</p>	<p>PSL supported the SingleCellSeq project of Institut Curie.</p>

<p>D-FIH (EQUIPE X)</p>	<p>Collaboration of several institutions within PSL: ENS, EHESS, ILB, CNRS.</p> <p>In the long run, the data from D-FIH will foster interdisciplinary research including economics, history, law and management.</p>	<p>Close synergy with Eurofidai (Grenoble).</p>	<p>Access to data on the history of stock exchanges to all PSL members, with special interest from Dauphine, EHESS, ENS, Mines Paristech.</p>	<p>The preselection of the IRIS project Scripta, combined with the possibilities offered by the « Resources and Knowledge » pole are important potential collaboration opportunities in the field of digitalization of historic data. This could be an interesting lead when the project is completed.</p>
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Are these strategic lines embodied by a specific structure (e.g. collegium, departments, institutes, schools, etc.)? What competences are exercised by these new entities?

The IDEX submission file proposed the creation of Research institutes. However, while building the University from 2012 onwards, it quickly became clear that the superposition of permanent structures over laboratories and member institutions would have unnecessarily complicated their running and hindered the dynamics that PSL is looking to encourage. This is why a focus was thus placed on an incentive-based approach to support the creation of open disciplinary and thematic networks and ensuring a close integration of research and teaching.

Four years of experience help shows rather the emergence of **specific teaching structures** like ITI or SACRe, (see 1.5.9) both of them being **managed by a steering committee under the supervision of the Dean for Teaching**. Two other teaching structures are emerging: the Institut des Hautes Etudes de l’Innovation et de l’Entrepreneuriat (see above; dedicated to continuing education in entrepreneurship) and a PSL Fashion School (see above) that will be launched in 2016. More fundamentally it has become clearer these last two years that *PSL masters with a powerful structuring effect could emerge from Labex or research programs*. A **College of master’s** will help make them more visible to French and international students. However a further development can be clearly observed: when a certain number of masters have emerged in a field, there is a natural evolution towards a **Graduate School**: for example the 3 engineering schools of PSL have agreed to organise a Graduate School of Science in Engineering (cf. 2.3 and 2.4).

1.5.4. Policy for research valorisation & knowledge transfer

What are the main successes of the IDEX policy for transfer to industry?

PSL aims to be an **engine of economic growth and innovation**. The concept of valorisation must be understood in a broad sense, including the transfer of knowledge in various forms, in all of PSL’s fields, from engineering and “hard sciences” to human sciences and arts (**see also 1.5.6**).

In 2014 the **Valorisation Committee** was created to advise the PSL President and Board regarding research valorisation and knowledge transfer, and their coordination with the research

strategy.¹⁸ This committee helps to define a joint strategy in these domains and encourages the exchange of good practices, the pooling of certain resources and the circulation of information and indicators.

The University's activities in valorisation and transfer have mainly been focused on the creation of **PSL-Valorisation**, which capitalises on the experience of ESPCI to transpose and develop across the university a **specific model of valorisation based on proximity to researchers, reactivity, simplicity and risk sharing**. Launched in late 2012, it became **fully operational in late 2013** with the signing of framework agreements for the transfer of patentable inventions with five member institutions (ENS, ENSCP, Collège de France, Observatoire de Paris, Mines Paris Tech), which enable PSL to apply for patents in its own name, on behalf of member institutions and other co-owners.

In a recent and significant development, ESPCI and PSL have decided to sign a similar framework agreement concerning ESPCI's intellectual property; moreover the agreement, to be signed at the beginning of 2016, will include a mandate on the management and valorisation by PSL of IP currently owned by ESPCI, and will entail the transfer of the ESPCI valorisation team to PSL. Following the general philosophy of PSL, it will not prevent other valorisation structures (CNRS, INSERM...) from contributing to the valorisation of ESPCI research results. This is nonetheless a major evolution: one of the most advanced member institution within PSL, as far as valorization is concerned, is ready to transfer its activity and know-how in this field to PSL-Valorisation, clearly a milestone in the building of the University.

PSL-Valorisation provides services and support for **the protection of intellectual property (IP)**. Agreements have been signed with four Patent Attorney firms (Regimbeau, Icosa, Osha Liang, Plasseraud) in order to guarantee the reactivity and quality of the services offered to researchers/inventors. **Pre-maturation** actions aim to complement patent application with financial support (typically €50,000) in order to help confirm complementary results, create prototypes and generally provide proof of concept. PSL also provides **maturation** funding (between €200,000 and €300,000) to ambitious projects with high potential for technology transfer, and with substantial needs for their technological and economic validation.

PSL-Valorisation actively supports the **creation of start-ups**, advising on their statutes, the constitution of capital and allocation of equity among shareholders, and the composition of the Board. PSL's policy is to cofound the start-ups it supports, typically holding a 5-10% share, and to be represented on their boards. PSL grants licences on the IP it owns to these start-ups, with a royalties model that favours their development. **Though unusual in France, this model reflects the practices of leading international institutions** (such as Oxford, MIT or Stanford), and enables PSL to support start-ups at their creation and develop a relation of trust with researchers, inventors and entrepreneurs.

PSL further supports the creation of start-ups through the **student entrepreneurship** program PSL-Pépité, which now runs its own collaborative workspace for student-entrepreneurs (PSL-Lab), thanks in particular to support from the City of Paris. The PSL-Lab is **co-located with the PSL Innovation and Entrepreneurship department**, and soon will be with PSL-Alumni. Since its creation, 37 projects have been approved by the Selection Committee, resulting in a community of 42 project participants with national Student-Entrepreneur status, 28 of which are enrolled in the PSL Student-Entrepreneur degree. **PSL-ITI** is also a focal point of start-up creation (with already one project at incubation stage) and it has undertaken a number of joint activities with PSL-Pépité. Synergies between innovation-related training programs will be further reinforced by the Postdoctoral Innovation call for projects and the Higher Education Institute for Innovation (Mines Paris Tech).

¹⁸ PSL's Valorisation Committee comprises representatives of the Collège de France, INRIA, the Observatoire de Paris, the Institut Curie, ENS, Paris-Dauphine, Armines, ILB and ESPCI.

PSL is also involved in other forms of valorisation, including through multiple partnerships, research contracts, and industrial chairs. Some member institutions have long been major players in these areas, though their valorisation department and/or through structures such as Armines, Institut Louis Bachelier or the Carnot Institutes M.I.N.E.S., Curie-Cancer and INRIA. Their expertise and activities have obvious complementarity with those of PSL-Valorisation, and there is significant benefit in combining them into a global and coordinated approach of valorisation and knowledge transfer. The added value of PSL appears clearly in this perspective, through the importance of interdisciplinarity in the creation and development of industrial or institutional partnerships, including through the Labex.

Results - Since 2012 PSL's member institutions have been **very active in collaborative research, in the valorisation of research and in the transfer of technologies to industry**, illustrated most strikingly by the filing of **304 new patents** and the creation of **48 new start-ups** between 2012 and 2015. During this period the IP revenue amounted to €33,689,000, while non-IP external revenue totalled €655,198,000. PSL's member institutions have also forged **4,509 new economic partnerships**. PSL's Labex have played a major role in this regard, registering 118 patents between 2012 and 2014 and creating important links with the socio-economic world. The DCBIOL Labex has created partnerships with the pharmaceutical and biotechnology industries (Genentech, Roche, Sanofi, Servier, Novartis, Pierre Fabre, Regeneron, Innate Pharma, Theravectys, Hybrigenics). The DEEP Labex has launched a public-private partnership with the pharmaceutical company Inventiva, while the ENS-ICFP Labex has been working in collaboration with the R&D department of the Schlumberger Corporation since 2012. The IEC Labex has pursued collaborative research projects worth €842,000 with Cap Digital and VivaTech. Finally, the IPGG, MemoLife and WIFI Labex have contributed to the creation of 10 start-ups since 2011¹⁹, including a Laureate of the Ministry's Concours de création d'entreprises innovantes de haute technologie (Creation of Innovative High-Technology Business Award) and two laureates of the Concours Mondial de l'Innovation (Worldwide Innovation Challenge), while the process for creating two other startups is currently ongoing.

In 2014 **PSL-Valorisation** provided support in the preparation of 6 invention disclosures and 4 priority patent requests, and oversaw the international extension of 3 patent families; IP activities are progressing rapidly, as in 2015 16 patents have been filed, including 12 priority patents, so that the department currently manages 18 patent families. It also supported 6 research maturation projects and the creation of 2 innovative businesses, Feroscan and Immunrise Technologies, of which PSL is now a shareholder.

¹⁹ These start-ups are Alveole, Picoseq, Hifibio, Biomillenia, Microfactory, Millidrop, Immunrise Technologies and Cardiawave.

Designation	IMOCA – DCBIOL Labex			
Socio-economic sector	Human health –pharmaceutical industry			
Research themes involved	Immuno-oncology, dendritic cell biology, pre-clinical models			
Names of the partners within this sector	Sanofi			
Form (framework agreement, contract, etc.) and nature of the contribution obtained (payments in €, provision of human resources, equipment sharing, sponsorship, skills-based sponsorships, etc.)	Four-year Industrial Chair funding from ANR; framework agreement between Institut Curie and Sanofi (partners Institut Carnot Curie Cancer and INSERM). Chair holder and project coordinator: Sebastian Amigorena (Inserm U932, Institut Curie). Funding secured for 2015 to 2018: €1.6 M from ANR; €2.2 M from Sanofi (excluding the Institut Curie and DCBIOL Labex contributions)			
Flagship result or achievement obtained thanks to the IDEX	The project leverages the scientific findings made by the teams of S. Amigorena and E. Piaggio as part of the DCBIOL Labex (in the PSL IDEX). These findings were made possible by funding from the Labex and the INSERM 932 Unit at the Institut Curie.			
Year	2012	2013	2014	2015
Funding (including IP [Intellectual Property] revenues) received from companies under these collaborations	-	-	-	530
Other funding received from external partners on the project (ANR, Europe, etc.)	-	-	-	360

Designation	CARDIAWAVE – WIFI Labex			
Socio-economic sector	Medical and surgical equipment in the field cardiology			
Research themes involved	Non-invasive ultrasound treatment of cardiovascular disease			
Names of the partners within this sector	<ul style="list-style-type: none"> - <u>Institut Langevin</u> and <u>WIFI LABex</u> for the development of the intense ultrasound focalization device and for real-time cardiac imaging - <u>Laboratoire de Recherche en Imagerie, Inserm U970, and Hôpital Européen Georges Pompidou</u> for pre-clinical and clinical validation - <u>Imasonics</u> (FR) for power transducers - <u>Verasonics</u> (FR) for the ultrasound platform electronics - <u>Strategiqua</u> (FR) for regulatory issues - <u>Axena</u> (UK) for mechanical and industrial design 			
Form (framework agreement, contract, etc.) and nature of the contribution obtained (payments in €, provision of human resources, equipment sharing, sponsorship, skills-based sponsorships, etc.)	<ul style="list-style-type: none"> - Patent licensing to Cardiawave by CNRS/FIST - Framework agreement with the Institut Langevin, in relation to the WIFI Labex for R&D, for access to scientific equipment and for the hosting of the startup 			
Flagship result or achievement obtained thanks to the IDEX	<ul style="list-style-type: none"> - Early prototype of a high-power ultrasound focalization (2014) - Improved prototype and preclinical trial using animal models (2015) <p>Perspectives: Preclinical validation (2016-17), early tests on humans (2017-18)</p>			
Year	2012	2013	2014	2015
Funding (including IP [Intellectual Property] revenues) received from companies under these collaborations	-	-	0	€60,000
Other funding received from external partners on the project (ANR, Europe, etc.)	-	-	CMI – 1 (€250,000) BPIFrance Innovation prize (€300,000)	CMI – 2 (€1,125,000)

Designation	Creation of the start-up FEROSCAN			
Socio-economic sector	MEDICINE – ONCOLOGY			
Research themes involved	Life sciences			
Names of the partners within this sector	<p>R&D</p> <ul style="list-style-type: none"> - <u>Institut Curie</u> (FR) in the development of the molecule in translational medicine, the confirmation of its mode of action and the proof of efficacy <i>in vivo</i>. - <u>Carlina Technologies</u> (FR) for the formulation of molecules - <u>Sanger Institute</u> (UK) for molecular stratification - <u>Citoxlab</u> (FR) for ADME tests and regulatory toxicology - <u>Sanofi</u> (FR) and <u>Pierre Fabre</u> (FR) for production of clinical batches of cGMP 			
Form (framework agreement, contract etc.) and nature of the contribution obtained (payments in €, provision of human resources, equipment sharing, sponsorship, skills-based sponsorship, etc.)	<ul style="list-style-type: none"> - Patent licence awarded to FEROSCAN by PSL-Valorisation. - Hosting agreement between FEROSCAN and the ENSCP enabling the start-up to benefit from its scientific environment and facilities. - PSL is a co-founder and shareholder 			
Flagship result or achievement obtained thanks to the IDEX	<p>R&D development plan:</p> <ul style="list-style-type: none"> - Finalisation of the formulation (2015) - Finalisation of the mode of action and efficacy <i>in vivo</i> (2015-2016) - ADME study (2015) - Regulatory toxicology (2016) - IND application for first human tests for 2017 (start of Phase I) 			
Funding (including IP [intellectual property] revenues) from companies under these collaborations	2012	2013	2014	2015
	-	-	-	0
Other funding received from external partners on the project (ANR, Europe, etc.)	2012	2013	2014	2015
	-	-	-	0

Designation	Creation of the start-up IMMUNRISE Technology			
Socio-economic sector	Agrochemistry and biological control			
Research themes involved	Life sciences – Plant-pathogen interactions			
Names of the partners within this sector	Partners and potential clients expressing an interest in the start-up's technology : <ul style="list-style-type: none"> - Monsanto US - Bayer CropScience (GR) - BASF (GR) - Pioneer Hi-Bred (US) - Syngenta (CH) 			
Form (framework agreement, contract etc.) and nature of the contribution obtained (payments in €, provision of human resources, equipment sharing, sponsorship, skills-based sponsorship, etc.)	<ul style="list-style-type: none"> - Patent filed by PSL-Valorisation in December 2014 (N° EP14307040.7) - Patent license to IMMUNRISE to be signed shortly. - Hosting agreement between IMMUNRISE and the ENS allowing the start-up to benefit from its scientific environment and facilities. 			
Flagship result or achievement obtained thanks to the IDEX	<p>IMMUNRISE aims at the launching of new tools adapted to the study of plant-pathogen interactions allowing for the immediate identification of important new molecules in infection control. The project aims at developing and commercializing innovative methods for:</p> <ul style="list-style-type: none"> - identifying natural molecules of interest in agriculture and pharmaceuticals - Developing strategies for infection controls in plants and animals. <p>The research group led by Prof. Navarro is recognized internationally in the fields of immunity and RNA silencing. It benefits from numerous partnerships (City of Paris, Fondation Bettencourt, Fondation Pierre-Gilles de Gennes) and grants, including one ERC Starting Grant (2011-2016).</p>			
Funding (including IP [intellectual property] revenues) from companies under these collaborations	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>
	-	-	-	0
Other funding received from external partners on the project (ANR, Europe, etc.)	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>
	-	-	-	0

Designation	IEC Labex - Core Assessment of Language Processing – CALAP			
Socio-economic sector	Health – Medical Research			
Research themes involved	Neurology – Speech and language therapy			
Names of the partners within this sector	Paris Public Hospitals Trust (Assistance Publique des Hôpitaux de Paris, AP-HP) Tekneo (Digital tools developer) Cap Digital (Business cluster for digital transformation)			
Form (framework agreement, contract etc.) and nature of the contribution obtained (payments in €, provision of human resources, equipment sharing, sponsorship, skills-based sponsorship, etc.)	ERDF (European Regional Development Fund) funding, supported by Cap Digital (Pôle de Compétitivité): E-thérapies Nature of the contribution obtained for the E-thérapies contract: €153,000 for staff and salaries			
Flagship result or achievement obtained thanks to the IDEX	<u>Tool</u> : Cognitive diagnostic test for speech impairment in adults <u>Patent registered with the National Industrial Property Institute (Institut national de la propriété industrielle, INPI)</u> Soleau envelope 527986, registered 12/01/2015 Patent CALAP FR1560922, registered 13/11/15, filed by PSL-Valorisation			
Funding (including IP [intellectual property] revenues) from companies under these collaborations	2012	2013	2014	2015
	-	0	0	0
Other funding received from external partners on the project (ANR, Europe, etc.)	-	€ 50,000	€ 103,590	0

Share of these three partnerships in the funding received by companies out of all the IDEX project actions (as a %)	N/A
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What relations are established with the SATT (society for accelerating technology transfer)? For what results? What areas are excluded from the SATT’s scope of cooperation? How are these exclusions justified?

PSL Research University has opted for **specific model of transfer to industry**, designed in order to remain in control of its valorisation policy and to foster a close relationship between its researchers and the socio-economic world. This strategic choice is based on a **principle of free choice**, whereby researchers are free to choose the procedure by which their research will be transferred to industry, in agreement with their research units and employers. As such, PSL has not chosen to delegate its valorisation capacity exclusively to a SATT. Some PSL member institutions have chosen to participate in the SATT Lutech (CNRS, Institut Curie) and IdF Innov (CNRS, INSERM), though without offering them exclusive access to their intellectual property. PSL-Valorisation also works on developing relations with IdF Innov and Lutech.

1.5.5. Student life and life on the Campus

The **quality of the student experience** plays a central role in developing a sense of belonging at PSL and contributes significantly to the university’s appeal. Since 2012, PSL has supported student initiatives through annual calls for proposals to encourage cultural and sporting clubs and societies and through the fostering of the cohesion of the student communities of its different member institutions. Support is offered to a wide range of different projects, on the condition that they bring together students from at least two different PSL member institutions. Thanks to these calls for proposals, **new societies have been created and links have been forged with member institutions’ existing societies**. The 110 projects that received financial support between 2012 and 2014 bear witness to the vitality and diversity of the student initiatives within PSL.

Number of students initiatives funded by areas of activity (2012-2014)

Fields	Number of projects funded	Fields	Number of projects funded
Student life and communication	11	Handicap	2
Culture	39	Humanitarian projects	1
Sustainable development	4	International	5
Knowledge dissemination	34	Sports	14
		Total	110

(For further information on student life see Appendix VI) PSL has also founded a **Symphonic Orchestra and Choir**, created in 2012 with the backing of two corporate patrons. Counting 150 musicians (among which 140 PSL students), the orchestra gave ten concerts in 2014 based on four different programs, and completed a tour of China, directly contributing to PSL’s standing on the international stage.

PSL has drawn up an ambitious **Real Estate Development Plan** (“Schéma directeur Immobilier”, See Appendix 10 for further information) for the organisation of its campus, with the aim of facilitating circulation between member institutions, negotiating improvements with the City of Paris and developing a “smart campus” that reflects PSL’s commitment to digitalisation and environmental concerns. The university has already agreed two partnerships with the Cité internationale universitaire de Paris (CIUP) and the Île-de-France region to provide **accommodation** to CPES students at the CIUP and to foreign researchers in the Joliot Curie hall of residence. PSL also signed a convention with the CROUS in late 2014, meaning that it can offer its students and staff a wider array of **sports facilities** and also ensure that its student initiatives have a wider reach.

1.5.6. Culture, Science and Society

PSL member institutions continue to fulfil **their historical mission of transmitting** knowledge to the public at large and showcasing their **exceptional scientific heritage** (80 libraries, 25 museums). PSL has reinforced this tradition by pooling members' resources and developing tools to encourage digitalisation and knowledge dissemination. The university has also committed to **organising flagship cultural and scientific events** and supporting numerous student initiatives. PSL has created a team to coordinate these different activities with member institutions through the Galleries, Libraries, Archives and Museums (GLAM) working group, which has met monthly since 2012 to organise and energize this collective drive.

Since 2012, PSL has taken major steps in the **digitalisation and valorisation of its scientific heritage**, mainly through the web portal **PSL Explore**, online since September 2015 (see 1.5.9),

Since 2012, PSL has also been **active in organising cultural and scientific events** open to the public. Its teams have worked with both member institutions and leading cultural institutions to stage numerous events and exhibitions, on the PSL campus but also elsewhere in Paris, London, New York and Berlin.²⁰ The *Humboldt Brothers* exhibition hosted in spring 2014 at the Observatoire de Paris received international media coverage and is currently on show at the Centre Sarrailh. Finally PSL has forged strong links with the **Espace Scientifique Pierre Gilles de Gennes** (ESPGG) at the ESPCI, organising a number of exhibitions there since 2013, especially as part of the annual Fête de la Science. PSL now sits on the steering committee of the ESPGG, thus benefitting from **a permanent exhibition space in which to exchange and debate** with the general public. In the short term, the ESPGG will allow PSL to bring together the different groups within its structure in charge of cultural and scientific dissemination, thus encouraging them to work together as a network.

1.5.7. Construction of the identity

The **construction of the PSL brand** is of the highest importance. Since 2011 a number of actions have been undertaken to **promote its identity and visibility both within its structure and with the general public** and to **develop a strong feeling of belonging among its lecturer-researchers, researchers and students**.

From the outset, the **identity of PSL** has been built on a **set of core values** (social commitment, selective recruitment and excellence) which bind the member institutions above and beyond the respective fields of specialisation. It is also firmly situated in the **continuity** of the sometimes centuries-old history of its member institutions. Finally, it has been made real in the creation of a **logo** and **graphic charter** defined for all its publications (including institutional brochures, posters, pamphlets presenting courses, products) (cf. 1.5.6.). The PSL brand's **visibility has also been increased on social networks and within the member institutions**, including the most recent members, where it features not only on display banners and through the PSL Newsletter, but also in all institutional communication (such as business cards or seasonal greetings).²¹ Moreover, a lit-up sign on the building of Paris-Dauphine is clearly visible from the Paris ring-road (1.3m users daily).

The feeling of belonging has grown significantly since 2012 within PSL. Interactions between research and teaching teams (through inter-institutional CFPs), between students (through inter-student CFPs) and between administrative staff (through the thematic working groups) have

²⁰ The Exhibition "The Inventors of the Future" at the the Cité des Sciences and the Palais de la Découverte, "My night with philosophers" in London, New York and Berlin, Shakespearean events at the Comédie Française, the Théâtre de l'Odéon, the Louvre Museum and the Bibliothèque nationale de France (BNF); conferences, talks, round tables, exhibitions, concerts and performances on contemporary science; the "Accelerations Festival" and "Sartre Night" on the PSL campus; "Sforzando – The European Chamber Music Competition".

²¹ In particular, the university has published a monthly Newsletter since 2014. The 4,900 paper editions enjoy a PSL-wide circulation, being read by staff and students.

reinforced the integration of the different communities. A number of measures have been taken to foster **a feeling of belonging among the students** of the university. **Enrolment and degree-granting** are obviously key factors in this regard, and are at present the domain of PSL for the 238 students in CPES, for around 3,500 doctoral students and for the students of the first PSL master's degrees (cf. 2.2). The **presence of the PSL logo on student cards** is a daily and ever-present reminder of their place within PSL and facilitates access to sites across PSL's different campuses. **An array of services available to all students** are being developed including a student intranet with responsive web design currently being rolled out, library access or the introduction of a multi-service student card (access, dining, libraries, transport).

Finally, since 2012 PSL has sought to **consolidate its visibility as a brand in the socio-economic world**, especially through the existing networks of the Mines Paris Tech, Paris-Dauphine, ENS and the Institut Louis Bachelier. While PSL's offer to businesses is still being developed, it already enjoys solid links to the worlds of economics and industry with a number of **leading figures** sitting on its two Boards of Directors.²² Finally, PSL has developed an active alumni program, creating the association **PSL Alumni** in 2014 to bring together the alumni associations of thirteen member institutions. PSL Alumni has established a joint directory for its members and collaborates with their Careers services; it has also made the incubator Schoolab available to alumni and offered the benefits of student entrepreneur status to alumni for the last three years.

1.5.8. International visibility

Since 2012, PSL's international development strategy has had the aim of **boosting its academic collaborations with the world's leading institutions** and of **increasing both the mobility of its students and the attractiveness of its own courses on the international stage**. While the Labex have played a key role in this strategy, the resources made available by the IDEX project have also been used to forge **structuring academic partnerships**, fund **targeted calls for proposals** and support researchers applying for **European funding**. Since 2012 this work has been coordinated by the Office of International Affairs and by a dedicated working group bringing together the IR directors of its member institutions under the leadership of PSL's Director of International Affairs²³.

The university has first and foremost sought to forge **strategic partnerships** in research and teaching with **some of the world's leading universities**. Partnerships have been signed, with **University College London, National Taiwan University** in 2012 and **the University of Cambridge** in 2014. PSL is thus the first European university to have signed a strategic cooperation agreement with the University of Cambridge, and only the second worldwide after MIT. The first 18 months of cooperation have seen nearly 20 collaborative, co-funded research projects take place between colleagues from Cambridge and PSL. In December 2015, PSL signed its most recent strategic cooperation agreement with Technion – Israel Institute of Technology. An emerging partnership with EPFL is slated to evolve into a strategic cooperation agreement by early 2016. Conversations with New York University (NYU) and Columbia University were initiated in the spring of 2015 and will lead to strategic agreements in the coming months.

PSL has undertaken other efforts to **enhance the internationalisation of its research and teaching** through a bottom up approach. PSL has made its degree courses more open internationally by creating 83 international mobility grants (38 of which were given to new students) between 2012 and 2015, with increased investment planned for 2016. A specific call

²² Anne Lauvergeon (the former president of AREVA), André Levy-Lang (former Chairman of the Executive Board of Paribas), Philippe Camus (former Managing Director of Lagardère, Chairman of the Board of Alcatel-Lucent, Jean-François Bensahel (DSO Interactive, CEO), René Ricol (Co-Founder of Ricol-Lasteyrie), Helle Kristoffersen (Senior VP Strategy and Business Intelligence at Total), François Darchis (Senior VP and Member of the Executive Committee, Air Liquide). Lionel Breton (Chairman of the Board at Force-A) .

²³ The DIA works under the supervision of the Vice-President.

for proposals was launched through which 9 international research projects have been supported between 2012 and 2014 with an average IDEX funding of €55,000. In addition, PSL applied for and obtained the Erasmus Charter in November 2015 allowing its students to benefit from the European mobility grants scheme.

The Labex projects have also had a major impact in integrating their researchers in international networks of excellence. In 2012 the TransferS Labex welcomed four visiting professors and initiated a partnership with Fudan University as well as a convention with the MSH concerning the hosting of foreign post-doctoral students. Equally, in 2012 the IEC Labex supported a number of international collaborations with prestigious research institutions in the field of cognitive science while the ENS-ICFP Labex recruited three foreign researchers. Finally PSL has undertaken a number of actions to **prepare for its entry in international university rankings**. Beginning in 2012, the university has entered into dialogue with the teams producing the Shanghai Ranking, the QS World University Rankings and the Times Higher Education World University Rankings, in order to better understand the criteria entry requirements.

PSL has also **supported its researchers' participation in Horizon 2020**. A dedicated call for proposals for H2020 European pre-projects was launched in 2013 and renewed in 2014 and 2015. Funding was also provided for a European expert to train Labex directors, researchers and students in writing up European project proposals.

PSL's investment in developing collaborations and the presence of its Labex have contributed greatly to increasing the internationalisation of its research and teaching. In total, 869 new agreements with foreign institutions were signed by PSL institutions between 2012 and 2015. Over the same period, 33.4% of doctorates were jointly awarded in conjunction with another university and the number of foreign doctoral students enrolled at PSL in 2015 increased by 49.4%. To give an example, in the first year of the SACRe doctoral program, 30% of its students were foreign, rising to 42% in its second year. Almost 13% of master's courses are organised with an international partner and 2.344 new foreign students have registered at master's level within the university in 2015.

1.5.9. Focus: remarkable achievements

The international physics master's degree supported by the ENS-ICFP Labex - This master's degree, directed linked to the ENS-ICFP Labex, stems from the redesigned ENS physics master's degree, which was transformed as part of the PSL project. It is a multidisciplinary master's in fundamental physics that aims to provide a world-class course covering all fields of physics. There are 150 students enrolled, of which more than 100 are in second year. Run within the framework of the ENS-ICFP Labex, it has rapidly become more and more attractive (from 150 applications in 2012 to 250 applications in 2014) and also seen its international reputation grow (34% of students are foreign, coming from leading universities across the world, including Imperial College London, Princeton University, LMU Munich and the Université Libre de Bruxelles).

The ITI doctoral program - Set up in 2014, the ITI program is founded on three pillars: interdisciplinarity, innovation and entrepreneurship. It aims at fostering a culture of innovation among PhD students. For this purpose a pre-doctoral year has been set-up. Student are taught in various disciplines according to their choice (from quantum engineering to innovative technologies for health, via environment, advanced materials and many others) by renowned researchers from PSL laboratories, and by professionals from start-ups and investors on the entrepreneurship side. Nine PSL members actively participate to this program (ESCPI, ENSCP, Mines Paris Tech, ENS, Dauphine, Observatoire, Institut Curie, Collège de France, ENSAD). The first intake (2014) of 20 reported very high levels of student satisfaction and led to a project to set up a company.

The Cycle Pluridisciplinaire d'Etudes Supérieures (CPES) - Beginning in 2012, this entirely new type of undergraduate course was granted full undergraduate degree status in 2015 and at present counts 238 students²⁴. It combines the best aspects of the CPGE and university systems, the teaching staff coming from both sectors. Its three programs of study (Humanities; Economics, social sciences and law; Sciences) are based on the principle of progressive specialisation and an immersion in the world of research. The CPES has shown a real commitment to its social ambition, with 44% of its students having grant-holder status (compared to 34.7% across all levels in French universities) and more than half of its students coming from outside the Île-de-France region (accommodation for 56 students is reserved at the CIUP). Its success can be measured by both the continuous increase in the number of applications (from 740 to 843 for first-year entry between 2014 and 2015) and the first-rate courses which its graduates have gone on to join.

Doctoral Program SACRe - Created in 2012 by the five PSL arts schools and the ENS, SACRe introduced a new type of doctorate closely linking artistic creation and research, in which artistic production is linked to theoretical thinking. The PhD defense is based on the presentation of a body of artworks and the submission of a written thesis. 43 PhD students have been enrolled since 2012. This initiative has had a major effect on the structuring of research within PSL, with a request for the creation of a research unit accepted by the Ministry in 2015.

The web portal **PSL Explore** - Online since September 2015, the web portal PSL Explore offers free access to around three million resources (library books and journals, photographic libraries, conferences, scientific archives). Developed as part of the Digital Development Plan, the portal also offers PSL researchers, teachers and students advanced content managing system features to facilitate the use of these resources in both research and teaching. Its development has gone hand in hand with a strong investment in the digitalisation of historical documents (53,000 documents digitalised in 2015, 450,000 documents to be digitalised and more than 2,000 hours of audio-visual teaching to be published between 2016 and 2018). This digitalisation program has benefitted from IDEX funding as well as financial support from the Higher Education Ministry and the Île-de-France region, awarded to PSL following successful applications to two different calls for proposals.

²⁴ The CPES model also favours the number of women pursuing degrees in the sciences, where they represent 2/3 of both candidates and successful applications.

2. Projection into the future (Part 1)

The last four years have seen the creation of PSL Research University, its adoption of an efficient operational structure, and its significant internal and external development thanks to a wide range of ground-breaking achievements. The University's enlargement through the accession of new members has reinforced its academic potential and improved its integration in the socio-economic world. PSL deserves to be definitively recognized as a leading university capable of attracting top academics and showcasing their talent.

The members of PSL consider their commitment to the university and its success as irreversible and are taking great strides to reinforce their drive for greater integration. The collective experience gained since 2011 has allowed PSL to observe its institutional model and its capacity for transformation in a new light. This chapter presents PSL's organization and transformation model and their application across PSL's main fields of activity.

2.1. PSL's organisation and transformation model

Since its creation, PSL Research University has been developed as a “*learning organisation*”, an adaptive organisation that grows and strengthens itself through feedback at all levels - from individuals and teams, to member institutions and university structures. In contrast with traditional organisational models, PSL calls upon the most appropriate and most effective contributors for its different strategic and innovative projects, regardless of their place within the organisation. This model lends itself particularly well to academia, a world undergoing profound change in which PSL can play a pioneering role.

In order to meet its ambitions, PSL will trigger five generic levers of transformation concerning as well the core missions as well as the support functions of the University:

The “evaluation and strategy” lever: PSL's foundational bottom-up approach favours development and fosters a spirit of innovation. It is combined with a top-down approach and instruments based on strategic oversight of PSL's environment, periodic evaluation of its academic potential, its organisation and its procedures. The implementation of a coordinated evaluation at the PSL level is designed to equip member institutions with the indicators needed for informed strategic thinking (cf. 2.2) and the development of strategic initiatives with significant financial support. The creation of a strategic dialogue (2.2), Key Research Programs (2.3), a corporate university, a global HR strategy (2.7) will also play a major role.

The “innovation” lever: PSL is committed to creating value through innovation (collaborative research, knowledge dissemination, technological impact, etc.) which will help transform its activities in the fields of research, teaching and creation. This commitment will require ever closer links with the socio-economic environment. PSL thus strengthens the coherence of the role it plays in society and in the knowledge and creativity economy (cf. 2.5), while integrating impact criteria in the evaluative and strategic processes (cf. 2.2.) and developing an increasingly thematic approach to research (2.3) and teaching (2.4.). In particular, it will launch an annual Forward Forum designed to bring together leading teachers, researchers and decision makers from the public and private sectors to work on the key challenges of the future.

The “pooling/structure” lever: the need for efficiency has led to the creation of instruments to maximise PSL's potential to identify and exploit internal synergies and economies of scale. Examples of these synergies include the mutualisation of certain infrastructures such as production facilities for MOOCs and management information systems (cf. 2.8), the structuring and organisation of academic potential (Key Research Programs, 2.3, and PSL master's degrees 2.4), and the sharing of know-how, best-practices and expertise (support functions, 2.8., and knowledge transfer, 2.5.). Digital strategy represents another major avenue through which PSL can adapt to an information revolution that has transformed all academic and management practices. The focus is not only on pooling computational and storage facilities (cf. Mesocentres

and the Data Center etc.), but also on improving the student experience (2.4.), enhancing the sense of belonging within PSL (2.7) and reinforcing administrative efficiency (2.8). The biggest challenge will be the development of resources through fundraising.

The “networking” lever: PSL's networking should be both internal and external. Internally, the focus is on promoting freedom of movement for students, (cf. 2.4), lecturers, researchers and administrative staff (2.7) and on facilitating connections thanks to a PSL social network and an events calendar open to the whole PSL community. Externally, PSL will confirm its commitment to Open Data, develop its capacity to meet the expectations of society and the economy (2.5), reinforce its international strategy (2.6), involve external experts in a wide range of key processes (2.2) and develop the PSL Alumni network worldwide.

The “image and communication lever”: in spite of the many achievements to date, enhancing PSL's visibility and standing remain key issues. This evolution involves significant investments in three fields. 1) Rankings: PSL aims to be ranked within the next two or three years. This is an essential milestone that will both reinforce internal bonds and guarantee PSL's reputation on the world stage. A number of measures have been – implemented to ensure that PSL meets the required criteria, most notably the common citation policy and degree-granting powers: all teams benefitting from financial support are to commit to the common citation policy from 2016; those who have not adhered to the charter will no longer be eligible for IDEX funding from 2017 on; only PSL-granted degree courses will be eligible for IDEX funding from 2017 on. 2) PSL Membership: Membership in the PSL community must be emphasised symbolically through PSL graduation ceremonies (cf. 2.4), the recognition of “PSL Permanent Faculty” status (2.7) and the systematic inclusion of the PSL label on degrees. 3) Communication: In terms of communication, measures will see the systematic inclusion of PSL Research University as a baseline alongside member institutions' logos across all media and a greater involvement of the academic community in public debates and policy making (2.5).

2.2. The governance of PSL

The four-year probationary period has shown the value of PSL's endowing itself with transparent instruments of governance that inspires confidence, reinforces coherent action and accelerates the transformation process. This governance model is designed to produce consensus over diagnostics and objectives, structure member institutions' strategies and lead to innovative global strategies. The instruments of governance cover PSL as a whole, rather than simply the IDEX initiatives as proposed in 2011. They are overseen by the president's office acting on the advice and decisions of the Council of Members. The functional governance encompasses evaluation, strategic dialogue and interaction with supervising ministries.

Evaluation: in order to streamline its evaluation system PSL proposes an external evaluation policy, in line with both the criteria of the French Evaluation Agency (HCERES) and international standards. This policy will first be validated by the Council of Members, presented to the Strategic Orientation Committee and the Academic Council, and then validated by the Board of Directors. The evaluation itself will be undertaken every five years, with a half-way progress report. It will be fully transparent and follow open data principles applied within PSL. Results will be presented to the Council of Members and the respective member institutions' governing bodies.

Upstream and downstream evaluation will be developed through a strategic dialogue on two levels: the member institutions elaborate their own strategic orientations and present them to the Council of Members annually, highlighting the transformational aspects linked to the IDEX; the Council of Members defines strategic initiatives on those issues that are beyond the scope of the individual institutions. These initiatives are elaborated jointly with the research organisations and submitted to the Boards of Directors of both PSL Research University and the PSL Foundation.

They are based on a multi-year vision of funding that encompasses all of PSL's resources. A funding and action plan is defined for each strategic initiative.²⁵ They are overseen by task forces that regularly report to the president's office and the Council of Members. They can rely on the research and expertise developed by the internal university (see below 2.7)

In order to ensure the coherence of PSL's relations with its supervising ministries, the member institutions share the strategic documents exchanged with their supervising bodies. PSL's president liaises with the French government to ensure coordination between these different bodies or between different members operating under the same body.

This functional governance is founded on the institutional governance presented in 1.3.2. The central role played by member institutions and the president's office at the heart of the executive will guarantee the profound transformation of PSL University towards a more fluid and effective organisational model. PSL's decision-making and advisory bodies (the Board of Directors, the Academic Council, the Strategic Orientation Committee) ensure the University democratic, academic and international legitimacy. **PSL will liaise with the government to suggest evolutions in the legal status of the ComUE that will grant it greater administrative flexibility and more generally bring together effective governance and a strong model of subsidiarity. PSL Foundation will then focus its efforts on valorisation and fundraising²⁶.** In the meantime, PSL University proposes four measures to guarantee its coherence and the reactivity of its strategic management:

- 1) Guarantee the unity of the team around the president of the Foundation (3 deans) and the ComUE (2 vice-presidents). This unity is now a reality and needs to be included in the statutes. PSL Foundation's statutes are to be modified to this end in 2016. The administrative team is also shared.
- 2) While preserving a culture of consensus, limit the number of decisions requiring a unanimous decision to those concerning the accession of new members or associate members. The election of the president will require a qualified majority.
- 3) Make project governance systematic. It is already central to PSL's running, bringing together the Council of Members which defines the major strategic orientations, the president's Office which prepares the Council's decisions and oversees their implementation, the Task Force grouping different committee in charge of data analysis, strategic reflection and advice for the different units of the University under the supervision of a leader appointed by the president and contributors proposed by the Council of Members..
- 4) Carry out consolidated stocktaking of the resources, activities and performance of the PSL entity, including the Foundation, the ComUE and its members from 2016, with the use of an

²⁵ Examples might include the growth of the CPES, the coordination of PSL's international dimension, the pooling of digital teaching, the improvement of the student experience and the Key Research Programs.

²⁶ The University could be structured as follows, as soon as an appropriate legal structure would be available. :



enhanced version of the existing REPEX compilation. The results will be communicated to the governing bodies to ensure that they have a global vision of PSL University.

2.3. Research policy: objectives, management and measures

PSL aims to implement a two-pronged research strategy: on the one hand promote the development of innovative high-potential projects, particularly through open calls for proposals; on the other hand promote the structuring of PSL's academic strengths along disciplinary, interdisciplinary or thematic lines through the implementation of Key Research Programs involving both junior and senior chairs.

2.3.1. Development

Support for this development will continue to be provided through a wide array of measures, including open calls for proposals, exploratory funding, strategic and academic oversight and ongoing discussions about future innovative research themes.

2.3.2. The structuring of the Key Research Programs

The structuring policy forms part of the wider strategic dialogue, and has two objectives:

1. Develop strategic sectors, clearly identified along disciplinary lines, following the model used by PSL Chimie and already established in some Labex. This will involve creating groups working within the different member institutions and forging links between them (“pooling/structuring” lever). The emergence of a strategic Research Program in Mathematics is currently in discussion.
2. Create new programs or new hubs by bringing together disciplines in unprecedented partnerships or with high added value (“innovation” lever). Thus PSL will foster innovative initiatives to complement its Labex programs, thereby developing groups that reach critical mass and reshape the disciplinary landscape.²⁷ A list of themes corresponding to initial proposals, made by various teams, might evolve towards Key Research Programs was drawn up in December 2015: Analysis of transitions. Risks and financing; Creation. Cognition. Society; Sensory design ; Global studies ; Governance ; Energy innovation ; Innovation and Sustainable materials for Mechanical Engineering ; Origins of life and conditions for its appearance ; Political radicalisation in Europe and the Middle East ; Data science and the data of science ; Scripta (History & Practice of Writing) ; Frontiers of living matter.

In line with the principles evoked in 2.1, these programs are structured as projects the duration of which is variable, from 3 to 8 years.

The selection process of these new programs shall take into account their strategic dimension: project proposals for the programs received following the call for proposals will be ranked by the Research Council on the strength of external evaluation of four criteria (strategic stakes, academic added value, coherence of the program, coherence with its academic leadership). The final decision will be made by the Council of Members. Funding of between €200,000 and €500,000/year, intended as seed money, will be allocated for three years, with the possibility of renewed funding for a period of up to five years.

Each selected program will be managed by a steering committee including at least one member named by each member institution with an interest in the given program, working alongside an international scientific advisory board for each program. They will be encouraged to identify sub-programs to be led by figures from the different institutions wherever possible. Finally, an annual review of the activities of these programs will be carried out by the Research Council. On

²⁷ Unlike the Key Research Programs being developed.

the basis of these findings, the Dean of Research will present an annual report to the Council of Members on the implementation of the programs and the calls for proposals.

The creation of these Key Research Programs will allow PSL to bring together the running of its strategic initiatives in the field of research across both new programs and the Labex. PSL has begun to think strategically about the future of the Labex (2019). A few guidelines are already clear: A. the very positive assessment of the Labex projects' scientific achievements in 2015. B. The extraordinary impact of the Labex on the Research, Teaching and Valorisation activity of the University. C. The structuring effect of the Labex for the University. D. The necessity of a new scientific assessment in 2018 but also of a broader evaluation of the integration of the different Labex projects to the strategy of the University. E. The results of the Key programs will play an important role in either suggesting new fields of research or nurturing the renewal of Labex projects (cf. Appendix IV).

PSL's research strategy will also be reinforced by its HR policy (cf. 2.8) and a strengthening and better integration of support functions, most notably concerning international calls for proposals ("pooling/structuration" lever).

(Chapter 2 continues in the free space attributed to the IDEX as Chapter 3 of the report)

3. Projection into the future (Part 2)

3.1. Teaching policy: objectives, management and measures

PSL offers a full spectrum of university courses (undergraduate, master's and doctoral level), providing first-rate teaching to a wide range of people who place research, innovation and creativity at the top of their agenda. This includes not only researchers, artists and engineers, but also all those for whom research can help stimulate innovation (high-ranking civil servants, industrialists, journalists, managers and business leaders, legal professionals and so on). PSL's ambition is to rejuvenate course content and educational practices: selective entry requirements, social commitment, individualised courses and student support, demanding academic and creative standards, internationalised year groups and courses, student involvement in the socio-economic world and the major questions facing society.

PSL University's primary objective is to strengthen its existing educational innovations, namely the CPES and PSL-ITI, in which enrolment is set to triple in the coming three years.

Its second objective is to reinforce the use of the "networking" lever and push for the greater permeability of courses by promoting student mobility between its different member institutions. The first "PSL options" programs will be available from September 2016 to allow students, where possible, access to courses in other institutions not only on the basis of already existing joint programs but on a free choice basis. Within the next two years, a system of options and majors/minors will allow students to choose courses from different institutions or degree programs within PSL. Each student will thus be able to create a personalised program that benefits from the wide range of courses available at PSL. As such, students take control of their education when they arrive at PSL.

Increasing networking within PSL also means increasing free access across PSL (to gardens, libraries and so on) where possible from September 2016. The three PSL Research University halls of residence to open between 2017 and 2020 will be interdisciplinary melting pots in which students from different institutions can meet, with an emphasis on social engagement and the development of transversal skills.

The "pooling/mutualisation" lever will be used to reinforce the coherence of the range of courses run by member institutions under the PSL banner. A PSL Graduate School of Science and Engineering, to be created and coordinated by PSL's three engineering schools, will be open to

students from all institutions (**See Appendix V**). This Graduate School will serve both to improve PSL's international visibility while also helping develop a “new engineering” curriculum adapted to the demands of the twenty-first century. More generally, a call for proposals will be launched to create the “PSL master's degrees”, bringing together courses from different institutions within a given disciplinary or thematic field, with an emphasis on links with the Labex and Key Research Programs. They will exploit the synergies between institutions while also cultivating a broad range of approaches across different courses of study, thereby contributing to make PSL's teaching program as a whole much more visible and coherent.

The implementation of this transformation will be orchestrated by a **Master's College** along the lines of the Doctoral College. In parallel an Undergraduate College will be structured to facilitate the development of a coherent PSL bachelor offer. These flexible coordinating structures will work in task forces on each initiative in coordination with the Dean of Teaching. They will be responsible for: 1) offering students increased choice from across courses and institutions (focuses including modularised courses, course schedules, registration, and cost sharing between institutions); 2) coordinating community services (focuses including helping international students settle, transversal courses (languages, academic working methods, personal development) where institutions wish to pool them); 3) organising PSL degree-granting powers and graduation ceremonies; 4) developing incoming and outgoing student mobility, in particular through the use of grants; 5) running a network and developing resources promoting educational innovation, notably through the development of a learning management system; 6) preparing PSL's teaching program as a whole and ensuring its clear presentation on the website, notably through a search engine allowing students to identify the most relevant courses across the whole of PSL by key word; 7) monitoring the skills, satisfaction and employability of PSL's students and proposing prospects for evolution; 8) overseeing mobility between PSL courses and courses offered by non-PSL institutions.

3.2. Research valorisation and knowledge transfer: objectives, management and measures

Developing stronger links with the socio-economic world is a priority objective for PSL. It will be achieved both through the growth of the PSL-Innovation & Entrepreneuriat department and through the reinforced coordination and commitment from member institutions to collaborative research, valorisation and transfer of expertise and knowledge. This progress will be based on the work of PSL-Valorisation and PSL-Pépité, and on their capacity for creating links and fruitful relations with the numerous actors of the innovation eco-system. The effort will also include knowledge transfer initiatives associated with a variety of industrial or institutional partnerships, leveraging an effort by the PSL community for ensuring a greater presence in public debate about major scientific, economic or societal issues.

PSL Valorisation will continue to focus primarily on the creation of technological start-ups based on intellectual property developed in PSL laboratories. It will interface with incubators within PSL or in its environment that will host and/or support these start-ups, and PSL will also advise them on public funding programs that may support their development, in addition to PSL's own maturation scheme. The development of high-potential IP assets (mostly patents and software) and the creation of a significant portfolio of start-ups associated with PSL through IP and/or equity are major objectives for the coming years. PSL's ambition in these respects is to achieve results comparable to those of international leaders such as MIT, Technion or Imperial College.

A number of complementary initiatives are also planned, notably the creation of an acceleration program and of a venture fund associated with PSL.

PSL Innovation & Entrepreneuriat will foster enhanced coordination of collaborative research and transfer to industry, particularly through the Labex, which are already very active in these fields. The key for PSL will be to flexibly combine fundamental, applied and technological research in order to maximise the benefit of the major synergies between interdisciplinary research and transfer to industry. PSL-Innovation & Entrepreneuriat will work in synergy with

the valorisation departments and structures of the members in order to support their industrial partnerships and, when relevant, to foster their development at the level of PSL, always following the principle of subsidiarity. To cite but two examples, ongoing projects launched by Institut Curie and Dauphine in the field of health economics, and by Mines Paris Tech on high temperature materials show promising potential for extending to other partners and disciplines under the umbrella of PSL.

Finally, PSL wishes to broaden the concepts of valorisation and transfer by committing to knowledge dissemination and engaging the economic world, opinion leaders & decision makers, and the general public. As such it will draw up an inventory of its areas of expertise and push for a greater output of expert opinion, policy papers and other means of informing public debates and decisions. Inspired by the digitisation work undertaken by the Collège de France, and by other initiatives from its member institutions, PSL Explore (cf. 1.5.9.) will be strengthened by data produced by students and researchers. Efforts will also be made to develop short and accessible formats, most notably videos.

3.3. International policy: objectives, management and measures

PSL Research University is moving ahead with its international development according to the following mission: to continue building a network of universities among the world's finest in order to create both academic and research opportunities for students and faculty; to increase PSL's worldwide visibility by promoting its excellence in research and academics, namely through ensuring and leveraging PSL's ranking in the coming 2 to 3 years; to develop an international network of partnerships among companies in key countries. The strategic partnerships signed with universities in the UK (Cambridge, UCL), in Israel (Technion) and in Asia (National Taiwan University) will be consolidated and developed. Engaging discussions, which should culminate in the signing of strategic agreements in 2016, are on-going with both New York University (NYU) and Columbia University in the United States and with EPFL in Switzerland. New possibilities are being explored, including the west coast of the USA, Asia (thanks in part to the network of the EFEO), continental Europe, Brazil, and francophone Africa.

Efforts are underway to 1) mutualize and improve services for international students, 2) to create a complete offer of credit and/or degree-earning international programs, and 3) for PSL to become a force in pedagogical innovation, offering more MOOCs and distance-learning in French and English for international audiences and creating chairs for young researchers from emerging nations.

PSL Research University will also organize a prestigious global academic and research event per year in Paris on cutting-edge themes, inviting members of the leadership, faculty, and staff of its international partner universities together with economic leaders, leaders from the social sector, policy makers and opinion leaders to participate, in order to stimulate collaboration and increase the university's brand image. PSL will also launch a summer schools program to increase its visibility, academic exchanges and bring in new resources.

In order to ensure the leadership and coherence of its international strategy and activities, PSL University has created an Office of International Affairs under the supervision of the University's Vice-President. The Office will grow from a staff of three to six international development professionals by mid-2016. The Office serves as the central liaison with partner universities. It will provide overall coordination, support, and expertise for the many actors involved in PSL University's international development including existing teams within the member institutions. Finally, the Office of International Affairs is in the process of creating committees composed of experts drawn from within PSL Research University and whose missions will be to 1) identify international development opportunities in countries of interest to the university, 2) contribute to the development of specific partnerships, and 3) help create PSL University's international offer in terms of academics and research.

Benchmark: New York University - a strategic partner for PSL but also a benchmark for the construction of our research university

PSL Research University does not intend to construct its Target University on any existing model. On account of the history and strong identity of its members, as well as the original form of collegiality that it has fixed as its goal, PSL cannot settle for merely adopting an existing template, but rather has to find a form of organisation that respects the identity of members while also promoting their cooperation and development. It is nevertheless useful to consider a benchmark project.

Comparisons are sometimes made between PSL's construction and Oxford or Cambridge, while in the University's own thinking on the structuring of the project, PSL looked at MIT. When looking for a benchmark for the University however, it was felt that it could be interesting to consider the characteristics of New York University, a university which has many longstanding links with PSL's member institutions, and with which the University begun, as of 2015, to establish a strategic partnership.

NYU is a research university with an international ranking similar to what has been projected for PSL (27th in the Shanghai Ranking, 30th in the THE Ranking). It is made up of twenty or so largely multidisciplinary schools and colleges which enjoy considerable organisational flexibility, cover a very broad spectrum of discipline (from medicine to the arts) and occupy a number of sites across its urban campus.

The governing structure and academic organisation of NYU show a balance between the autonomy of its academic entities (the Schools, College and Institutes, most of which are multidisciplinary and each of which is overseen by a Dean) and effective coordination and cooperation at the global level of the university: each entity is in charge of its own academic affairs (organising teaching courses and research, recruitment and the promotion of lecturer-researchers), but is also integrated into a system of governance in which the administration plays a coordinating and facilitating role as well as providing support in looking to the future (cf. the Administrative Management Council):

- coordinating, through the Deans Council, which includes the President and the Provost and meets regularly to determine the university's collective strategy;
- facilitating, because the Office of the President brings together a number of administrative functions (health, public relations, development and alumni, real estate, IS);
- looking to the future, because the extended team of 15 Vice-Provosts around the Provost is not only responsible for the academic running of the university (overseeing recruitment, promotions, course creation, etc.), but also, and especially, for supporting the evolution of the Schools and Colleges by overseeing working groups studying future perspectives in academia. The Provost's teams thus inform the wider strategic thinking on 11 academic themes through the oversight of 12 Advisory Committees and several ad hoc committees working on current themes.

NYU also stands out because of the culture of interdisciplinarity that it has created across the Schools. A total of 44 degree courses are offered conjointly by two or more Schools while student mobility is also facilitated by numerous agreements between Schools. A Graduate Program Committee and an Undergraduate Program Committee coordinate these activities. However, many structuring interdisciplinary initiatives have also been launched by NYU, under the control of the Provost (Data Science, Inclusive Leadership, Entrepreneurship).

3.4. Human resources: objectives, management and measures

All of PSL's member institutions and research organisations boast an HR policy and recruitment procedures that guarantee the excellent quality of the university's talents. All five levers of transformation will be central to reinforcing efforts in this regard:

The “innovation” lever: a corporate university will be created in 2017 with the aim of making PSL a world leader in innovation through the integration of three dimensions that are too often considered separately: 1) developing the skills of PSL's managers and staff, thereby contributing to the sense of belonging within PSL while also encouraging the exchange of the best management practices and shared management and IT tools; 2) setting up a Lab of Teaching and Research Excellence to help lecturer-researchers to develop new educational practices. 3) Delivering fundamental research on the performances and perspectives of academic institutions worldwide to support the governance of PSL's elaboration of a strategy.

The “evaluation and strategy” lever: a talent management strategy will be drawn up every five years, based on a consolidated vision of the needs of PSL's member institutions and an analysis of possibilities for joint recruitment and subsequent coordinated actions. At the heart of this coordinated strategy, junior and senior excellence chairs, which prove their worth during a probation period, will be a major means of attracting talent. The strategy will be developed by a HR committee run by the vice-president, the deans and the Executive director of administration and finance with the involvement of the Research Council and Teaching Council.

The “pooling/structuring” lever: The Idex funds will increase support to teams responding to international calls for proposals. Existing resources will also be better coordinated and leveraged, notably those of the CNRS and INSERM. As a result, a recruitment charter will be drawn up to define the major principles of PSL's academic recruitment. Selection committees or their equivalents will count a proportion of PSL Permanent Faculty coming from other member institutions.

The “image and communication” lever: PSL Permanent Faculty status will be created in 2016 and granted to all PSL's permanent lecturer-researchers and researchers.

The “networking” lever: On the one hand PSL will leverage its members' international research networks, notably the CNRS's international offices to search and attract both junior and senior academics abroad. On the other hand, PSL will enhance its internal mobility for both PSL Permanent Faculty and administrative staff. Concerning staff, a number of measures will be implemented to boost mobility (position exchanges, alignment of staff management and financial facilitation in case of wage gaps...).

3.5. Support functions: objectives, management and measures

While PSL clearly demonstrates a significant potential in this field, the great variety of its member institutions (who differ in their size, purpose, history, digital policy and quality management) represents a real challenge. In order to prioritise actions, the member institutions' Executive Directors for administration and finance (EDAF) will carry out diagnostics of all support functions to identify areas for action and pooling resources with high added value. This approach will also help develop a shared PSL identity among PSL's community.

There are a number of prospective actions in this field, including the sharing of best practices, an inventory of expertise to promote cooperation, facilitate exchange and identify opportunities for pooling and collaboration. Structuring synergies will be reinforced in areas including campus life and student experience, managerial approaches and quality management, IT, safety and security policy for assets and staff. The sharing of best practices in human resources will see greater efforts in social auditing, ongoing vocational/professional training, social responsibility, preventive medicine...

The strategic management of support functions is coordinated by PSL's COO Conference. They will provide a status report to the Council of Members every trimester and suggest a series of actions to be taken to reinforce the integration of PSL Research University's administration. Each initiative will be jointly overseen by the University's COO together with one or two COOs from member institutions.

Efforts to pool resources will first leverage the most relevant expertise and facilities within member institutions. In order to accelerate this drive, a "Synergies" fund is created to help to structure and implement these projects with the aim of improving the quality of services, reducing overall cost and enhancing networking effects by bringing PSL's different communities closer together. Projects are reviewed in two phases, an initial qualifying phase to identify the opportunity followed by a second structuring phase with a contract to support the pooling drive. Funding cannot exceed three years.

Essential will be the development of fundraising. PSL will develop this activity from 2016 on, on the model of major university worldwide. According to fields and needs, money will be raised either at the level of the research center or of the member institution or of the University. This will be done in good coordination to ensure an efficient diversification of resources in a time of decreasing public resources. The aim will be to raise an equivalent to the IDEX endowment in 10 years.

Focus on the information system (see Appendix IX)

An information system dedicated to the management of support functions has been decided upon within the framework of PSL's needed multi-year planning. As part of the Digital Development Plan the management program will progressively develop a PSL decision support system (DSS) in coordination with the development of the PSL information system. The aim is to give PSL's common services and member institutions a shared repository (interoperability) that will in time become a real decision-making tool.

Structuring tools and their associated practices having already been implemented (for example REPEX), it is now a question of capitalising on them in order to encourage shared standards and solutions which will produce consolidated and reliable data through the PSL IS.

This consciously concrete and operational approach will be put into practice through the progressive adoption by member institutions of tools such as a shared learning management system, the multi-service university card and function specific applications. This flexible and participative approach to the structuring of services will help to contribute to member integration within the shared PSL project.

Nature of commitment	Description of the indicator	Target	Date of achievement	Difficulties
Modification of the statues of the FCS to unify PSL executives	Yes/No	Yes	2016	
Abolishing unanimity except for the enlargement PSL	Yes/No	Yes	2016	
Implementation of a strategic and evaluative dialogue	Yes/No	Yes	The end of 2016	Methodological complexity (bringing together diverse practices, the framework imposed by the HCERES and international standards)
PSL research programs	The number of programs and the funding pledged	15 programs for a total of €4m to €5m	2016-2018	Avoiding resources being spread too thin.
Pooled funding reinforced by PSL to support research	Yes/No	Yes	2nd semester 2016	Coordination of existing resources with varied practices and know-how
Fundraising	Raise a sum equivalent to the Idex endowment at the University level in 10 years	€75m/year	From 2016 on	Necessity to coordinate levels of fundraising
Creation of a seed fund	The raising of capital	€20m (excluding BPI co-financing)	2017	Incertitude over fundraising
Double the yearly CPES intake	CPES yearly intake	120	Sept 2018	Funding
Triple ITI yearly intake	ITI yearly intake	60	Sept 2018	

Educational freedom of movement within PSL	The average availability of PSL Options per student	15%	2016-2018	Coordinating time tables and schedules, ensuring coherence in the awarding of ECTS credits, overcoming differences in supply and demand
Transfer of degree-granting powers to PSL	PSL University degrees over the total of the degrees granted within PSL	80%	Sept 2018	Diversity of regulations and the needs for cooperation between institutions
PSL social network	Active profiles among students	75%	2017	
Creation of the PSL Learning Management System	Proportion of students covered	75%	June 2018	On the basis of the existing learning management systems.
Creation of a Graduate School of Science & Engineering	Yes/No	Yes	Sept 2017	
Creation of undergraduate college and master's college	Yes/No	Yes	Sept 2016	
PSL Student Houses	Number	3	2017-2020	Identifying real estate opportunities
Common citation policy	Percentage of publications respecting the common citation policy charter	90%	2017	Convincing researchers
PSL Forward Forum	Yes/No	Yes	2017 (pilot)	
PSL Summer Schools	Intake		2017	

PSL in the Shanghai Rankings	Yes/No	Yes	2018	Common citation policy and transfer of degree-granting powers
Creation of PSL Permanent Faculty	Yes/No	Yes	2017	
PSL in-house university	Sessions on management/ Lab for Teaching and Research Excellence/ Institutionalised strategic oversight	10-20% of administrative staff 5% of academic staff	2018	Coordinating existing actions and resources
Talent management strategy defined	Yes/No	Yes	2017	Alignment of practices and standards
Coordinated support functions	Number of operational charters specifying the distribution of competences and key processes in the support functions	5	2016-17	
Synergies fund	Budget pledged “Client” satisfaction	€1m/year Satisfaction >75%	2017	



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APPENDIX I - Mission, vision and values

Our mission

- To bring together the arts, knowledge and knowledge transfer to create a university model for the 21st century.
- To produce first-rate scientific knowledge, ensuring the widest dissemination possible and the most rapid transfer to innovations that contribute to the public good.
- To train artists, entrepreneurs, senior executives, and experts to work with intellectual rigor, aware of the importance of culture, conscious of their social, individual and collective responsibility, and open to the opportunities of a globalized world.
- To build a leading university that is exacting with respect to academic quality and admission requirements.
- To promote convergence: between the *grandes écoles* and the universities, between disciplines, between teaching and research, and between the academic and business worlds.

Our vision

- To rank among the global players in higher education, in the world's Top 30 research universities, a magnet for faculty, students and organizations at the international level.
- To play a crucial role in the transformation of the French higher education and research landscape by breaking down the barriers between sectors and institutions, and by improving coordination between teaching and research at all stages in the curriculum.
- To be recognized and sought after as an experimental and innovative institution, both in terms of methods and content, both in initial training and life long learning.
- To hold its own as an intellectual hub whose expertise is sought after and whose scientific and cultural contributions are valued by the private and public sectors.

Our values

- Excellence: scientific rigor is a virtue; we do not compromise on the level of fundamental knowledge required as this is the foundation of professional expertise and intellectual rigor. We train our students *for* research and *through* research. We dare to promote emulation through competition.
- Team spirit: individual ambition is both necessary and stimulating, and it should also contribute to the public good. We encourage and support campus life and a commitment to solidarity by its stakeholders.
- Diversity: we promote the diversity of student profiles and showcase individual talents regardless of socio-economic background, gender or country of origin. We instill a respect for the plurality of opinions.
- Integrity: both of scientists confronted by the uncertainties of the research process and of professionals in their relationships with stakeholders. Ethics should be their foremost skill.

APPENDIX II - Thesis Charter

1. Introduction

The working methods for writing a PSL doctoral thesis at one of its member institutions depend first of all¹ on a mutual agreement between the doctoral student and the thesis director, concerning both the subject matter and the working conditions required to do the research. **Therefore, the thesis director and the doctoral student respectively have both rights and duties with regard to high achievement levels.**

This charter sets out those reciprocal duties reflecting the code of ethics that underpins applicable regulations and already tried practices, respecting the diversity of the disciplines at the Paris Sciences et Lettres Research University (PSL). The purpose thereof is to guarantee high-quality scientific research.

This charter concerns the preparation of a thesis under the auspices of a Doctoral school co-accredited by PSL. Such accreditation must comply with evaluation and academic training conditions applicable to the Doctoral school where the student is registered. Furthermore, the doctoral training is part of the general framework of PSL's doctorate policy, coordinated and implemented by the PSL Doctoral College, which regroups all Doctoral schools co-accredited by latter, plus its doctoral programs. The PSL Doctoral College contributes to the sharing of experience, good practices and promotion of PSL doctorates.

When registering for the first year of a thesis program, the doctoral student signs this charter along with the thesis director, the assigned research lab director and the director of the Doctoral school, in compliance with the principles set forth below and the code of ethics applying to the field of research².

Students under doctoral co-supervision have the same rights and must meet the same conditions set out in the agreement entered into for this purpose.

This charter was drafted in accordance with applicable laws and regulations: Decree dated September 3, 1998 concerning Thesis Charters (NOR (French standard): MENR9802320A), Decree dated August 7, 2006 concerning doctoral training (NOR (French standard): MENS0602083A), Decree dated January 6, 2005 as amended by Decree dated August 7, 2006 concerning international co-supervision of theses – and it sets forth the conditions governing the PSL Doctoral College.

The PSL charter comprises a general framework (para. 1, 2 and 3) plus a specific appendix for each Doctoral school that is part of or co-accredited by PSL (para. 4), setting out the specific rules applying to supervision, training and financing. This last paragraph is an integral part of the PSL charter associated with that particular Doctoral school, to be validated by the school and by PSL.

¹ This agreement assumes that the doctoral student's host laboratory, where the thesis director teaches, is able and willing to admit the student; this aspect is not addressed herein, nor are relationships with the student's Doctoral school.

² See "Un guide pour promouvoir une recherche intègre et responsable", A Guide for Promoting Ethical and Responsible Research" by the Ethical Committee at CNRS (<http://www.cnrs.fr/comets/spip.php?article91>).

2. General organization of the doctoral thesis

A thesis is a step forward in a personal project and a professional career

Preparing a thesis is training both *for* and *through* research. The goals and high standards required must be clearly defined, as part of a personal life project and a professional career. This implies clearly defining the objectives and the specific means of achieving them.

The thesis director, the Doctoral school and if applicable the head of the doctoral program concerned inform the candidate of possible funding opportunities to finance a thesis (a "doctoral contract", private company financing – in particular CIFRE agreements – or financing by regional governments or associations, among others). Any specific financing conditions are mentioned in the appendix for each Doctoral school.

Once registered with a Doctoral school, the student must comply with its regulations and obligations, particularly as concerns courses, conferences, seminars, etc. (the information on these activities are distributed by the Doctoral school and, if applicable, the head of the doctoral program concerned).

The student receives information about academic and non-academic opportunities in his or her field. The Doctoral school laboratory and the host laboratory make available national statistics on the future of young PhDs and information about the careers of their PhD graduates.

The doctoral candidate should specify the professional career desired as soon as possible. The student should be concerned with life after the PhD, and manage the doctoral work in such a manner as to facilitate future career opportunities. The doctoral staff is there to help the student clarify his or her career ambitions, to study feasibility, to advise, and to help the student through administrative processes and career searches. Depending on the discipline and the research center, it could be useful to offer an array of additional training programs such as a teaching experience, a corporate internship for a few weeks, working in a laboratory abroad, and so forth.

Subject matter and feasibility of the thesis

Registration for the doctoral program shall specify the thesis subject, the context, the host environment (research laboratory and, if applicable, the research team) as well as the appropriate doctoral program for the subject (Sacre, ITI or others).

The subject matter of the doctoral thesis should constitute valid training and lead to an original body of work, and be feasible in the allotted time frame. The thesis subject is formally agreed on by the student and the thesis director at the time of registration. The thesis director, with recognized expertise in the field of research concerned, should help the student to uncover the unexploited aspect of the thesis subject in the scientific context, and verify its relevance. The director should also seek out the spirit of innovation in the student.

The thesis director must define and ensure the means necessary to accomplish the work. To do this, the doctoral student must be fully part of the hosting research laboratory, where he or she has access to the resources required for such research (for instance: documentation resources, equipment, computer technology, documentation, access to seminars, colloquia and conferences, presenting work in seminars, conferences and colloquia, etc.). Host staff members require the student to adhere to

rules concerning scientific ethics, and to respect the collective environment that they all share. The doctoral student is actively engaged in the life of the host laboratory where he or she is being trained, but cannot be assigned tasks that interfere with the progress of the thesis.

The doctoral student has a commitment to a given time frame and working pace. He or she must inform the thesis director of the progress made on the thesis and any difficulties encountered. All doctoral students must demonstrate initiative in their research work.

Supervision and monitoring of the thesis

The doctoral student is entitled to personal supervision by the thesis director, who shall consent to devote a significant amount of time to that purpose. Regular and frequent scheduled meetings are necessary, to be set out in the initial agreement and maintained throughout the thesis work.

The doctoral student agrees to submit as many progress reports as necessary to the thesis director, and to make presentations of the thesis work in internal seminars or outside the host institution. The director undertakes to follow the work progress regularly and to consider new directions for the thesis in light of the results achieved. Up to completion of the thesis, the director must inform the student of any positive observations or objections or criticism of the work. Any specific provisions applying to an individual Doctoral school for monitoring theses may be set out in an appendix.

Duration of the thesis work

As in the spirit of all doctoral studies, under the law and in the interest of the doctoral student, a thesis is a research process subject to a schedule and programmed deadlines. Specifically, working on a thesis implies annual renewal of the student's registration at the school. Such renewal must comply with assigned deadlines, with exceptions made for duly documented reasons.

Under applicable regulations (Article 15 of the 2006 decree), the time allotted to complete a thesis is three years. Exceptions may be granted, in the name of PSL, by the director of the institution where the thesis is accomplished, on the recommendation of the head of the Doctoral school. The request for exception is submitted to the Board of the competent Doctoral school, accompanied by a reasoned request of the doctoral student, following a reasoned opinion from the thesis director.

Thesis publication and promotion

The quality and impact of the thesis can be measured by publications, patents and industry reports involving the work, be it the thesis itself or articles published during or after preparation of the manuscript. The position of the doctoral student among his or her co-workers should reflect the student's investment in the work, in so far as it is compatible with the practices proper to each discipline. Rules pertaining to publication and industrial property shall be those applying to the host laboratory or the institution where the thesis is carried out.

As an author, the doctoral student is solely responsible for the content of the thesis. In particular, the student must be sure to secure all authorizations to reproduce excerpts of works from other authors appearing in the text. Such authorizations must be requested from authors or publishers.

As an exception to this rule, only short citations as defined in the French *Code de propriété intellectuelle*, shall be authorized, crediting the author or the source.

After defense of the thesis

A diploma or proof of the diploma shall be delivered only after filing the final version of the thesis manuscript and documents submitted for defense and distribution of the thesis.

To provide future doctoral students with information on job opportunities, all students must keep the Doctoral school abreast of their professional careers for five years after the PhD is awarded. Such information may be distributed, for instance as responses to surveys carried out by the Doctoral school. The PhD shall undertake to consult such surveys for five years, and to communicate the information requested by electronic mail to the Doctoral school.

Mediation procedures

In the event of a conflict between the student and the thesis director or the laboratory director, a mediator shall be appointed by the head of the Doctoral school if it operates in one sole discipline, or by the head of the doctoral program if it covers several disciplines. The Doctoral school Board may be called upon to rule in the following cases:

- if the conflict continues after mediation;
- if the mediator deems it necessary;
- in a conflict between the doctoral student and the head of the doctoral program concerned, or the head of the Doctoral school.

If the Doctoral school Board considers that, due to its position, it cannot guarantee the required neutrality, it shall submit the case to the Board of the doctoral College, which refers it to an *ad hoc* committee. Should such mediation fail, the doctoral student or one of the other signatories of this charter can request a ruling from the head of the institution where the thesis work is carried out.

3. Respective commitments of the parties involved in the doctoral thesis

In view of the principles set forth in this Charter, the parties hereto subscribe to the following undertakings:

Thesis director

The thesis director undertakes to inform the doctoral student of the number of theses currently under his or her direction. As mentioned hereabove, the thesis director provides the student with personal and appropriate guidance, committing to regularly scheduled meetings. The director may intervene to correct the student's work in order to channel it in a more scientifically favorable direction. Should the student embark on thesis work without funding, the thesis director must support the student in seeking financial backing. The director must inform the student of the resources available for his or her thesis work.

Doctoral student

The doctoral student shall comply with all rules and regulations, particularly referring to ethics, as well as charters and health and security regulations applicable to the host laboratory. He or she must submit progress reports to the thesis director as often as necessary. The doctoral student has an obligation to inform the thesis director of the progress made on his or her thesis and any difficulties encountered. All doctoral students must demonstrate initiative in their research work.

The doctoral student undertakes to make presentations of the thesis work in seminars at the hosting research laboratory or Doctoral school, or outside the institution and particularly at venues within the PSL scope. He or she must participate actively in the life and activities of the host research laboratory. The doctoral student must also follow the organization of the Doctoral school, particularly concerning proposed training sessions and, if applicable, the organization of the doctoral program in which he or she is registered.

The director of the hosting research laboratory

The director of the hosting research laboratory guarantees the material means and access to resources made available to the student. The lab director undertakes to integrate the student into the host laboratory from the beginning, by ensuring the appropriate facilities to accomplish the research work, in so far as the laboratory has the means necessary. The director also undertakes to inform the student of the life and activities of the laboratory.

The head of the doctoral program

In a pluri-disciplinary Doctoral school, the head of the doctoral program is the guarantor of the quality and relevance of the doctoral training proposed to the student. He or she undertakes to inform the doctoral student of the content and methods of the training concerned. The head of the doctoral program shall be a primary interlocutor for the doctoral student for the entire duration of the doctoral training.

The head of the Doctoral school

The head of the Doctoral school shall oversee compliance with the Charter, recruiting conditions and follow-up of the doctoral student. He or she shall implement a doctoral training plan and ensure professional and career monitoring for the PhDs graduating from the school.

Appendix

Specific features of XX Doctoral school

Staff

Standard ratio: % doctoral students/thesis director

Staff members: thesis co-directors, changes in thesis director

Thesis funding

Obligation (yes/no)

Specific features of Doctoral school

Duration of thesis and derogations

Number of hours or ECTS training credits

Committee end 1st year, 2nd year, thesis committee

Pre-defense

Number of authorized re-registrations

Funding beyond 3 years

Specific supervision conditions

Defense of thesis

Prerequisites (courses and training completed, publications, conferences, etc.)

Committee honors: Doctoral school recommendations

Agreement

The undersigned hereby declare having full knowledge of the provisions contained in the Thesis Charter applicable within the Paris Science et Letters Research University (PSL), in accordance with the Decree dated September 3, 1998, the Decree dated August 7, 2006 concerning doctoral training, and the Decree dated January 6, 2005, approved by the PSL Board of Directors on the proposal of the Academic Council and the Doctoral College of PSL.

They hereby undertake to comply with the provisions herein.

Done in Paris, on

DOCTORAL STUDENT

Name, surname, signature:

THESIS DIRECTOR

Name, surname, signature:

**RESEARCH LABORATORY
DIRECTOR**

Name, surname, signature:

**HEAD OF DOCTORAL
PROGRAM**

Name, surname, signature:

HEAD OF DOCTORAL SCHOOL

Name, surname, signature:

APPENDIX III - Charter for the signature of scientific publications

The adoption of a joint signature policy for scientific publications within PSL is critical to strengthening the reputation and visibility of our research community. It will facilitate identification of the scientific output of our institutions and will associate the publication of research results with all institutional partners involved, notably the parent bodies of research units.

The reference to PSL in the signature is a clear and firm commitment to the PSL Idex and the site's 5-year contract.

This Charter sets out the requirements for the implementation of the joint signature.

The joint signature takes the form of an explicit reference to PSL, immediately after the name of the institution as follows:

Name of institution, PSL Research University

The signature is to be found in the **Affiliation-Address fields** and in the **Acknowledgements** (at the end of the article or in a footnote).

(i) **AUTHOR AFFILIATIONS** are preferably written in single line format, in descending order so as to facilitate tracking by bibliographic databases (references in square brackets are optional):

Name of institution, PSL Research University, [institute or department], EPST, [number of the joint unit], co-supervising university, laboratory, [team], [address], postal code, city, France

Note: it is possible to use the non-abridged version of PSL: *Paris Sciences et Lettres Research University*, or, for articles in French, *Université de recherche Paris Sciences et Lettres*. The use of the joint research unit (UMR) number is optional.

Example 1:

Ecole Normale Supérieure, PSL Research University, Department of Cognitive Studies, Inserm, U960, Cognitive Neurosciences Laboratory (LNC), F-75005 Paris, France

Example 2:
Chimie ParisTech, PSL Research University, CNRS, Institute of Research of Chimie Paris (IRCP), F-75005 Paris, France

If the editor and/or the author prefer to use an ascending order, the following wording can be used:

[Team name], Laboratory name, [department or institute], [joint CNRS or Inserm unit], Name of institution, PSL Research University, postal code, city, France

For joint research units (UMRs) belonging to several COMUEs (typical case: a non-PSL university that co-supervises the joint research unit), it is possible to use a multi-line format (one line for each COMUE). This is notably recommended by Sorbonne Universities, Sorbonne Paris Cité and Paris Saclay

University.

The full postal address is usually reserved for the "**corresponding author**" field. *Example:*

Corresponding author: Surname initials, ESPCI ParisTech, PSL Research University, CNRS, Institut Langevin, 1 rue Jussieu, F-75005 Paris, France

(ii) **Acknowledgements, at the end of the article or in a footnote**, are used for fields relating to funding or contracts, and for any additional information. The following reference number is applicable to PSL IDEX: ANR-10-IDEX-0001-02 PSL.

For example, for a Labex that is financed by IDEX, the following wording would be used:

In English: **Acknowledgements:** This work has received support under the program "Investissements d'Avenir" launched by the French Government and implemented by ANR with the references ANR-10-LABX-XXX and ANR-10-IDEX-0001-02 PSL.

In French: **Remerciements:** Ce travail a bénéficié d'une aide au titre du programme des "Investissements d'Avenir" lancé par l'Etat et mis en œuvre par l'ANR portant les références ANR-10-LABX-XXX et ANR-10-IDEX-0001-02 PSL.

A working group has been set up to answer any questions or comments with respect to the application of this Charter. Provisional contact: daniel.egret@univ-psl.fr

APPENDIX IV - The Labex and Equipex as part of the University's strategy : analysis and perspectives

The Labex and Equipex programs have been decisive drivers in the development of the Idex. Beyond the Labex' very positive evaluation by the Labex jury³, they have contributed to the structuring of the University in several ways and are thus the buttresses of its research strategy. Firstly, the Labex have structured departments or even whole institutions, as is the case with the three Curie Labex, which have been at the basis of the reorganization of the Institute's research department. Another striking impact of the Labex and Equipex is their role in the emergence of major research poles for the University, combining already strong existing forces to develop associations with impressive potential. Of course, the Labex have structured whole research fields within PSL, like IEC for cognitive sciences, or IPGG for microfluidics, and developed new fields and approaches, such as WIFI for the physics of acoustics and optical waves gathered in one institute. Many (such as DCBIOL or ENS-ICFP) have been commended by the Labex jury as positioning research centers at the very top of their field, others have been described as outstanding Labex which pave the way to what new research centers or Labex should be (IEC, DEEP, TransferS). Further, TransferS, gathering forces throughout PSL, will benefit from the arrival of EHES, EPHE, Ecole des Chartes and EFEO, and the already strong axis of research will be further developed, should the submitted IRIS programme on "Etudes Globales" be selected, to become a strategic pole for PSL. Equally impressive is the emergence of an outstanding axis around physics, biology and chemistry, with the combined potentiality of such Labex as DEEP, DCBIOL, CelTisPhyBio, WIFI, IPGG, ENS-ICFP and MemoLife, to which one can add the Equipex Ultrabrain, Equi@Meso, IPGG or Dynamo, and the infrastructure France Génomique. The possibilities for promising emergent new research fields and developments are already obvious and have been evidenced by the submitted IRIS programs (IRISes) (Strategic initiative of interdisciplinary research) on Origins of Life, Interfaces of the Living and the many collaborations between Labex that have been described. The development of the Data Science axis should also prove extremely useful to the unfolding of new research. This pole is witness to the structuring effect of the Labex and Equipex on the University through the intensification of collaborations within its member institutions (including the new members): to name a few, TransferS or ENS-ICFP have strengthened the relationships of ENS and Collège de France; and so has MemoLife, which benefits also from the fruitful collaboration of Institut Curie and ENS, contributing to the development of the Medicine/science track; IPGG gathers ESPCI, ENSCP, ENS and the Curie Institute. Last but not least, the Labex have enormously contributed to a stronger integration between the national research agencies, (CNRS, INSERM and INRIA) and the other members of PSL. INSERM is essential to the Labex of the Curie Institute or IEC; the participation of INRIA in Equip@Meso is important to develop its outreach; and the CNRS is central to all projects through its governance, planning, and of course, the human resources devoted to these projects. The ongoing process of association of the Institut Pasteur to PSL is part of the same trend.

³ ESEP is the only Labex which has been somewhat negatively evaluated. The report by the Jury includes inexplicable assessments, including the fact that PSL has absorbed all the funds or that it is impossible to identify the impact on the funding on the publication rates or the research, while recognizing that the publications numbers themselves are impressive, and that the doctoral program is outstanding.

The Labex and Equipex are decisive in strengthening and structuring the backbone of PSL's of research. The first dimension is the development of the core PSL component of innovation. Notably, there is a strong axis around technology transfer: the Labex jury described IPGG and WIFI as models of "valorisation", commenting that they are some of the best investments in French science. IPGG has led to no less than 12 start-ups since 2011 and WIFI to 8. Memolife has also led to 36 patents, and 2 start-ups are already underway. These are examples of leverage effects for PSL for which FCD and BEDOFIH represent different models (partnership research or commercialisation of data access) which can be reproduced across other PSL components. Those are notably interesting leads to ensure the future of the Equipex and Labex after the end of the PIA funding. The Labex and Equipex are also part of the definition of the PSL DNA through their training component: they contribute tremendously to the dynamic of PSL as a research university. Without being comprehensive, they have participated in many major MOOCs (ICFP, FCD, OSE), e-learning activities (ESEP) and other training within the masters programs of several PSL members (IEC, OSE, First-TF); they can be platforms for training (PLANAQUA); they have been at the core of the development of PSL-ITI (WIFI and Ultrabrain, as well as ESEP and IPGG); MemoLife has greatly intensified the Medicine/Science track and ENS-ICFP has designed a major international master. Last but not least, as part of the PSL mission, the training component of the Labex is contributing to the building of the first PSL masters (like "Chimie aux frontières du vivant").

Of course, the strong ties between the Idex and the Labex and Equipex go both ways. PSL offers an important breeding ground for innovation that enhances the potential of the Labex and Equipex. First, coexisting in the same institution, the Labex themselves are enriched by each other's vitality and innovation. Amongst many examples, the collaboration between MemoLife, IEC and OSE leads to exciting new research that could not have been anticipated. IPGG contributes to bringing its knowledge in microfluidics to such projects as DCBIOL. Further, as part of the transition to the new stage of its research strategy, PSL has aimed at developing the interactions between the Labex and the other research teams through a specific call for proposals "At the Frontiers of the Labex". Currently under evaluation, the projects are promising. The HR component is, of course, a critical axis for mutual reinforcement. It goes without saying that the recruitment policy of the Labex per se is a major asset for the intensification of the scientific power of PSL. The doctoral policy is of course shared across PSL including the Labex, as part of the development of the research strategy. However, more importantly, on top of the participation in many calls for proposals set up by PSL, the structures funded by the PIA have greatly benefited from the recruitment tools offered by PSL to recruit leading researchers through the Excellence Chairs and high potential young researchers through the New Teams call (no less than 5 Excellence Chairs recruited directly for Labex, 3 New Teams and 2 New Teams currently under evaluation).

Given the many organic ties between the structures funded by the PIA and the current tools offered by PSL, they have been very naturally at the core of the development of the new phase of the research strategy. The research programs, both disciplinary programs or through the IRIS offer a transition for many Labex which could bring in the results of their research and rise to a new more integrated phase where they combine their forces with other complementary research. Thus, "Analysis of the Transitions" is conceived, partly, as an evolution of FCD. Similarly, "Interface of the Living" integrates the leads offered by CeTisPhyBio. Scripta, now in exploratory phase, is being constructed in coordination with HaStec (a Labex which is expected to be integrated within PSL, see chapter 2).

The integration of the Labex is going to be largely accelerated in the new phase that PSL is entering. The scientific monitoring is going to be greatly intensified with the setup of conferences and meetings to enhance the already existing interactions between PIA funded projects (Labex, Equipex and Infrastructures); enable best practices to be identified and shared within the PIA and throughout PSL; share the findings to foster new research ideas and crystallise the potential, thus creating a stronger holding environment for innovation as part of PSL's DNA. The role of the PIA structures in the research strategy is going to be strengthened as they integrate into their own dynamic or renew themselves through, when relevant, the upcoming IRIS programs. The integration into PSL of three Labex (Corail, HaStec and TEPSIS), resulting from the membership of the EPHE, EFEO, EHESS and ENC, is also a milestone in the development of the University's research strategy, including regarding the strategic interdisciplinary research initiatives. The strong relation between Corail and PSL Environment is clear: it will bring into the project a crucial dimension on ocean studies through corals; the flow between both projects will be facilitated by the fact that Serge Planes, director of the Labex, is also the newly-appointed director of PSL Environment, translating the success of the Labex into the new research thematic for the whole of PSL. Of course, the funding tools that are currently available to the Labex within PSL will continue to play an important role in their development and evolution: Excellence chairs, New teams, calls for proposals will contribute to fulfill specific needs and increase the structuring effect for research fields and institutional relations alike. Thus a balance will be maintained between bottom-up (calls for proposals, HR funding tools, including recruitment of post-docs and doctoral contracts) and top-down (research programs including IRIS projects). The new dimension created by the IRIS programs for the Labex is also envisioned as complementing and enhancing the cross disciplinary interaction of these programs. In addition, the definitive integration of Labex into PSL will also be part of a larger reflection on the diversification of resources for the University. The role of Equipex models like BEDOFIH or Labex models like FCD has already been presented. Paris-en-résonance, Equip@meso and PLANAQUA also present interesting opportunities. Finally, the arrival of the recent members will also strengthen the existing dynamics of PSL. For instance, the center of gravity for OSE has now shifted to make PSL an even stronger partner in this programme.

APPENDIX V - Focus on Feroscan, a start-up created by PSL

Feroscan is a biotechnology company in the business of developing new treatments for currently untreatable cancers, especially ovarian cancer. The company's competitive advantage is the exclusive access to a novel, safe and patented series of compounds that significantly reduce incurable cancer cells viability both in vitro and in small animal models through a novel mode of action, therefore creating a novel targeted therapy.

Feroscan's proven and patented technology was developed by the team of Professor Gerard Jaouen at Ecole Nationale Supérieure de Chimie de Paris (ENSCP), a world-class leading expert in the field of organometallic chemistry. Exclusive access to the technology was granted by Paris Sciences & Lettres (PSL) in exchange for equity in Feroscan. In November 2014, Feroscan became the first start-up created by PSL-Valorisation, the technology transfer arm of Paris Sciences & Lettres.

Feroscan is developing its therapy with an emphasis on ovarian cancer in partnership with the Institut Curie (a founding member of PSL, as is ENSCP) and the Sanger Institute in the UK. Both research institutes are working jointly with Feroscan to stratify and identify the genetic signature associated with the best outcome for Feroscan's therapy, bringing organometallic chemistry into personalised oncology. Contract Research Organisations specialised in preclinical oncology were selected to provide the fastest development of Feroscan's molecules into deliverable drugs for the patients. This innovative therapy is formulated with FDA approved ingredients, and tested on patient-derived mouse xenografts. Feroscan is aiming at starting the first human trials of this exciting potential treatment in mid 2017.

APPENDIX VI - Engineering in the heart of Paris: Towards a PSL Graduate School of Science in Engineering

1- Summary

A true pole of engineering is emerging within PSL, which must be made visible and provide a focus for development (both for the three schools of engineering and for the entire Paris Science et Lettres).

- *Make the proposals of organisational synergy currently being developed by the ENSCP and the ESPCI a concrete reality, with the financial support of PSL.*
- *As of 2016 and building on the masters programs currently in development, structure the PSL Graduate School of Science in Engineering, where students will come to find a concrete response to the challenges of training the engineers of the 21st century. With its ability to harmonise engineering, life and material sciences, formal sciences, social sciences and arts, PSL will clearly assert its originality with respect to Saclay and Sorbonne Universities. The PSL Graduate School of Science in Engineering will be a major factor for the international attractiveness and development of the PSL brand.*
- *The potential for innovative training of the three schools of engineering within PSL is considerable. It is expressed both in the programs that are common to the three schools as well as in the participation in other schools that are being developed within PSL, such as the PSL Fashion School.*
- *The lines that structure the research of ENSCP and the ESPCI, as well as that of Mines Paris Tech, enable the three schools of engineering to weigh heavily on the definition of the research strategy of Paris Science et Lettres.*

Introduction: the environment

Paris Science et Lettres now includes three high level engineering schools, each with its own specificities (in terms of programs, objectives and teaching methods) but also a strong propensity towards interdisciplinarity and, at the same time, the capacity to anchor its training in fields of research developed at a high level. Ecole Nationale Supérieure de Chimie de Paris (ENSCP) thus deals with areas of research in which chemistry plays an essential role: energy, health, materials, cosmetology, etc. Research at ESPCI is conducted within a triangle formed by Chemistry, Physics and Biology. MINES ParisTech has also developed a very wide spectrum, including the sciences of organisation and social sciences.

Even if they have different supervisory authorities, structures and organisation, the three schools have some things in common:

- a. The challenge to train engineers through research or in strong connection with research (at least twice as many graduates go on to write a thesis than the national average).
- b. strong contacts with industry
- c. the objective of training engineers of innovation.

The appearance of new technologies, the tremendous recent progress in the field of life sciences, and the new societal issues that are emerging (climate change, collaborative economy, new forms of work, etc.) are causing an upheaval in the role of engineering in our societies. Far from the traditional categories of this discipline, the engineer of tomorrow will have broad, multidisciplinary scientific knowledge, increased awareness of the societal and human issues related to the evolution of technologies, and will evolve in a rapidly and constantly changing environment that is highly global and open, where innovation will be the key to entrepreneurial success.

It is in this spirit that the three engineering schools have created, in conjunction with Ecole Normale Supérieure, the Institute of Technology and Innovation of PSL (PSL-ITI), whose originality is to unite doctoral programs with innovation training. Several other institutions of PSL participate in ITI: Collège de France, ENSAD, the Observatory of Paris and Paris-Dauphine.

Beyond ITI, the year 2015 marked a turning point during which the foundations for a PSL Graduate School of Science in Engineering were laid.

2- Pooling a number of means and functions

The choice of joining Paris Science et Lettres has led ENSCP to separate completely from UPMC. This entailed a loss of means in a number of supporting functions. In the 2016 budget, the shared services of PSL help ENSCP to redeploy its support functions in the framework of the construction of an organisation that is mutualised with the surrounding institutions on the Montagne Sainte Geneviève in Paris, among which ESPCI is in the front line. Mutualisation in terms of security and maintenance has already been discussed specifically with ESPCI, as well as the sharing of premises and services (e.g. for glass work or preventive medicine). As of the 2016 budget, the shared services of PSL will support the convergence of the two schools in these areas and the problem of the premises will be considered in the context of the Real Estate Strategy of PSL.

3- The pedagogical convergence of the three schools of engineering

Convergences between engineering training

The construction of PSL has created a strong demand from students to be able to "navigate" between the different schools, which was confirmed by the success of the "**PSL week**", which opens each school to the other two. This event was also an opportunity to welcome students of the art schools that are members of PSL, in particular La Femis and ENSAD. Other common events have already been envisaged, such as the night of the "start-ups".

The scope of the programs that are rapidly deployable between the schools has already been set out for the 2016 academic year:

- the possibility of double degrees, similar to the Mines – ESPCI degree, will be extended
- the Biotechnology track of ESPCI will be open to students of ENSCP;
- access to the courses in chemical engineering at Chimie ParisTech will be open to students of the ESPCI;
- pre-academic year courses will be shared for students from other streams of admission (ENSCP, ESPCI, Mines). A common platform for the assessment of the level of students admitted on qualifications will be set up (depending on the SPIF3 project supported by the three schools), prior to a common recruitment of these students.

To enable students to navigate more easily from one institution to another for the 2017 academic year, the three schools have started to work on the **semestrialisation of courses**. This is essential in the context of the "study contract" that will be established for all the students of PSL. This will also be an essential point for an offer on the international level.

New masters programs for the 2016 academic year

The appearance of new technologies, the tremendous recent progress in the field of life sciences, and the new societal issues that are emerging (climate change, collaborative economy, new forms of work, etc.) are causing an upheaval in the role of engineering in our societies. Far from the traditional categories of this discipline, the engineer of tomorrow will have broad, multidisciplinary scientific knowledge, increased awareness of the societal and human issues related to the evolution of technologies, and will evolve in a rapidly and constantly changing environment that is highly global and open, where innovation will be the key to entrepreneurial success.

The three schools have begun to develop some new M1/M2 pathways at PSL. The lines of force have been:

- themes in which the laboratories of PSL excel
- original angles of attack
- added value thanks to the multidisciplinary of PSL

Thus, in autumn 2016 three PSL masters programs will be launched and managed jointly by the engineering schools:

- "chemistry at the frontiers of the living,"
- "sciences and engineering of materials"
- "energy"

4- Towards the PSL Graduate School of Science in Engineering

The opening of the International Master of Science in Engineering for the 2017 academic year

The three engineering schools of PSL will set up (for autumn 2017) an "International Master of Science in Engineering" which will propose an M1/M2 type of training in the field of engineering in the broad sense. It will build on the existing and future PSL masters degrees in the field of science and engineering and on the PSL Schools of Engineers. It will propose disciplinary and multidisciplinary pathways and shared modules, particularly in the areas of management, innovation and start-ups. Specific courses in Human and Social Sciences in relation to technological development and its societal consequences will be given. An awareness of design and artistic aspects will be proposed.

Enhanced cooperation with one or more foreign establishments will be established for student exchanges, particularly in the form of shared summer schools. Selective international recruitment will be organised by PSL. The courses will be delivered in English.

Parallel recruitment in the second year for the engineering schools will be shared and integrated into the recruitment for the Masters programs. This will provide greater strength for recruitment on the international level. The students thus recruited will obtain their engineering degrees under the same conditions as today. Logically, this means that second year courses in the engineering schools will be given in English.

The insertion of the engineering schools into the research of PSL

Two developmental poles appeared when the PSL Chimie programme emerged:

- "Chemistry at the frontiers of the living" corresponds to a dynamic of research that is already well established on Montagne Sainte Geneviève, at the interfaces between biology, physics and chemistry, and already implemented by Institut Pierre-Gilles de Gennes. It places ENSCP and ESPCI within a particularly dynamic cluster of research, which also benefits from the participation of ENS, Institut Curie, CNRS and INSERM.
- "Chemistry for a sustainable city" enables Paris Science et Lettres to invest itself in an original way in one of the major themes of the 21st century, that of "smart territories". In the last three months, Paris has hosted two high-level international conferences on "Smart Cities" (the Smart3C Forum in early September and the Smart Cities Forum of Greater Paris in late November). It is quite obvious that, proudly bearing the name of Paris in its brand, PSL cannot ignore such a theme. The axis of PSL Chimie, the research conducted at MINES ParisTech, and also the structuring of PSL Environment will enable our group to play a leading role in the research on "smart cities in smart territories" at the interfaces between chemistry, life sciences, medicine, data science, management, social sciences and the arts.

Another way to describe the potential for interdisciplinary research in engineering at PSL: the five themes which bring together the research centres within Mines Paris Tech - Sciences of the Earth and the Environment; Energy and Processes; Mechanics and Materials; Mathematics and Systems; Economics, Management and Society. The PSL Fashion School project, in which Mines Paris Tech participates along with Dauphine and the ENSAD, from the outset will start with a research project on "sensory design", to which the ENSCP and the ESPCI will naturally be associated.

Attractiveness of a PSL Graduate School of Science in Engineering managed by the three schools

The International Master in Engineering that we have just mentioned, but also the "chemistry at the frontiers of the living", "science and engineering of materials" and "energy" masters, the schools of engineering degrees, the pre-doctoral and soon the ITI doctoral school invite us to reflect on the creation of a very powerful pole of training within PSL managed by the three schools of engineering, a true "Graduate School" in the American sense of the term, highly visible at the international level and based on the specific characteristics of engineer training at Paris Science et Lettres.

It will in no case be a closed structure nor one that will undo the existing:

- The specificities of engineering degrees "à la française" will be respected, based on the harmonisation and semestrialisation of the training to be generalised in PSL.
- The PSL PhD students in engineering, attached to the 4 different inter-ComUE doctoral schools, will find the Graduate School to be a specifically fertile place, with "advanced training".
- The PSL Graduate School of Science in Engineering has been thought out in the spirit of the organisations of the digital era (complexity, openness, "liquid spaces") and is essentially a place of convergence, a home port for the students-engineers of PSL from where they can go on to other training: for example the PSL "environment" master which will not fail to emerge or the forthcoming PSL Fashion School.
- This Graduate School is also a place of convergence for students from other programs within PSL and who wish to undertake engineering training. Students from Paris Dauphine, Ecole Normale Supérieure or the art schools will feed the great diversity of engineering students of PSL thanks to the original pathways laid down by the Graduate School.

In all, the PSL Graduate School of Science in Engineering will be a real pole of attraction around which other dimensions of engineering training will naturally develop. It is still too early to answer the question of whether PSL will one day create a bachelor's degree in engineering, but the question is on the table. Similarly, we can only try to imagine the huge potential for continued training that the engineering pole of PSL could develop one day, of which ITI or the soon to be created Institute of Advanced Studies in Innovation and Entrepreneurship are the first manifestations.

APPENDIX VII - PSL Student Initiatives

Since September 2012, PSL Research University has included three completed "PSL Student Initiative" calls for projects for a total amount of € 265,362. These three calls for projects have helped to select 116 student projects, of which two-thirds are new projects each year.

AAP No. 1, year 2012/2013	25 projects selected	€ 82,500
AAP No. 2, year 2013/2014	45 projects selected	€ 82,600
AAP No. 3, year 2014/2015	46 projects selected	€ 93,262

1- Uniting the PSL student community

In 2014, the PSL students banded together to form the **PSL Union**, an organisation which had the purpose of bringing students from the different PSL institutions together; facilitating discussions between them; and promoting all of their activities on campus. CNSAD (Conservatoire national supérieur d'art dramatique [National Academy of Dramatic Arts]), ENSAD (École Nationale Supérieure des Arts Décoratifs [Higher Education Institute for the Decorative Arts]), Beaux-Arts (École nationale supérieure des beaux-art [Higher Education Institute for Fine Arts]), ESPCI (École Supérieure de Physique et de Chimie Industrielles de la ville de Paris [City of Paris Industrial Physics and Chemistry Higher Educational Institute]), Ecole des Mines [Mines ParisTech Graduate School]), ENSCP (École nationale supérieure de chimie de Paris [National Institution for Chemistry in Paris]), CPES (Classes Préparatoires privées aux Etudes de Santé [Private Preparatory Classes for Healthcare Studies]), ENS (École normale supérieure [Higher Education Institution for Sciences and Humanities]), École des Chartes and Fémis (Fondation Européenne pour les Métiers de l'Image et du Son [European Foundation for Image and Sound Professions]) are already represented there.

Activities:

- Organising the "Apéro PSL" Forums at ENSCP in November 2013, at Ecole des Mines on 28 November 2014 and on 16 December 2015: stands run by winners of the PSL Student Initiative call for projects and more than 400 students were present,
- Running the "Antenne média PSL" website, together with the Latitude organisation and with feed from the Facebook page,
- Creating a directory of the PSL institution organisations,
- Updating a meta-directory combining all the student contacts,

The PSL student community also established its own communication network in 2014 with the founding of "Les périodiques du quartier latin" organisation which publishes the monthly magazine **Latitude**, dedicated to cultural and student events in the Latin quarter. The magazine is distributed free of charge in the PSL institutions. This information is principally relayed by the students themselves. The organisation will develop a student guide at a later stage, also designed in a participatory manner. This project is also a winner of the *Kit-à-se-lancer (Striking out)* in Paris competition. In 2014 it helped to finalise the graphics and to publish the first issue of the magazine. The organisation runs in partnership with the PSL Union the 2013 initiative "Antenne Médias" (a community website designed and hosted by PSL students) with the aim of centralising and sharing student information on campus.

Radio PSL is the PSL student radio. It aims to bring together all students in the PSL network who wish to engage in all types of radio programs.

Radio PSL is available via its Facebook page (link: <https://www.facebook.com/RadioPSL/>), via its SoundCloud Radio PSL (link: <http://soundcloud.com/radio-psl>) or even on the antenne-média PSL website (link: <http://media-psl.fr>).

The web radio station "TrEnsmision", based at ENS, continues to open up on the PSL campus due to its **Battements** programme, whose recordings, outsourced to various PSL institutions, have been increased this year: ENSBA (Institution of Fine Arts), ESPCI, but also Paris-Dauphine University with coverage of the student festival "Music to rock the nation." The TrEnsmision team has also covered the "Play Sport" day organised by the PSL Sports Association on 26 October 2014 at the CROUS de Paris (Paris Student Welfare Organisation) Jean Sarrailh Gymnasium. Other notable and original events: coverage of the Cannes Festival and participation in "Radio Day" in partnership with the Sciences Po (Paris Institution of Political Studies) and ENS Lyon student radio stations.

2- Student participation

Citizen initiatives (mentoring, social advancement)

The **Discovering Classical Antiquity Days (JDA)** are five themed days provided each year to an audience of secondary school students from all over France, allowing them to discover Greco-Roman classical antiquity from different aspects (mythology, theatre, history of the sciences, etc.) This year, the JDA students also met the secondary school pupils through the "Ancient Horizons" project which provides a series of talks directly in class.

Originating from the previous initiative, the **Discovering Literature Days (JDL)** work on the same principle, but this time have a major literary theme as the subject. It is a question of opening up the discipline, getting it out of the academic setting, and publicising research in literature to people who are kept away by their young age, geographical location, or their social background.

FOCUS ON 2014

The JDA received 445 pupils at ENS and at the Paris Observatory, for the following days:

Everyday Life in Rome Day, 4 February 2014

The Orpheus Myth Day, 5 February 2014

Comedy Day, 20 March 2014

Discovering Classical Antiquity Day, 17 July 2014

History and Historian Day, 24 March 2014

Sciences in Classical Antiquity Day, 25 March 2014
in partnership with the Paris Observatory

The Ancient Horizons programme has resulted in about ten talks by mentors in class.

For their first programme, the 3 days organised by the JDL involved 6 classes aged from Year 7 (Grade 6) to Year 12 (11th Grade):

Shake Shakespeare Day, Friday 9 May 2014

Surrealism Day, Do it yourself, 26 May 2014

Mediaeval Literature Day, 30 May 2014

The organisation, **Les Agitateurs**, was founded by a group of social sciences students from Paris-Dauphine University and ENS. Their first project is called "Tintin en Banlieue" (Tintin in the Ghetto) after the article by the sociologist, Jérôme Berthaut, which appeared in *Le Monde diplomatique* in September 2013. The article will be the starting point for writing a play about the media portrayal of the socially-deprived areas known as the *banlieues*. Hence, this play is intended to be performed before an audience of middle or upper secondary school pupils in the Parisian *banlieues* and helps to stimulate and spark the ensuing discussion in the classroom.

Focus 2015: first performance on 16 April at Bobigny before a Year 12 (11th Grade) class studying Economic and Social Sciences, on 23 April, and 1 June.

The **PariDance** project brought by students at MINES ParisTech and Chimie ParisTech who are dance enthusiasts allows a class from a technical secondary school to discover and practice dance in all its diversity for a semester. On the programme: discovery of dance and its history with a teaching kit, a visit to great places of dance, dance courses given by dancers from the Atelier de Paris, as well as a session at the National Conservatory of Music and Dance in Paris, accompanied by a meeting with students from the Conservatory.

The organisation, **Les Handinattendus**, resulted from the meeting of several PSL disabled and able-bodied students, researchers in the field of disability or not, connected by a strong wish to shake up the perceptions of disability. They were committed to:

- creating an area for discussion and reflection on the topic of "disability",
- promoting the exploration of different forms of artistic expression opening up innovative perspectives on disability, mainly through the joint work of disabled and able-bodied artists,
- promoting accessibility to knowledge and culture for everyone, and taking on a role of awareness regarding accessibility issues that students are likely to encounter.

WoMines PSL is a student organisation for the promotion of gender equality in PSL. Its goal is to conduct interviews, discussions, and debates on gender diversity around contentious issues and prejudices related to this topic. More specifically, it organises lectures and debates, workshops, and awareness weeks, always promoting meetings between PSL students. Finally, WoMines PSL is a link between professional organisations, networks, and other existing groups with the same values.

Focus 2015: Thursday 21 May 2015: interview /debate with Nathalie Loiseau, Director of ENA (École nationale d'administration [National School of Administration])

Solidarity initiatives

61% of Togolese do not have access to drinking water. The **EVEA** organisation, Volunteer Students for Water and Sanitation, made up of students from MINES ParisTech joined by students from CPES, has mobilised to provide access to drinking water to an entire village in Togo. For two years and in partnership with a local NGO, JKSDS (Youth of Kozah for Socio-Economic Development), the EVEA students worked on **the construction of two wells** which now enable nearly 800 inhabitants in the village of Yadé, 500 km north of Lomé, to be supplied with drinking water throughout the year.

Students from the **RIVOTRA** organisation are involved with raising awareness of the health risks and the risks related to cyclones among the Malagasy population, including children. The three-week stay in the north of Madagascar helped them to conduct their work in three schools in the city of Sambava and half-dozen bush schools around the village of Bemanevika. So, with the help of the organisation, Sustainable Vanilla Bemanevika and the Alliance Française in Sambava, the students were able to meet nearly 500 children aged 7-15 years. The principle of RIVOTRA is based on the creation and use of two sets of seven families to communicate and speak with the children about cyclones and enable awareness of risky behaviour for their health and that of those around them through play.

The purpose of the **Les ateliers du regard** initiative is to provide young Malians with an introduction to cinema through the production of six short films in three weeks. Each year, three PSL students leave for Bamako to show film clips, present the production chain of a film, introduce the young participants to cinema techniques, etc. Due to the links forged with the Balla Fasséké Kouyaté Conservatory of Arts and Multimedia Professions, les Ateliers enables students from the PSL network to meet Malian

students, as well as major cultural players recognised internationally. The organisation also holds meetings throughout the year to discover Mali, a highly cultural country. <https://www.facebook.com/LesAteliersDuRegard/>

FOCUS ON 2015: Synopsis of the short films

My Mother and I by Balakissa Doumbia (8'37'')

Tensions between a mother and her daughter, whom she suspects of going out with boys late at night.

Fadima by Mariam Kontao (5'31'')

A lonely little girl refuses to play with other girls her age. Until the day when...

The Athlete of the Year by Kadiatou Kouma (8'23'')

It's the last day before the holidays. An unruly pupil persists in challenging his teacher.

Scam and Love by Tagaror W. Mohamed (10'48'')

A couple of con artists plan to do one last job before living the good life. But nothing goes as planned.

Kôdor by Ibrahim M. Touré (11'53'')

A documentary about the difficulties of Diezz D, a young rapper from Gao who has come to Bamako to succeed.

The Red Blade by Natalia F. Sylla (9'35'')

A mother stands up to her mother-in-law as she refuses to have her daughter circumcised. However the mother-in-law seems determined to maintain the tradition by whatever means.

3- Innovation and technological sciences

InnovEns (ENS) and **Start'n Go** (ESPCI), student organisations dedicated to innovation, entrepreneurship, and valorisation have worked together to organise a series of events on these subjects on the PSL campus:

The valorisation of research with Jacques Lewiner and Arnaud Tourin, (video available at:

<http://savoirs.ens.fr/expose.php?id=1669>)

Open science and intellectual property,

Simulation of the founding of start-ups led by Charlotte Hochman

1st MEETUP presentation of technology projects (partner: MINES ParisTech).

Ongoing project: establishment of an online portal bringing together the contacts accumulated by InnovENS during the year.

The goal of the **VECTOR** project is to design an ultra-energy-efficient electric vehicle in order to take part in eco-marathons. The initiative helps to promote the technical and cross-disciplinary knowledge of engineering students at MINES ParisTech and ENSAD, in partnership with pupils at the Louis Armand secondary schools in Nogent-sur-Marne and in Paris.

Results:

- Selected to participate in the Shell Eco-Marathon 21-24 May 2014, which is the European benchmark for eco driving: **15th place in the overall ranking** (out of 50 entrants).

- Participated in the EduEco challenge 29-31 May 2014 and winner of two first Jury special prizes:

- **1st prize for MathWorks Simulation**
- **1st Continental Award** for the eco-driving strategy for its système de rétroversion vidéo et de commande optimale.

The **OGI (OIL & GAS INNOVATION)** project brings together PhD students at PSL with the purpose of promoting, sharing, and spreading research related to the oil and gas industry conducted at PSL. The

first R&D and Technological Innovation workshop was held on 28 April 2015 at ESPCI and brought together students, researchers, and companies.

Programme:

Back to the use of JUMP, a BNP Paribas collaborative innovation platform focused on anonymity Jérôme DUBOIS, Innovation Manager – BNP Paribas CIB

Analysis and sensors: an example of co-operation between Research and Development and Technological Innovation, Isabelle BETREMIEUX, Analytical Methods Research Delegate – Scientific Management TOTAL

Diamond synthesis for sensors and high-performance coatings, Philippe BERGONZO, CEA Research Director – CEA (Alternative Energies and Atomic Energy Commission) Saclay

Benefit of diamonds for sensors in the oil industry: Protective coating and electrodes, Guillaume BERTHET, PhD – CEA Saclay

GCxGC, SFC and SFC–GCxGC for the oil industry, Didier THIEBAUT, Research Director CNRS (National Centre for Scientific Research) – ESPCI ParisTech

A new generation of gas-phase chromatography integrated with silicon-based technology for measurement in the industrial environment, Eric COLINET, Product Development Director – APIX Analytics

Low pressure sampling (L.P.S) and OFCEAS technology, the combination of 2 patented innovations for online gas analysis, Pierre CHOLAT, Chairman – AP2E

New generation of miniaturised GC for online analysis of liquids, Adrien MANIQUET, Ph. D. Student– IDEEL

µGC-MS, the alternative to standardised methods for a fine characterisation of process gases and atmospheric emissions, Guillaume PASCAL, Laboratory Manager – EXPLORAIR

Meloware is a software project designed by students from Ecole des Mines together with students at ENSAD. Their goal was to design an effective and intuitive software solution to help composers and musicians to digitally rewrite scores, and it is a real interactive tool capable of transcribing a score directly from a sound sample, while remaining accessible to beginner musicians. www.meloweb.fr has been posted online.

The **annual conference "Thinking innovation"** was organised on 3 April 2014 under the patronage of Fleur Pellerin, by the Dauph'Innov student organisation in partnership with students at the Ecole des Mines. The conference is open to all PSL students and a video of the day is available on YouTube: <https://www.youtube.com/watch?v=F9cNeVYWNPw&list=UU1BxwPJvmqjSEYRZhpuddwg>

A real laboratory for technological creation, **Langevinium** offers PSL students a set of tools necessary to carry out a personal or team project. Langevinium supports students throughout their project and their feasibility study for making a prototype. A technological workshop, Langevinium is also an actor in innovation funding in the PSL student community.

Several examples of technology projects have already been proposed to us such as:

- the design of a GPS-guided drone;
- the manufacture of a laser harp;
- the use of electroencephalography devices to control an electronic system;
- the production of an "open-source" 3D printer.

Our long-term goal is to contribute to developing the entrepreneurial spirit, but also to serve as a springboard for future start-up founders.

4- Cultural awareness

Arab Week brings together researchers and artists from the North African Maghreb countries, the East Asian Mashriq countries, and Europe to share their research and work on the theme "Border and territories", during a week of discussions and cultural events: exhibitions, cinema evenings (film screening followed by discussion), workshops (writing, calligraphy, cooking); reading stories, concerts, setting up an eastern cafe, and plays. (2013 Programme "Laughter Goes Arabic" and 2014 "Borders and Territories")

Italian Week is held each year at ENS around five main themed meetings to discover the Italy of today with for example in 2014:

Literature, interview with Giovanni Cattabriga,
Art and chemistry, the restoration of Italian paintings,
Dance and anthropology: Folk dances in Italian culture,
Cartoons: Meeting of Italian cartoonists,
Theatre: *Reading-discussion* about the situation on the island of Lampedusa and the case of the refugees in the Mediterranean,
Day dedicated to anti-mafia.

The Silk Roads, a PSL inter-institutional student organisation (Ecole des Mines, ESPCI, ENS, and ENSCP), offers its members cultural exchange sessions between PSL students and large Chinese universities: Peking University, Tsinghua, Nanjing University, Southeast University, Tongji University and Fudan University. The exchanges take place over two weeks, with the first session in January hosting Chinese students who discover Paris and the PSL campus (laboratories and institutions), but also French businesses. The PSL students are hosted in their turn in April in Beijing; Nanjing; and Shanghai for a similar programme.

A group of PSL students (ENS, Collège de France and Fémis), who are passionate about Iran and its culture, have come together to provide a series of events (lectures, film screenings, and workshops) under the name **Persl** to introduce Persian culture to the entire PSL community.

In 2014:

- Launch of a weekly Persian conversation workshop
- Lecture by Clément Therme (EHES (École des hautes études en sciences sociales [School for Advanced Studies in the Social Sciences])-IRI (Institut de recherche interdisciplinaire sur les enjeux sociaux [Interdisciplinary Research Institute]) and Serge Michel: " - Iran, a completed revolution, or a future one?" on 26 March 2014.
- Film screening: "Modest reception" by Mani Haghighi, and - - Screening of the short film "Lady Tehran" by Camille Simony on 17 April 2014.
- Afternoon "Persian Tales" on 18 May 2014.
- Film screening "About Elly" by Asghar Farhadi on 1st October 2014.

A series of screenings / debates was organised by Fémis and ENS students to discover cult films on the theme of "**transgressive comedies.**"

- I Married a Strange Person! by Bill Plympton with the director on 11 March 2014.
- The White Sheik by Federico Fellini with Jean Max Méjean, a French writer and author of several books about the film-maker's life and work on 9 April 2014.
- The year 01 by Jacques Doillon on 14 May 2014.
- Daisies by Vera Chytilova on 11 June 2014.

5- Artistic practice and creation

Cinema

The short film **Imago** brings together students from ENS, ENSAD and Beaux-Arts. After a crowdfunding campaign, the shooting which included the actor Dominique Pinon, took place from 20 February 2014 to 1 March 2014 in different places at PSL and in the capital. This project also had support from the CROUS de Paris.

Imago's plot: *" Cesare leads a mundane life which seems to him to be devoid of beauty and meaning. The only escape for the young man: the cinema and its wonderful fictional world. Consumed by a passion for film which puts him out of touch with reality, Cesare will try to pull himself together by seeing Dr Carl Gari. A brilliant psychoanalyst and inventor of a machine for travelling into the subconscious; Gari will enable the young man to cross over the boundary of his own superego. Looking deep within himself, Cesare meets Lilith, a femme fatale who embodies the film buff's most burning fantasies ... Will he be able to resist the charms of the one who incarnates his desires?"*
<https://www.facebook.com/imagothemovie>

The production of the short film, **The Burrow** helped, like the participating students (ENS, FEMIS, ENSAD) wanted, to make PSL a meeting platform for young professionals and to bring talents from its different institutions together. This project also received support from the CROUS de Versailles and won the special award for the screenplay competition at the Nouveaux Cinéma 2014 festival.

Synopsis: The storyline is "very freely inspired" by the Kafka short story called The Burrow.
"Odile lives alone. Fearing that someone might enter her house, she places surveillance cameras in all the rooms and publishes her videos in real-time on the internet: she hopes that internet users will monitor her apartment and inform her of suspicious events. However an intrusion occurs: dark spots appear on her walls. Angry, she decides to leave the community. When she tries to fight against the intrusions, she realises that she is always being watched."
The first public screening of The Burrow takes place on 30 June 2015 at the Ecole Normale Supérieure in Paris (45 rue d'Um).

Exhibitions

" Future Inventors": success for the EPICS (ESPCI ParisTech) student initiative

Palais de la découverte, from Tuesday 25 February to Sunday 6 April 2014C

Cité des sciences et de l'industrie - 22-27 April 2014

After 2 years of hard work, the EPICS student initiative has just completed its flagship project: the "Future Inventors" an exchange forum at the Cité des Sciences et de l'Industrie. Due to the efforts of ESPCI ParisTech (inventory and explanation of inventions) and Ecole des Arts Déco students (set design, artistic approach to the operation), 5,000 visitors have discovered and enjoyed about 15 technological innovations over 400 m2, originating from the ESPCI ParisTech-CNRS laboratories or developed by ESPCI ParisTech engineers. What it demonstrates to the general public, is that fundamental research studies can lead to practical applications that will soon be usable by everyone.

The **Dauphine Expo exhibition** *Emptiness under the Floor* was put together by the "Dauphine expo" collective from 31 March to 10 April 2014 in the courtyard of the Paris-Dauphine University. This art installation is the result of a meeting between students from Paris-Dauphine University and ENSAD on the theme "A rebellious society" with the goal of making the entire university community aware of artistic creation.

<https://www.facebook.com/dauphineexpo?fref=ts>.

Focus Topic 2015: Dauphine Expo is putting together works on the theme of image in the university courtyard, this time in partnership with the Beaux-arts students.

Event on Facebook:

<https://www.facebook.com/events/1073963229287806/>

As well as the project page:

<https://www.facebook.com/dauphineexpo?fref=ts>

The project, **The Gauls at PSL**, is a joint effort between students from ENS and ENSAD and has resulted in a series of Gaul-themed events at the same time as the BNF Asterix exhibition.

- *The Gauls and Cartoons*: exhibition of caricatures and posters by the ENSAD students.
- *Celtic archaeology*, a photographic exhibition in partnership with AOROC. (Archéologie et Philologie d'Orient et d'Occident [Eastern and Western Archaeology and Philology]).
- Screening of documentaries: 6 February 2014 *When the Gauls lost their heads*, a Court-Jus production
History in pieces: The Gauls, CNRS Multimédias, *The secret of the fibula*, CNRS Multimédias.
- In conjunction with the Cultural Department of CROUS de Paris: *The Gauls since Asterix, researchers answer your questions*, exhibition from 17 October to 19 December 2014, held in the university restaurant at Paris-Descartes University's Boulogne-Billancourt campus.

The mixed media project **Metachronique** aims to bring together and create collectively with students, artists and scientists at PSL and elsewhere.

Metachronique is centralising its activity via its website and has provided a series of multi-faceted events for 2014: radio interviews, presentation of artists' works, joint research with researchers, and talks by professionals.

Events in 2014:

Metachronique – radio interviews / ENS from March 2014:

Escape plan: exhibition event / ENSBA – EHESS/ 4 – 5 and 10 July 2014:

The call of the virgins: collective work / le LAC – Brussels / 18 September 2014

Playful Luddism: art and science workshop / Festival des Utopies Concrètes-Paris/ 28 September 2014.

The "arts and science" exhibitions, **Experiments** and **Minute Images** which were held respectively from 16 May to 31 October 2015 in the garden of the Curie Museum and from 10-24 November 2015 at the Town Hall in the 5th district of Paris, have resulted in a series of artistic interpretations after images taken from scientific corpora, bringing together students from ENSAD, école nationale de Chartres, école normale supérieure, CNSMDP (Conservatoire National Supérieur de Musique et de Danse de Paris [National Conservatory of Music and Dance in Paris]), Institut Curie, and the Beaux-arts.

Since 2014, **the Middle Eastern Express festival** has been bringing together students, artists, and researchers from PSL institutions and higher education institutions in the Mashriq and Maghreb

countries to participate in a series of cultural events with the purpose of developing and understanding contemporary Arab culture in an interdisciplinary approach and that is accessible to the general public.

For a weekend, all the art forms are summoned to move into the walls of 45 rue d'Ulm! **The 48 hr of Arts** provides an opportunity for all PSL students to present an original artistic project before a large audience in order to promote the practice of the arts within PSL. The aim of this festival is also to enhance artistic practice beyond the academic field, which explains our requirement of free entry. Led by a small team of PSL students, the Festival provides financial support for participating companies, and provides them with the necessary equipment to carry out their project.

Theatre, dance, singing, circus, film screenings, martial art demonstrations, as well as evening entertainment and gourmet buffets fuel the rich programme for the weekend!

Theatre

The foundation of a mediaeval theatre workshop at the initiative of ENS students in partnership with students from ENSAD resulted in the performance of the play, **Heavens, it's the priest! Plays and mystery plays from the Middle Ages**, which are the result of several working sessions, bringing together researchers, artists, and students. The play was performed on 27, 29 and 30 March 2014 at the ENS theatre.

The **El Ánima sola (The Lonely Soul)** initiative, a Spanish language theatre project, provided an opportunity for a group of PSL students (ENS, ENSAD, CNSMDP) to visit Colombia (Bogota and then Cartagena) in the summer of 2014 to lead theatre workshops and to give several performances of the play *Ánima sola (Lonely Soul)* by the Colombian author Enrique Buenaventura. This project was also supported by the Alliance Française and the CROUS de Paris. The play was also performed on 25 June 2014 and 18 October 2014 in Spanish at the ENS theatre.

#Création_FD Projekt is a writing and theatre performance project narrating Franco-German history started by students from the ENS Physics Department and ChimieParis students. Both theatre plays in the project, **La guerre ne sera pas longue - Die Gefallenen (The Fallen)**, which was performed on 9 and 11 February 2015 at the PSL campus and *Steckrübenwinter (Turnip Winter)* (written in 2015), tell the fate of several families on both sides of the Rhine caught up in the turmoil of the events of July 2014 and plunged into the tragedy of the Great War. As a show and a radio play, the audience is invited into drawing rooms between Göttingen and Paris and is led through the front lines to Russia. The project will continue in 2016 with a tour in Saarbrücken (Germany). Website : www.grandewelt.wordpress.com

Music

Sforzando, the European Chamber Music Competition for Student Amateur Musicians, whose 7th programme was held on 25 and 26 April 2014 at the Ecole des Mines de Paris and Collège des Bernardins. 10 programs of chamber music, or 32 candidates, appeared in front of more than 200 spectators. This year, the jury included among others Frédéric Lodéon (Honorary President) and Julien Caron (Director of La Chaise-Dieu Classical Music Festival, President). For the first time, a press jury was made with representatives from France Musique, La Lettre du Musicien and Classica magazines. The final on 26 April 2014 rewarded the following prize-winners: **1st Prize**: Robin Stephenson, piano; Gabriel Sulem, violin; Ariane Issartel, cello.

Publishing

Récit is an independent publishing house founded in 2014 by students at the Beaux-Arts in Paris, whose speciality is publishing artists' books.

Récit encourages discussions between art students and professional, young, or more experienced artists. The publications are subject to a call for projects in the PSL institutions in order to instigate meetings and promote young artists.

The publications are really exhibitions conceived in support of the book and designed according to a principle of commissioning.

Publications: *A Friend of a Friend*, March 2014; *Crosswords*, July 2014; *The History of Trance*, September 2014; *Boat People*, November 2014. It participated in OFF PRINT, the large independent publishing exhibition on 14 November 2014.

After the success of the workshop on the topic of **Baba Yaga**, a character from Russian tales, the LETAP organisation mainly made up of ENSAD and ENS students published a collective book on the workshop and organised an academic colloquium on the figure of Yaga and her isba (hut).

Focus 2014/2015:

- Foundation of the association publishing house: Les Editions l'Imprimante, with the goal of publishing original works, theoretical and artistic research papers by LETAP members, as well as that of PSL students selected by a call for projects.
- Publication of the collective Baba Yaga book, December 2014
- Organisation of a two-day colloquium, which will also present the work from the workshop in the form of videos, photos, and promotion of the book (January 2015).
- Launch of the project: *Wolfson, le schizo et les langues (Wolfson, The Schizophrenic and Languages)*

The magazine **regarD** brings together a range of viewpoints of the PSL institution students: texts, visual arts, short films, etc. Each one features a creation inspired by one and the same image: the cover illustration. The printed magazine is linked to a website for broadcasting short films, radio programs, playlists, and regularly posts articles online.

The first edition of the magazine was distributed in September 2015 in partner university libraries and in some bookshops. Participating PSL institutions are: CPES (PSL's multi-disciplinary Undergraduate cycle), ENS, Dauphine, Lycée Henri IV secondary school, Beaux-Arts, Conservatoire National Supérieur d'Art Dramatique, and Fémis.

Website: revueregard.fr

6- Sharing knowledge

Les Ernest comprises a series of filmed 15-minute lectures that have been uploaded. Its goal is to provide a lecture format adapted to the new media, because knowledge must be democratically shared and bridges must be built between the general public and knowledge shared, because more than ever, these new approaches, which are very often cross-disciplinary, are needed to understand the world around us, because conventional lectures are deserted as they are not compatible with internet codes. <http://www.les-ernest.fr/>

The digital magazine **Interphase** resulted from a shared desire by science and literature students in the three Ecoles in the PSL group (Ecole normale supérieure, Ecole des Mines, Ecole nationale supérieure des Arts décoratifs) to think about the sciences and their challenges together.

The two annual issues are an opportunity to combine different approaches, to question researchers in order to see and to show their applications better, the role of science in the public domain, and its relationship with other forms of thought and human, design, or pictorial activity.

This magazine provides topics for discussion which the students and researchers in various specialities will encounter. Therefore, it is not specialised and is intended for any member of the public interested by interdisciplinary issues and transfers between sciences and humanities.

Website: <http://interphase48.webnode.fr/>

The multidisciplinary magazine **Chantiers Politiques** continues to reflect on the humanities and social sciences at PSL. Based on in-depth articles, the magazine gives voice to researchers and students while being intended for the general public. Set up by ENS students in 2002, the magazine now includes students from Dauphine on its Editorial Committee and actively works with the PSL Ecoles for arts.

Publications: *Where are the maths?*, magazine No. 13, which appeared in May 2014 whose artwork was done by students at Beaux-Arts.

Edition No. 14 was devoted to *Violence* on 12 December 2014. Its launch was accompanied by a screening of Sam Peckinpah's *Ride the High Country*, followed by a discussion on the portrayal of violence in cinema between the audience, S. Denis and Emmanuelle Tissérant-Perez (EHES).

The **Lutétium** project is a popular science channel on YouTube, which brings together pupils from ENSAD and PhD students from ESPCI in order to make professional quality videos exploring original scientific topics, in English or French, with strong artistic components.

Website: www.lutetium.paris

The online magazine, **Bulles de savoir**, supported by PSL students is dedicated to sharing knowledge. It also provides written or filmed interviews with a recognised expert. <http://bullesdesavoir.com/>

2014 figures:

58 published articles including 10 video interviews

51 contributors

3,000 different readers on average per week

2,620 fans on its Facebook page, or an increase of around 265 % over the last 6 months.

PROCYON organises annual lecture series dedicated to astrophysics and aimed at the general public. The talks are hosted in various PSL institutions such as ENSAD or the Institut Curie. They are complemented by a visit to the Observatory at the end of the series. <https://www.procyon.espci.fr/fr/>

Example of programming for 2013 and 2014:

- 16 January 2013, Jean-Marc Lévy-Leblond, "Why is it dark at night?"

- 1st April 2013, Roland Lehoucq, "Can we make astrophysics from science fiction?"

- Antoine Labeyrie, Astronomer at the Haute-Provence Observatory, Professor of Observational Astrophysics at the Collège de France, Wednesday 12 November 2014 at ESPCI,

- Thomas Widemann, Astronomer at LESIA (Laboratory of Space Studies and Instrumentation in Astrophysics), Paris-Meudon Observatory, Senior Lecturer at Versailles-Saint-Quentin University, Wednesday 10 December 2014, at ENSAD,

- Michel Mayor, Emeritus Professor at University of Geneva. He is the first person to have discovered an exoplanet. Wednesday 5 March 2014, at Institut Curie,

- Marc Ollivier, Astronomer at the Institute of Space Astrophysics at Orsay, Wednesday 2 April 2014, at ESPCI.

The association, "**Cogito Brunch**" organises brunches and open lectures for everybody at École des Mines de Paris with the aim of connecting the Paris Sciences and Literature network. Contemporary thinkers - artists, scientists, writers - are invited to discuss the major social issues. These events are extended by brunches during which the audience can debate and ask questions about the proposed topic. This makes the major cultural issues accessible to all with an introduction to this discipline often considered elitist.

<https://www.facebook.com/cogitobrunch?fref=ts>

Dauphine Discussion Débat organises debates and major interviews open to all PSL students. These events bring together up to 1,000 students and are led by the organisation members. So, the public has the opportunity to ask the guests direct questions for a dynamic and interactive discussion about subjects which closely affect current affairs. This year, there were 14 debates and "Major Interviews", including a discussion with Mme Le Gal (Advisor on Africa to M. Hollande) and a debate between M. De Rugy (EELV [Europe Ecology-The Greens] deputy) and M. Mariton (UMP [Union for a Popular Movement] deputy) on energy policy. <http://dauphinedebat.com/>

La Plume is a student newspaper which freely explores subjects, such as the economy, culture or more generally current affairs. Supported by a website, it publishes four printed issues of 32 pages during the academic year. <http://laplumedauphine.fr/>

7- Sports

In January 2014, the **PSL Voile** crew was formed from students from different PSL institutions: ENSAD, Mines and ENS. The training sessions occurred over five weekends between March and April 2014 at the Le Havre Regatta Society and enabled them to participate in the Le Havre Voiles Étudiantes regatta with a ranking of 8th out of 17.

RUGBY PSL, on 15 March 2014, the PSL student rugby players took part in organising the **Soyez Rugby** day Paris-London University Challenge, organised by the PSL sports association

Le Chapitre des Armes is a PSL student initiative aimed at practising, studying, and promoting European historical warfare techniques. Since 2013, it has been offering PSL students:

- the practice of Mediaeval and Renaissance fighting techniques by trying to reconstruct the techniques and ways of fighting as they were practised at the time. The weapons used are very varied: sword, dagger, club, spear, etc.
- the study of old books: a specific feature of the discipline in order to advance the discipline by confronting different opinions and interpretations.

The first PSL "**Head and Legs**" race took place on Sunday 24 May 2015. Open to PSL students, this 8 km course race was preceded by a general culture questionnaire whose results will count towards the final ranking, just like the physical performances. Organised by the Dauphine sports association , the race was followed by an awards reception in the main university courtyard. The Dauphine sports association is a partner of the ELA (European Leukodystrophies Association) which helps children with leukodystrophy. In addition to students raising awareness, a part of the proceeds was donated to the association.

<https://www.facebook.com/as.dauphine.paris?fref=ts>

The "**PSL Paris Fencing Tournament**", is a student and European fencing competition, which was held on 9-10 May 2015 in the heart of the Latin Quarter in the CROUS de Paris gymnasium. This first event brought together more than 60 participants from 17 different universities, including 5 foreign ones. The second event will be held in April 2016 over two days and will involve the three weapons: épée, foil, and sabre individually and as a team.

http://ece-escrime.fr/?portfolio_category=psl
<https://www.facebook.com/ECEscrimeParis>

8- Sustainable development

The **PSL environment project: waste, first step in sustainable development** has been bringing together students from the Dauphine Durable, Écosciences (Chimie ParisTech) and Écocampus (ENS) organisations since 2013, with the aim of improving waste management across Paris Sciences et Lettres.

- An enquiry into sorting in the PSL institutions via an online questionnaire circulated to all members. The results of this opinion poll with regard to ENS can be viewed on the Ecocampus website
- A series of events raising awareness of selective waste sorting and waste management on the Dauphine, Chimie ParisTech, and ENS campuses throughout the year 2013/2014: screening of the film *Wasteland* by Lucy Walker at ENS and at Paris Dauphine; event with the visual artist Zampo and "Prof Cindy Salmon", "plasticologist" interpreted by Compagnie Caribou at ENS, Dauphine, and Chimie ParisTech; screening and discussion of the film "Ready to Throw Away" by Cosima Dannoritzer on programmed obsolescence at ENS; visit to the Vert-le-Grand (91) incinerator; screening of the fictional documentary *Into Eternity* by Michael Madsen at Paris Dauphine; lecture and discussion on nuclear waste at ENS. With Bernard Laponche (nuclear physicist, Global Chance network) and Fabrice Boissier (National Agency for Radioactive Waste Management), a lecture-discussion with Delphine Lévi Alvarès (Independent Information Centre on Waste – CNIID) on waste management in France and its control at Chimie ParisTech.

The **Second Life** project enables all mobile phones, computers, printers and unused connectors to be collected on the PSL campus in order to be refurbished or dismantled ecologically. The recovered devices are then used in social or humanitarian projects. So, the collection in 2015 helped to set up a cybercafe in Togo in partnership with a local association.

The event "**Solutions for the Climate**": **Research and designs by PSL e-s students** was held at the same time as COP21 on 29 November and 2-6 December at the initiative of PSL students (ENS, ENSAD, ESPCI, Dauphine) engaged in environmental protection and who came to present their research and designs for a more sustainable world. This exhibition/performance also helped to prepare for the foundation of the PSL Sustainable **Club**: a network linking all the organisations and e-s students at PSL, rallying around environmental, ecological, climate, and sustainable development topics.

<https://www.facebook.com/psldurable/>

9- Support for young researchers

The 13th forum of cognitive sciences in the Île-de-France area, organised by the student organisation **Cognivence**, was held on 22 March 2014 with the title *Man, animal, machine, at the intersection of intelligence*. 2,000 visitors were received throughout this day to promote the cognitive sciences with the scientific community and the general public.

Focus 2013: 12th forum of cognitive sciences in Île-de-France on 30 March 2013, "When consciousness makes science"

Focus 2015: 14th forum of cognitive sciences in Île-de-France on 28 March 2015, "Humour, laughter, and irony, how does our brain work?"

After the success of its first programme (on 31 May 2013), the second **Multidisciplinary Paris Sciences et Lettres Day** was organised on 24 May 2014 at the initiative of PSL PhD students in the PSL lecture hall. These two days allowed 24 PSL PhD students to present their ongoing research studies before the general public. Videos of their presentations are available on the PSL website:

http://www.univ-psl.fr/default/EN/all/education_fr/journee_pluridisciplinaire_des.htm

The 2nd programme of **Meet the Young Physicists** on 6 November 2014 brought together the community of young physics researchers in a colloquium organised by and for young researchers.

Estimated summary for the 2014 programme:

- 200 registered
- 140 participants
- 41 abstracts submitted
- 16 verbal presentations
- 45 posters
- 10 organisers
- 14 PhD students represented (109, 127, 162, 287, 288, 391, 397, 447, 474, 511, 517, 534, 560, 564)

APPENDIX VIII - Note on the organization of reflection, teaching and academic innovation in research universities

This note addresses the proposal in V3 of Chapter 2 of the Idex Rapport to create a university within PSL, which would be responsible for training PSL managers on how to “re-think the university of tomorrow”. It would thus become a major driver in the PSL learning organization by both stimulating organizational innovation and promoting visibility of PSL as an entity. Three specific tasks are at play in this process: forward-looking thinking about the university’s organization; training of personnel in order to enhance “academic management”; and support for academic units in their innovation and transformation process. We will provide a brief overview of the bodies that are responsible for these tasks in international research universities today.

Three models can be distinguished:

- A Committee-Based Model.
- An Institutional Research Model where the university’s central organization is responsible for the collection and analysis of data, and its transformation into effective policy.
- The Innovation Lab Model where a specific organization is set up with its own team to provide support to academic units. It is generally focused on questions of educational innovation (Education Lab), and we will consider only those Labs that provide academic units will support for their educational innovation.

For each of these models, we will set out the task or tasks for which they are responsible: forward-looking thinking, training of personnel, or support for innovation.

1- The Committees Model: MIT/NYU/JHU

An essential element in the governance of Anglo-American research universities, the Committees are working groups that bring together members of various academic units within the university, generally led by an administrative representative (Vice-Provost, Deputy Vice-Provost or Chancellor, etc.), under the authority of the relevant Vice-Provost (academic affairs, personnel, international relations, etc.). They can be permanent (standing committees) or non-permanent for topical subjects (ad hoc committees).

These working groups are generally responsible for making recommendations to the university’s decision-making bodies. They can write formal reports but are not involved in the training of staff, or in providing support or implementing programs that result from their recommendations. Generally speaking their role is primarily one of forward-looking thinking. The issues they deal with can include:

- The functioning of the university (the strategic 10-year plan, the financing model, the use of digital technologies, etc.)
- Transversal academic questions (the future of education, the future of PhDs, etc.)
- Assessing the value of major thematic programs (Should an environment program be set up? Should a School of Education be set up?).

The role of the administration vis-à-vis these working groups is primarily to steer the reflection of academic members (logistical organization + coordination for the production of deliverables; they may also liaise with external experts on specific subjects).

MIT is one of the universities that gives its Committees the most important role to play in forward-looking thinking: on extremely varied subjects (Future of MIT Education, Graduate Education and MITx, MIT School of Education?, MIT Energy Initiative, etc.), and relative to various hierarchical levels (Congregation, President, Provost, Graduate School). At NYU and Johns Hopkins, the work of the Committees is facilitated by a sufficiently strong administration (extended Provost's team with approximately 15 Vice-Provosts in each case), which ensures the production of reports and the implementation of recommendations.

Principal task performed: forward-looking thinking.

2- The Institutional Research Model: Harvard

Some universities have nevertheless decided to institutionalize their strategic thinking, conferring responsibility for this task on a specific individual. Harvard has thus set up an Office of Institutional Research, composed of a dedicated staff of 9 people under the leadership of a Vice-Provost for Institutional Research.

The mission of the Office: to collect and analyze institutional data from the perspective of higher education and its developments, thereby supporting decision-making in the university's various governing bodies (President, Provost, Governing Boards, Deans of Schools). It thus serves as a body for data analysis, strategic reflection, and advice for the different academic units. One of its principal missions is to provide useful information (internal data and insights on the functioning of higher education) in order to facilitate decision-making.

The Office is also responsible for relations with external accreditation bodies. Focused on organizational reflection and innovation, the Office has a number of counterparts in educational innovation. These include various research and experimentation centers (the 2 principal ones being the Bok Center and the Christensen Center), which test new educational practices and train academic staff in educational innovation. This exemplifies the separation proposed in Chapter 2 between the Internal University and the Teaching Center.

Principal task performed: forward-looking thinking + data analysis.

3- The Innovation Lab Model: HKUST/Maastricht University

Some universities have sought to institutionalize academic innovation (to be distinguished from educational training for teachers, which is generally administered by Learning and Teaching Centers). They have thus set up Labs that provide support to academic units (schools, departments or professors) in the implementation of new teaching or academic practices.

In 2014, Maastricht University set up an EdLab that is focused on educational innovation and which also has a research and experimentation function. With a dedicated staff (8 persons), the EdLab is available for all teachers who want to develop their teaching practices. It also serves to analyze the functioning and success of innovative programs launched by Maastricht University. Two aspects are of particular interest: educational research and the concrete support given to academic units for the implementation of projects.

For its part, HKUST set up an Interdisciplinary Programs Office in 2008 that provides support for the creation of new research and training programs. It provides support to academic units that plan to launch interdisciplinary projects and also acts as an internal consulting body. Programs or projects can

then be carried out within the IPO (two majors – Environment and Bioengineering – in addition to an interdisciplinary Masters degree on risk management).

Principal task performed: support for program development.

4- Summary

Two messages emerge from this overview:

- The three tasks listed initially (forward-looking thinking, staff training, and support for academic innovation) are quite related, calling on skills and fields of expertise that are highly correlated. All three are essential to re-thinking and implementing the university of tomorrow. They all help facilitate changes and evolutions in the academic context. They all require strategic knowledge of the higher education environment. They all represent a valuable resource in the transformation of academic units, ensuring that the academics themselves also subscribe to the changes.
- These tasks are not centralized in a single structure; if PSL was to do that, it would represent a major organizational innovation for the institution. Such a structure, which would require the participation and acquiescence of member institutions, does not appear to be compatible with PSL's organizational model.

These two comments lead to one question: what will be the scope of the internal PSL university proposed in Chapter 2? Will it be limited to the training of a generation of PSL Managers? Or will it have within its scope of action the steering of inter-institution working groups (as per – and relative to the same subjects – as the Anglo-American Committees)? Is there any value in making it be a body that provides support for change, and thereby helps the institutions create new innovative programs?

APPENDIX IX - The P X L programme: People Excellence Leadership

Building the Excellence of Tomorrow

This note aims to make proposals to contribute to the reflection on the "PSL target university". The general idea is to strengthen the management of support teams for the development of the PSL Research University.

1- Plan

- Introduction: for innovative and efficient support services
- 6 findings and points of attention regarding the administrative organisation of PSL
- Potential target objectives for the "support & staff" services
- 2 complementary schemes:
 - o Progressive "à la carte" implementation of 7 cross-cutting projects
 - o Capitalise on the pre-existing skills of certain institutions

2- Introduction: for innovative and efficient support services

Toward a new management function: economic, light and inventive

PSL must create a new administrative superstructure that is light, economical and efficient: the objective is to facilitate the implementation of scientific and academic projects and to provide support and assistance for this strong ambition.

In this respect, limiting the numbers of PSL administrative staff is a major objective. It is important to show that the funding granted by our financers is indeed primarily devoted to its ambitious policy of research and training.

PSL must aim to be particularly virtuous in its organisation. It must even establish an original, ambitious and innovative goal for its administration and develop new standards of efficiency, innovation and economy in terms of the administrative management of its projects. It would thus act as a laboratory which would also allow its members to benefit from the feedback on experience.

Of course, this approach aims at an optimisation of the use of public funds and of the funds allocated by our financers. It may also offer its member institutions, at a time when the optimisation of budgets is a key issue, paths toward the simplification of their administrations in order to effectively focus their resources primarily on projects of research and academic recognition.

For a fluid and simple dialogue of management and coordination

The coordination of efforts and the operation in a network mode will ensure the integration, association, implication and mobilisation of the stakeholders around the ambitious and shared objectives of the site.

If the structure of PSL must ensure the quality of the reports with respect to its financiers and controllers, as well as equip the Steering Committee with the proper management tools, PSL Research University proposes to develop simple and innovative systems of feedback with the member institutions aimed at the empowerment and mobilisation of the recipients of funds, based on a dialogue of management and a well-planned timetable.

The mission of monitoring management is under the supervision of the Director General in charge of finance.

This dialogue could take place during a bimonthly conference with the general management of PSL, the directors general of the services of the institutions, their assistant directors general and their financial directors. This conference would aim to ensure the coordination of the reports, as well as the preparation of administrative decisions for the Steering Committee.

General coordination promoting the sharing of experience and the search for mutualisation

Beyond the quality and simplicity of the Idex/LabEx reports, the PSL general management team, with the COO and the SG of the member institutions, will promote the search for synergy between the institutions, the sharing of best practices and the search for economy.

It will achieve this:

- by building on common resources to advance common projects
- by promoting actions that will enable member institutions to benefit from:
 - the effects of scale (e.g. grouped orders and the promotion of a purchasing strategy),
 - the pooling of resources (premises, staff, equipment),
 - specific expertise (international, knowledge transfer, etc.).

General coordination encouraging innovation and agility

It will focus on launching original and innovative projects to complete, control and monitor a programme of transformation, or even ambitious multi-dimensional integration.

It will support the organisation in its pursuit of development by contributing to new sources of funding.

Finally, it will provide governance tools and innovative methods to promote flexible and efficient management, in particular with the support of well-designed IT systems which are deployed and shared or connected with the PSL institutions.

3- 6 Findings and points of attention

- Management of the ambition of PSL: to become one of the Top 20 Universities of Excellence
- Management of development in a complex environment: fast and sure, international, multi-site
- Management of the diversity of PSL institutions: professions, missions, visions, cultures
- Management of identities: varied, based on different trajectories and histories
- Management of strong personalities: ambition, pride, skills, excellence

- Management of the lack of resources and means within the institutions in terms of quality and number, and the intensification of auditing and reporting procedures

Findings and points of attention regarding the administrative organisation of the entire PSL

- It is essential to increase the transparency of decisions, information and project management to generate confidence
- The administration, or rather the Staff & Support services, has a dual mission:
 - o Secure the administrative and financial framework for the operation of PSL
 - o Provide perspective, global vision, methods, added value, ideas, resources, "smart simplicity" and real substance!
- Everyone, at all levels, must benefit from the dynamics of PSL and contribute to it.

Target objectives

- Propose scenarios for the development of organisation that
 - o Innovate, imagine, create value
 - o Reinforce, complement, fill gaps or weaknesses
 - o Generate cooperation, sharing and commitment... which should be the PSL spirit
 - o Secure and strengthen the development of PSL in its fundamental missions
- Devote the means (and find them) in order to promote initiatives for the cross-fertilisation of management
- Provide a budgetary framework and calendar for this initiative

In short, demonstrate that PSL "empowers" each of its members.

4- 2 complementary schemes which could unite and support development

- Implement 7 levers and cross-cutting projects in order to progressively disseminate a managerial culture and the tools for innovative and efficient management
- Identify and build on skills developed by the PSL institutions to capitalise on the know-how and save time

Here is a proposal of 7 levers and cross-cutting projects to federate the energies

1. **Create a managerial culture of excellence** by launching programs in the areas of quality development, project management, leadership, mutualisation, sharing experience and good practices
2. **Prepare, train and develop the managers of tomorrow with the creation of a Training Centre**
3. **Support the development of simple and effective Digital Solutions**
4. Propose to the teams of lecturers & researchers from very different backgrounds and disciplines a place for reinforcement, resourcing, exchange, meetings, discussion and re-creation: **the Centre of Teaching & Research Excellence**
5. **Develop international presence built on real logistics bases** to accelerate the Recognition of PSL
6. **Support the search for public and private resources:** marketing and commercialisation for new financial resources

7. Build new spaces for work and academic life

How the cross-cutting projects could irrigate and transform...

Empowered by PSL
RESEARCH UNIVERSITY PARIS

DAUPHINE
UNIVERSITÉ PARIS



l'Observatoire
de Paris

L'ÉCOLE
DES HAUTES
ÉTUDES
SCIENTES
SOCIALES

MINES
ParisTech

Chimie Paris
ParisTech

And the other
institutions

1-Programmes & Methods for the Management of excellence

2-PSL Manager Training Centre

3-Develop digital solutions

4-Develop a centre of pedagogical excellence and innovation for research

5-Prepare and support our international presence

6-Develop and support the search for funding and resources

7-Imagine new spaces for academic and university life

How the cross-cutting projects would be managed

Empowered by PSL
RESEARCH UNIVERSITY PARIS

DAUPHINE
UNIVERSITÉ PARIS



l'Observatoire
de Paris

L'ÉCOLE
DES HAUTES
ÉTUDES
SCIENTES
SOCIALES

MINES
ParisTech

Chimie Paris
ParisTech

And the other
institutions

Project management:

Co-coordinators PSL / COO "commissioned" institution

Selected projects: each institution remains free to engage in a specific project and to determine when to get involved

Resources

- Budget allocation by PSL
- team (if applicable): PSL, external resources and availability
- power of negotiation (grouped purchases) and economies of scale

Governance

- PSL president's report (budget / lead time / quality / performance) e.g. Task force
- committee of members or Steering Committee

1-Programs & Methods of the Management of excellence

- ✓ It is the fruit of the current work of the group of COOs
 - Identification of avenues for progress
 - Launching inter-establishment projects
 - Sharing experience, documents and good practices
- ✓ To define:
 - the articulation of the group of COOs with the IS, Comm and HR groups, etc.
 - Reporting to the Steering Committee

2-Creation of a Manager Training Centre

- ✓ Objectives
 - Develop a common managerial culture of excellence
 - Boost the leadership skills of managers
 - Strengthen the skills and expertise of the collaborators
 - Identify and Master the key skills (e.g. Leadership, Project Management, Quality, Language skills, etc.)
- ✓ Means and possible operator: House of Public Affairs and DEP of Dauphine-PSL

NB1: We already have programs open to managers of PSL

- Executive Master in Public Management
- Executive Master in Research Management
- Executive Master in the management of change in public organisations
- Executive Doctorate in Public Affairs

We are in the process of developing a programme for the management of projects and quality (2 levels: the basics over 2 days, certification over 5/6 days)

We can develop cycles of conferences with managerial themes, but also on all the subjects of interest to PSL

3- Develop digital solutions that are innovative and which create value

- ✓ Services to students (and to lecturer/researchers)
 - MOOCS, SPOCS
 - ENT

- Multi Service Card
- Knowledge portal
- ✓ The dematerialisation of administrative operations
- ✓ "A la carte" pooling of the deployment of new IT systems
 - Human resources information systems (HRIS)
 - Finance IS
 - Academic IS
 - Research IS
 - Websites, etc...

4- To develop a centre of pedagogical excellence and innovation for research

- ✓ Create a "Faculty Club" or a faculty network: both physical and digital
- ✓ Develop resources to develop the pedagogical skills of lecturers/researchers
 - Teacher training with the best foreign institutions and universities
 - Theatre workshops
 - New technologies...
- ✓ Provide lecturer/researchers with premises and cutting-edge tools to support their research
 - FabLabs
 - Video walls
 - Etc.

5-Prepare and support our international presence

- ✓ Identify and build on the "international" contacts of PSL members:
 - CNRS network,
 - EFEO,
 - Dauphine,
 - etc.
- ✓ Gradually create legal structures to assure the development of the activities of PSL abroad

6- Develop the search for financial resources

- ✓ Secure sustainable public resources for the institutions (e.g.: the risk of budget cuts)
- ✓ Optimise the search for funding in a coordinated manner

- CPER (national-regional contracts)
- Financing by local communities
- European funding
- ✓ Develop a strategy for the search for own resources
 - Tuition fees
 - Businesses
 - Continuous training
 - Sponsorship and donations

7-Imagine new spaces for academic and university life

- ✓ Student housing: promote the idea of "Houses"
- ✓ Host Incubators
- ✓ Develop Learning & Research Centres
- ✓ Digitize the campuses
 - Deployment of fibre broadband
 - Wi-Fi everywhere
 - Harmonise equipment for simple connection throughout PSL

2-Identify and build on the skills developed by the institutions

Empowered by PSL RESEARCH UNIVERSITY PARIS

	DAUPHINE UNIVERSITÉ PARIS	ÉCOLE NORMALE SUPÉRIEURE	EPCI ParisTech	L'ÉCOLE DES HAUTES ÉTUDES SCIENTES SOCIALES	MINES ParisTech	l'Observatoire de Paris	And the other institutions
ENT, CMS...	X						
Continuous Training	X						
New spaces for <u>academic</u> and university life		X					
Student housing		X					
Innovation and incubator	X		X		X		

How know-how develops and is shared...

Empowered by **PSL** 
RESEARCH UNIVERSITY PARIS

 DAUPHINE
UNIVERSITÉ PARIS

 ÉCOLE NORMALE SUPÉRIEURE

 Observatoire
de Paris

 L'ÉCOLE
DES HAUTES
ÉTUDES
SCIENTES
SOCIALES

 MINES
ParisTech

 Chimie Paris
ParisTech

And the other
institutions

Project management:

COO or the "resource" teams of the institutions "identified" by their skills

Selected projects: each institution remains free to engage in a specific project and to determine when to get involved

Resources

- Budget allocation by PSL: funding for the "base" and human resources (e.g. worker with PSL contract "placed" with the IT services of Dauphine)
- Funding of "variations" per institution
- team (if applicable): PSL, external resources and those ideally available within the institutions (the challenge of maintaining the level of skills within the institutions)

Governance

- PSL president's report (budget / lead time / quality / performance) e.g. Task force
- committee of members or Steering Committee

APPENDIX X - The Digital Development Plan (DDP)

1- Achievements

With the implementation of the DDP in 2014 and 2015, PSL has conceived, developed, deployed and put into production the following information systems, which will be operational from 31/12/2015:

- The X-Net portal offering services to different communities within PSL (teachers, researchers, students, etc.) and the general public;
- The knowledge portal, helping teachers, researchers and students to navigate the resources of PSL's institutions;
- The digitalisation of the historical resources that constitute PSL's cultural heritage, available through the knowledge portal (PSL Explore) to the general public who, for example, will be able to discover a virtual copy of an original work;
- A system for advertising and managing calls for proposals, making this complicated process more straightforward for researchers, lecturers and students;
- The *Partage* messaging service for internal use by those working for PSL services;
- The collaborative student portal, centralising resources for PSL students, based on the software developed by Paris-Dauphine University and since adapted and deployed for the whole of PSL;
- The staff portal, allowing for the exchange of documents about projects between PSL services staff and improved coordination of the administrative staff of the different institutions.
- Three fixed studios and two mobile studios, all fully equipped, as well two newly recruited digital media producers, for the production of MOOCs to be shared between institutions;
- The PSL Alumni website;
- The 'Repex' collaborative portal for the collection and computation of performance indicators and statements of expenditure, to be used by the general directors of services and the finance directors of the institutions in order to make this key reporting process more coordinated and more reliable.

2- To be deployed between 2016 and 2018:

- A repository of structures and people, as well as a directory and federated identity, which represent an indispensable foundation for the many systems mentioned above and will be finalised in September 2016;
- A single PSL Wi-Fi network available across all institutions, currently in development and operational from summer 2016;

- Management systems for the administration of student services and PSL doctoral students, to be launched before summer 2016;
- The electronic document and records management system, to be operational before the end of 2016;
- A single PSL card, harmonising the 14,000 existing student cards spread across the different institutions and offering a range of services (secure access to certain rooms, access to the canteen, library access, discounts on books etc.), to be finalised by the end of 2016;
- A document and records management system for resources belonging to the different institutions and shared for use across PSL and a management system for centralising and disseminating research documents, to be launched in 2016;
- A management system for transfer to industry actions, providing services for registering patents and providing support to start-ups, available from 2017;
- A decision support system to replace Repex, designed to automatically manage the data from management and performance indicators by connecting directly to the institutions' information systems, to be operational from 2017;
- The optimisation of the infrastructure of the inter-institutional network, to be brought up to the Ministry's security standards in 2017; A management system for running and disseminating the bibliometric database, planned for 2018;
- Centralised management of libraries, a network as wide as it is complex, to be developed during 2018.
- Finally the shared system for computing big data, through the creation of a cluster, planned for 2018

APPENDIX XI - Paris Sciences et Lettres' real estate and urbanisation master plan

Priorities

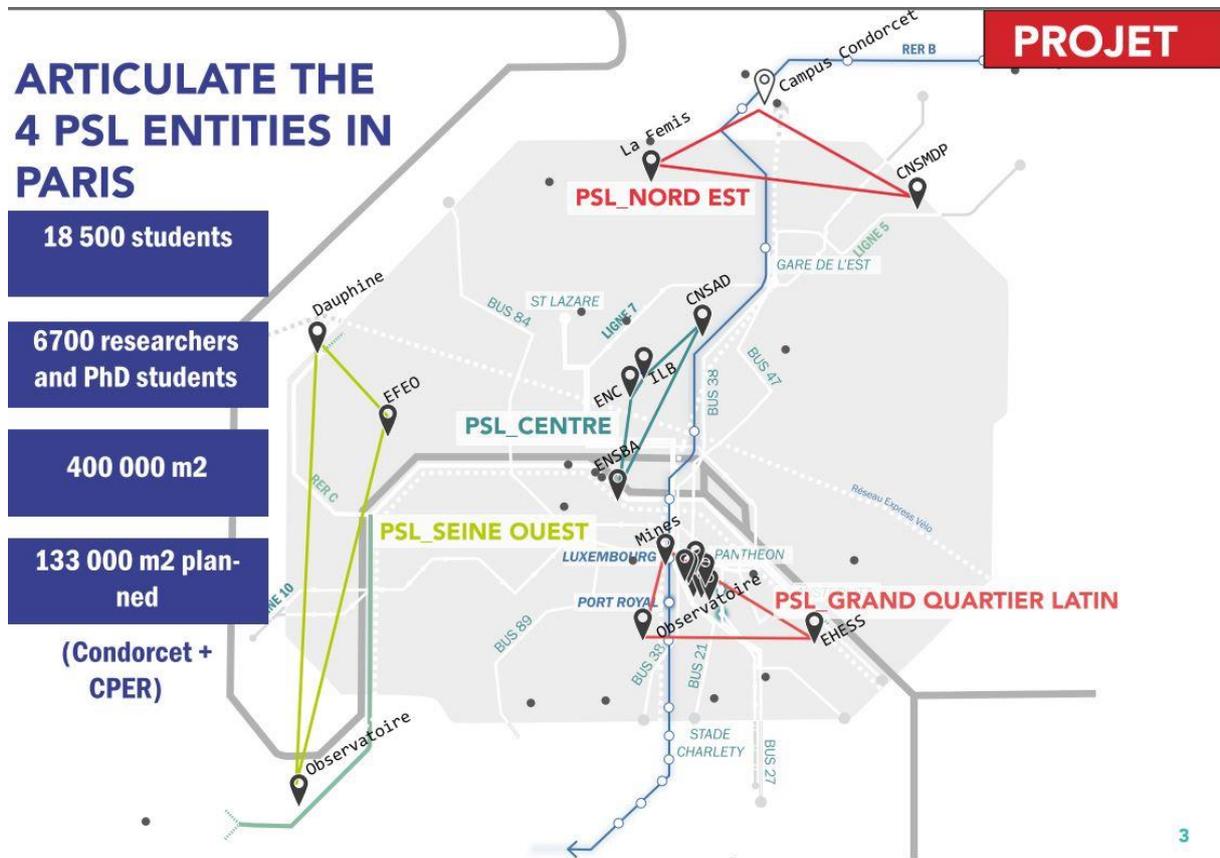
- 1) Improve students and researchers living and working conditions
- 2) Make PSL's Urban Campus more visible and comprehensible
- 3) Take advantage of real estate opportunities with the support of the Paris city council.

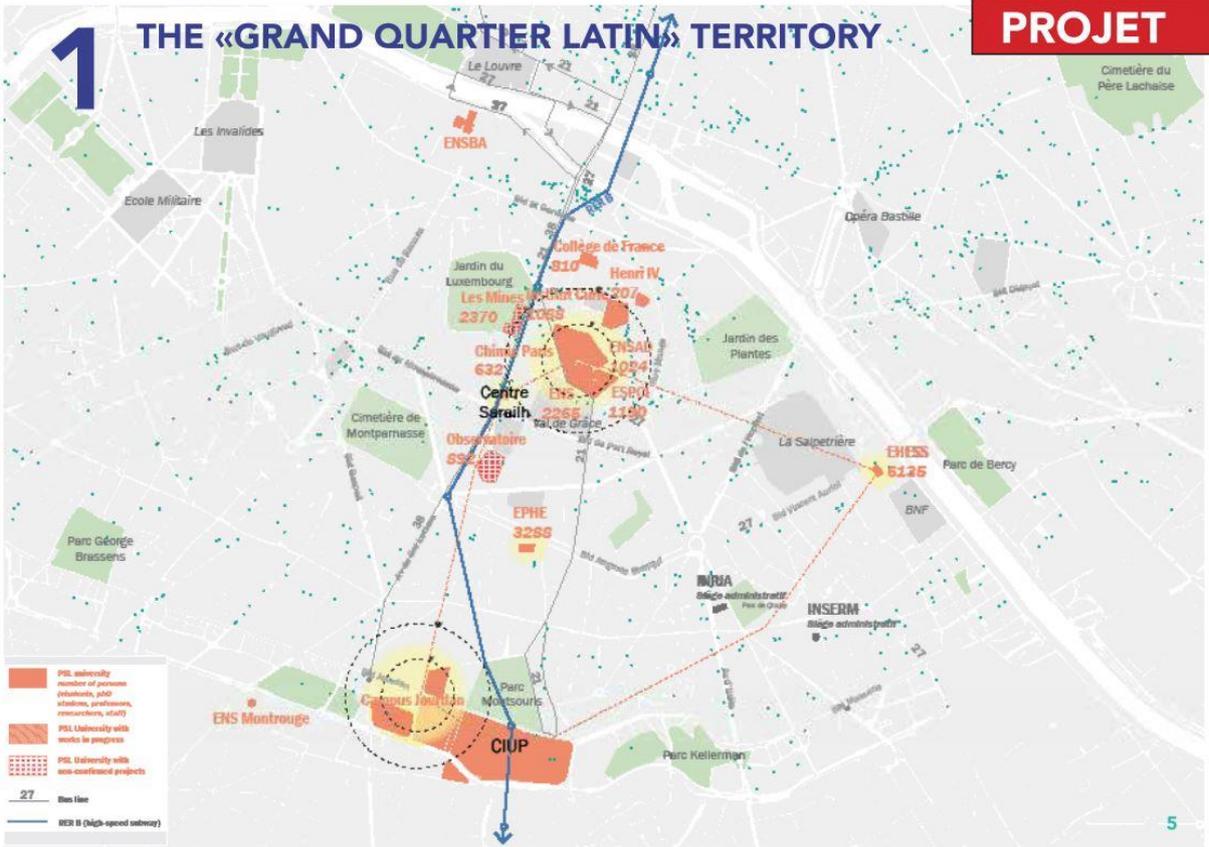
OFFER THE SPATIAL CONDITIONS FOR PSL'S DEVELOPMENT

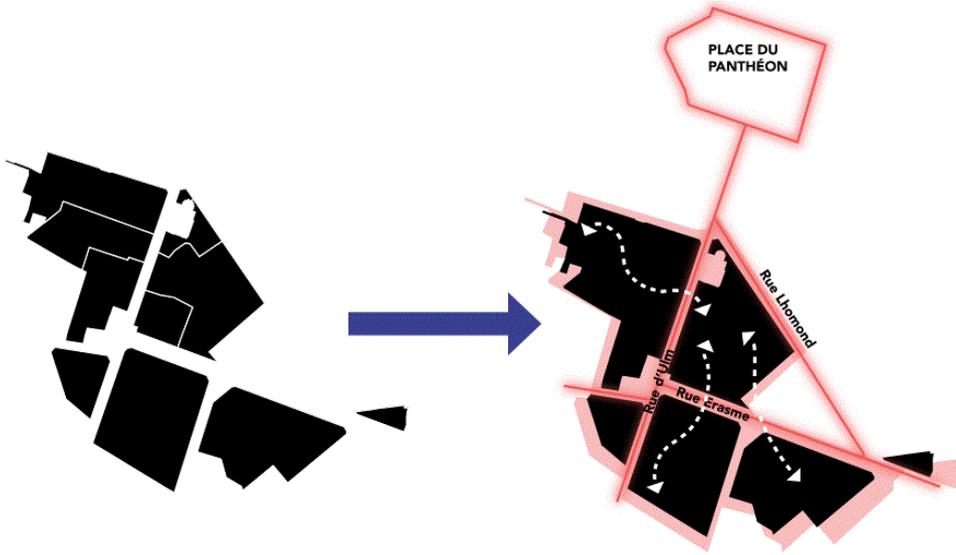
- > One priority: student and researcher housing
- > Identify mid and long term real estate opportunities

ESTABLISH PSL CAMPUS

- > Recognize PSL establishments in the city
- > Open the establishments to different types of groups
- > Make possible study and research in a legible urban campus

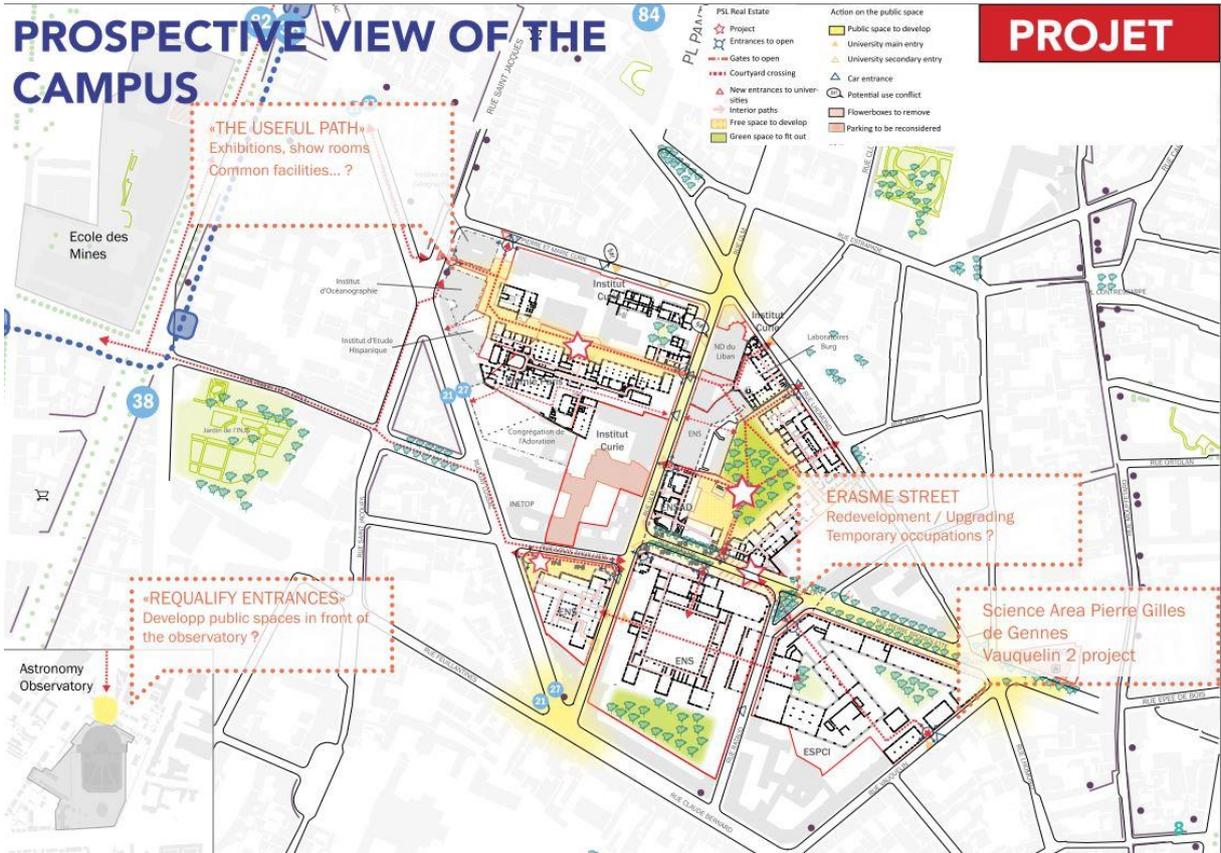






FROM A NEIGHBOURHOOD...

.... TO A CAMPUS



PROJET



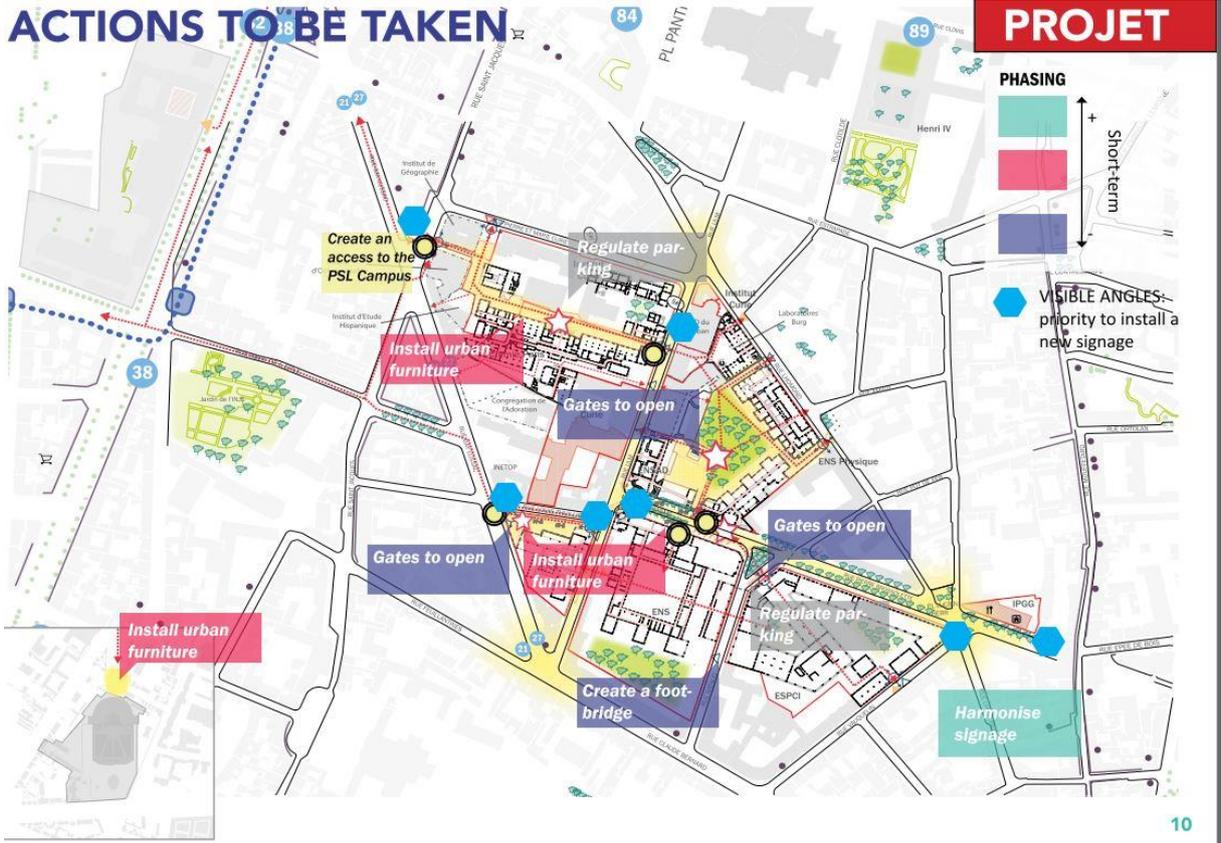
COURTYARDS
INSIDE THE PSL
UNIVERSITIES

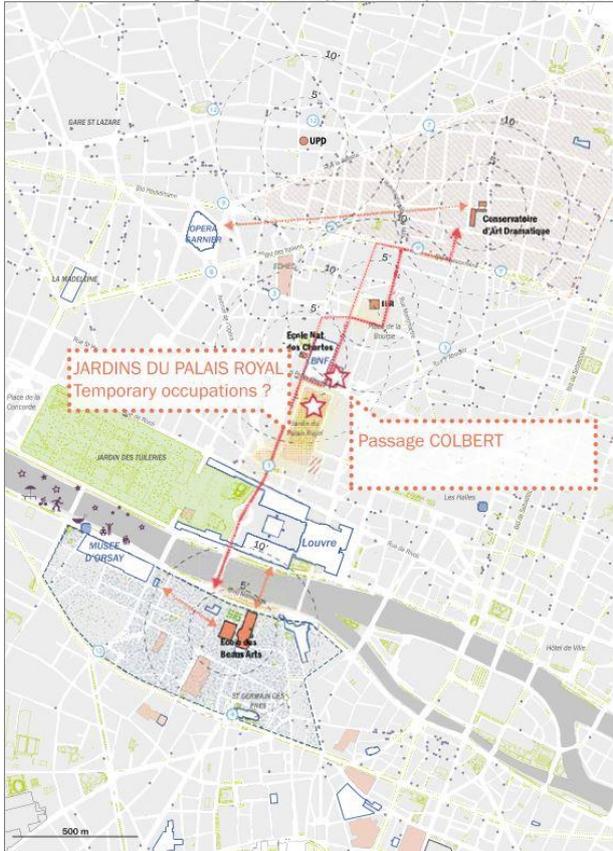
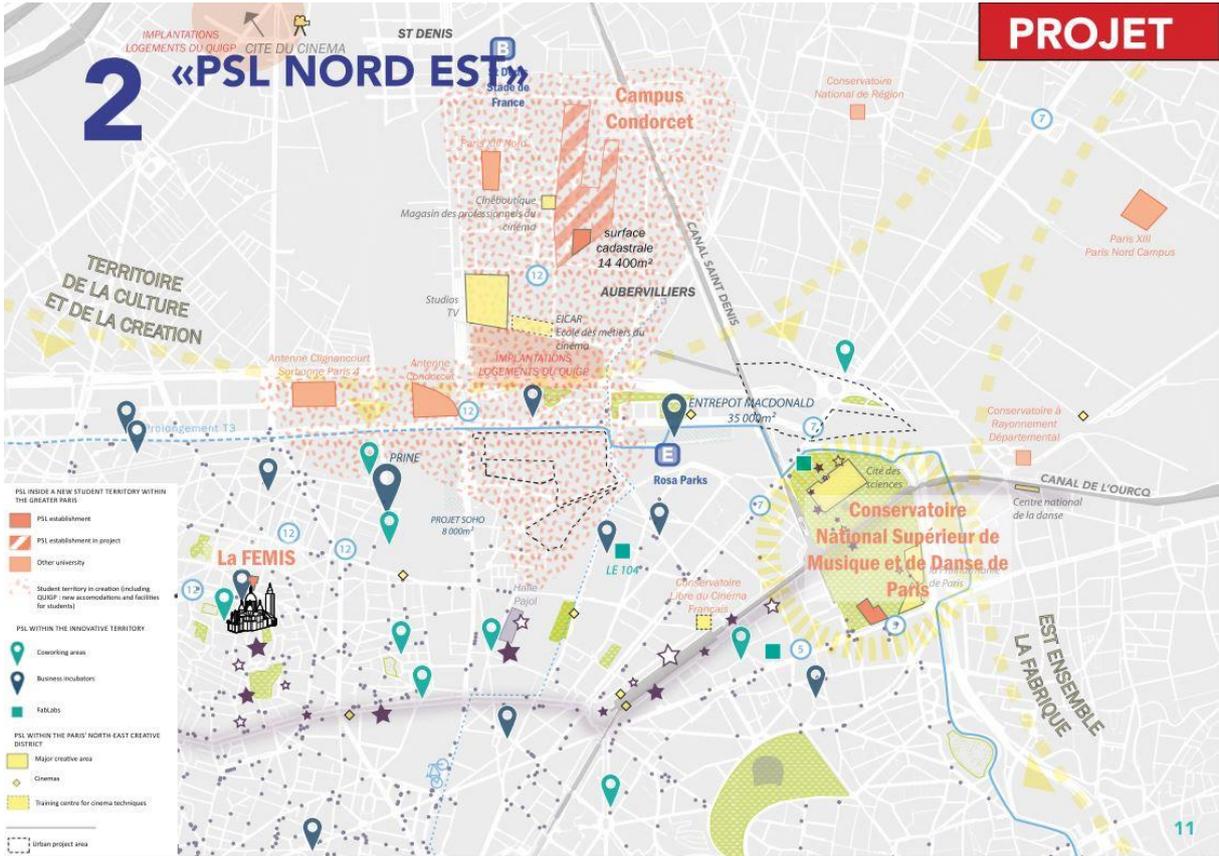


RUE ERASME AND PLACE KASTLER :
UPGRADE THE PUBLIC SPACE



ACTIONS TO BE TAKEN

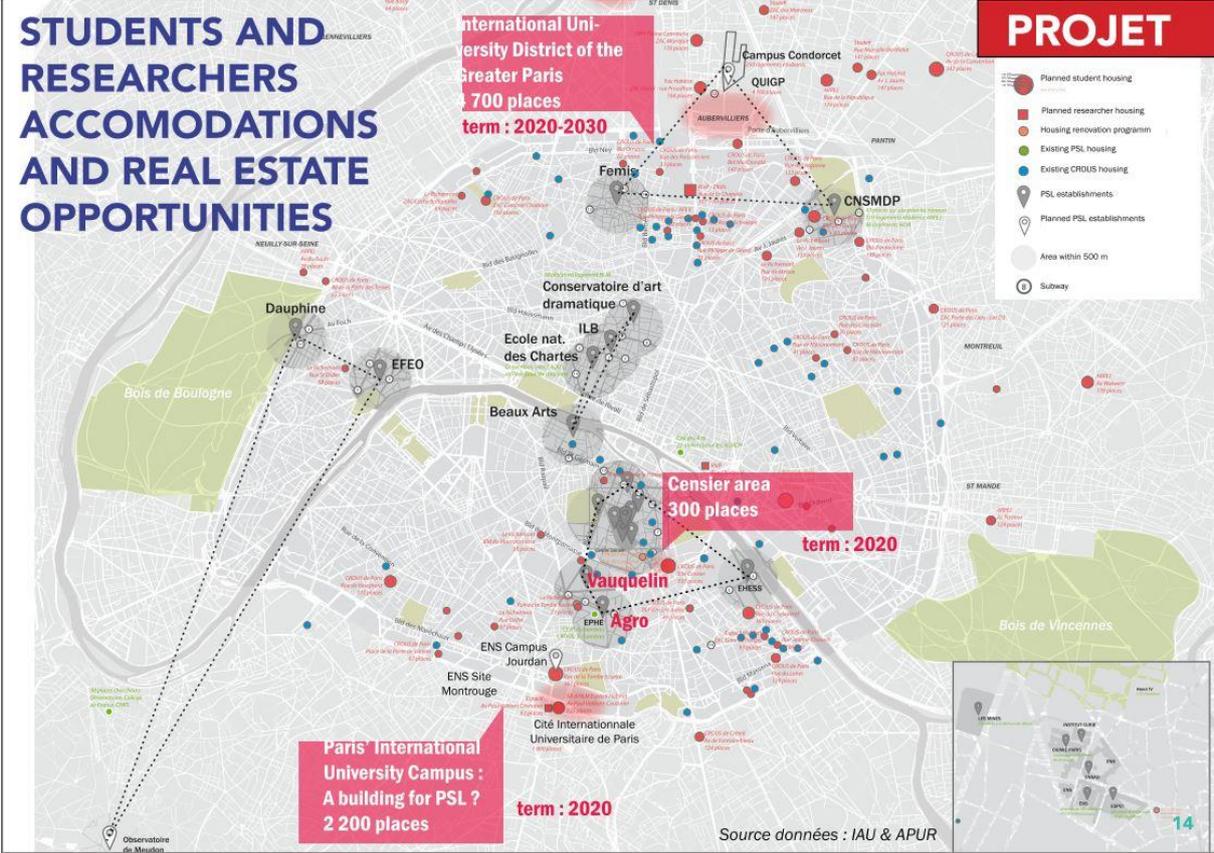




STUDENTS AND RESEARCHERS ACCOMODATIONS AND REAL ESTATE OPPORTUNITIES

PROJET

- Planned student housing
- Planned researcher housing
- Housing renovation program
- Existing PSL housing
- Existing CROUS housing
- PSL establishments
- Planned PSL establishments
- Area within 500 m
- Subway



Source données : IAU & APUR

APPENDIX XII - First Report of the PSL Strategic Directions Committee

(in French, the committee is known as the Comité d'Orientation Stratégique (COS))

January 2014

Background: PSL Strategic Directions Committee (SDC)

1. The SDC was set up by the PSL Directorate to offer commentary, insights and guidance on PSL's vision and goals and to offer recommendations for the short, medium and long term. The members* of the SDC were invited to Paris on 8-9 December 2013. In advance of the meeting, the PSL Directorate circulated to members of the SDC a series of presentations about PSL, including some describing individual initiatives. These documents proved an excellent foundation for the Committee's deliberations and discussions with colleagues from the PSL Foundation and from member institutions of PSL. The SDC members are grateful to all PSL colleagues who gave of their time and engaged very openly and creatively with us.

2. This report is based on our reading of all the documentation provided, on background research carried out by members of the SDC, and on our discussions and deliberations in Paris.

Introduction

3. The committee members were unanimous in applauding the vision and the ambition of PSL, which aims to become a truly world-class research university, one that is recognised as amongst the leading universities in the world. PSL is already more than simply a grouping of prestigious institutions: unusually but excitingly, it seeks to become a full academic entity operating as a federation with a central directorate and all of the characteristics of a research university**, offering the full (L-M-D) range of educational provision as well as undertaking research. The ambition is shared by all of the member institutions of PSL, which are themselves committed to excellence and of the highest quality in research and education. There is also a shared commitment to developing ever-more innovative and interdisciplinary synergies in research.

4. PSL thus has enormous academic assets and has the potential to be a genuinely paradigm-changing university in Europe (and, indeed, globally). However, the diversity of its federation also raises questions and challenges, since each member institution has its own history, deep-rooted culture, specific ways of functioning and, indeed, national (and to differing extents, international) brand and profile. Furthermore, the member institutions maintain their autonomy. In other words, PSL is neither a tactical grouping nor a traditional merger but is, rather, a unique integrative federation, based on the convergence of research and educational initiatives. A significant indication of the PSL vision is that it aims to be a research university with a common signature and a common degree.

* See Appendix 1 for membership of the Strategic Directions Committee.

** For a recent definition of what makes a research university, see the Press Release on the Hefei Statement on the Ten Characteristics of Contemporary Research Universities announced by AAU, LERU, GO8 AND C9 and the Statement itself (attached in Appendix 2)

5. It was made clear in many of our discussions that, while there was considerable enthusiasm for the concept of PSL, its origins were rooted for some in anxiety about their own institutions' ability to develop and flourish alone in an increasingly complex higher education landscape in France and in the highly competitive globalised landscape of higher education research and education.

6. The main issue is therefore one of integration and collaboration, rather than one simply of excellence, since that has already been achieved – although it needs to be fostered, furthered, deepened and broadened as PSL develops a culture of and commitment to innovation.

7. PSL must therefore aim not only to be a world-class university, but also to establish a deep sense of collective vision and to become and operate as 'a harmonious congregation'. Furthermore, it must also hold fast to its vision of making innovation and interdisciplinarity key defining characteristics. Additionality through growth and federation is not enough; it is vital that new synergies be identified, nurtured and promoted across all of PSL's academic, administrative and corporate processes and not simply in research.

PSL as an institution

8. Developing a federal entity is the most challenging and the most interesting problem faced by PSL. It might initially seem to be just an organisation problem of building a workable federation. However, it is not just a problem of structure and organisation but a linked problem of strategy, structure, culture and identity, people and leadership. Ultimately it is a problem of delivering outcomes in the short, medium and long term; consequently, the setting of deliverable targets across different timescales becomes a crucial political problem.

9. PSL seems to have made great progress in a relatively short time. This is laudable, but also potentially dangerous. Sometimes those who move first and fastest can be those who fall first into the pitfalls and fail. Somehow PSL has to manage the temporal problem of achieving purpose and momentum in the short term whilst also providing the seeds of sustainable development in the medium and long term. This is one of many dualities that PSL faces as an institution and it will be helpful if the PSL board explicitly recognised these dualities and worked on them as an ongoing agenda.

10. The central duality is how to build a credible and progressive institution whilst also nurturing and sustaining relationships with its constituent parts. The complexities of engaging with these dualities over time will require an explicit 'learning-by-doing' process. PSL must capture what it learns and respond to any mistakes of judgment or direction in a judicious manner.

11. The creation of a common degree (e.g. the undergraduate programme) is a notable step forward. It is just as vital that all staff commit personally to the desired common signature in publications, public lectures and conferences, consultancy work, etc. It is thus important to make the member institutions and their staff members understand that the common signature does more than confer heightened institutional value: it will ensure that PSL performs much better in the international ranking tables than any of the individual institutions could do alone.

12. PSL has already embarked on institution-building initiatives. SDC commends the three types of research funding instruments that have been implemented for the years 2012 and 2013: pilot, exploratory projects (PEPS); inter-institutional structuring projects; and PSL Chairs of Excellence. SDC also commends the fact that, while each of these funding initiatives has its own purpose, they share the overall objectives of increasing interactions between PSL research teams and promoting a structuring momentum and the fact that the criteria for selecting projects were scientific excellence, their potential impact for research at PSL, and how they would help in the organisation and development of research.

13. SDC considers it paramount that further instruments (with a greater funding pot made available) be put in place to leverage the exceptional quality of the science represented in PSL institutions and encourage cross-institutional collaborations, which both provide an impetus for structural development of PSL and foster the sense of belonging to a single over-arching institution.

14. However, the criteria for evaluation of the projects could be better spelled out. In addition to the excellence of science, the potential for the emergence of a common PSL culture and for the promotion of the values of PSL seem to be important. Also, all projects, including those involving the humanities and arts, should be evaluated externally.

Recommendation 1: The PSL Board should explicitly consider on an on-going basis the dualities of achieving purpose and momentum in the short term and providing the seeds of sustainable development in the medium and long term.

Recommendation 2: PSL should adopt an explicit ‘learning-by-doing’ process as part of its strategic thinking and management processes.

Recommendation 3: The PSL Directorate should find ways of persuading all staff of the urgency and importance of using a PSL signature in all public engagements (publications, public lectures, conferences, consultancy work, etc).

Recommendation 4: Further research funding instruments (with a greater funding pot made available) should be put in place in order to continue the leveraging of the exceptional quality of the science represented in PSL institutions in order to encourage cross-institutional collaborations and consequent institution building.

Recommendation 5: All projects, including those involving the humanities and arts, should be evaluated externally.

Innovation and interdisciplinarity

15. The PSL commitment to both innovation and interdisciplinarity was applauded by all members of the SDC, who equally welcomed PSL’s determination to work creatively and effectively with business.

16. It was noted that traditionally the training received by French engineers made them into good ‘administrative engineers’, trained not so much to conduct research as to become the top managers of French multinational companies. The SDC noted also from the experience of a member who has been working with ESPCI for several years that there is considerable difficulty in persuading French researchers and French companies to speak to one another and that this is a long-term problem. In

this respect, ESPCI has been a leader in building relationships with industrial R and D (Research and Development) and in setting up joint laboratories.

17. ESPCI has been unique among the Schools in having a strongly research-based curriculum, and has introduced research-based projects running over several terms into the training of all students. This has been enthusiastically embraced by the students.

Indeed, when the International Scientific Committee of ESPCI met the graduates from 2009, these alumni highlighted their multidisciplinary expertise and the high value of their research training, stressing that this type of education was unique to ESPCI and should be perceived as one of the main strengths of the School.

18. A flagship PSL project is the creation of an Institute of Technology and Innovation (ITI), which brings together the strengths of 3 engineering Schools (ESPCI ParisTech, Chime ParisTech and MINES ParisTech) and ENS with several other PSL member institutions (Université Paris-Dauphine, Institut Marie Curie, Observatoire de Paris, Collège de France and École nationale supérieure des Arts Décoratifs); the École nationale des Ponts et Chaussées is also a partner. This is a highly ambitious project of integration in itself, as it seeks to harmonize the syllabi of the core engineering Schools with the further aim of promoting interdisciplinarity. In what will be a unique engineering programme in France, students will also follow classes in innovation and entrepreneurship and each student will have two tutors, one from business/industry and the other from the world of academic research; furthermore, students will be expected to work on a start-up project based on a business plan and aiming to develop a patent.

19. The SDC was very impressed by this determination to produce a different type of PhD focused not only on research but also on its translation to application. Furthermore, it applauds the decision to create from Autumn 2014 a doctoral programme including a preparatory 'D-zéro' year which will lead to a PSL pre-doctoral certificate, and then to a PSL doctorate, and SDC urges PSL to develop this example and create a PSL-wide doctoral programme on this innovative model, which will undoubtedly attract many excellent students from France and the international community. Such an increase in the number of doctoral students is essential if it is to be internationally competitive.

20. It will be crucial that this doctoral programme secures strong on-going financial and political support from both Government and industry, both for the obvious reason of sustainability of the programme and also (and even more importantly) in order to establish the national and international credibility of the programme.

21. SACRe, a programme for creating and performing arts students, is an equally innovative doctoral programme. Now in its second year, it is offered across the five PSL creative and performing arts Schools and ENS, and one of the originalities of the programme is that there is a mix of students from the six different schools. The students follow specific classes and a core programme of courses, the idea being that they should form a multi-disciplinary cohort of artists within a single doctoral programme. The aim is to train students at the interface between theory and practice, with the selection of students being based on their creative/artistic skills rather than on their theoretical or academic results. This is a bold and much-needed initiative, and SACRe has the potential to change the world of the arts as well as the academic world.

22. The importance and value of practice-based research in the arts is not yet fully recognised in France or, indeed, in many other countries. However, as countries increasingly see their futures in terms of the knowledge economy, it is imperative also to understand and exploit the benefits brought on both the individual and the national levels by the cultural sector, by what is now called the ‘creative economy’. PSL’s SACRe programme will give it a leadership position in France, but it might usefully engage with foreign research agencies which have developed both clear policies for practice-based research and funding opportunities for practice-based PhDs and collaborations between university academics and practitioners, e.g. the UK Arts and Humanities Research Council (AHRC) or the PEEK programme of the Austrian Science Fund (FWF).

23. CPES, the new undergraduate programme now in its second year, is another imaginative educational initiative, offering a creative alternative to the traditional preparatory class while maintaining a multidisciplinary core curriculum. SDC was impressed by the partnership approach to curriculum adopted, with the students starting their first year at Lycée Henri-IV and then, depending on their broad disciplinary interests, moving in the second and third year to the Grandes Écoles or Dauphine or split their time between Lycée Henri-IV and Lycée Louis-le-Grand. SDC applauds the fact that, thanks to a partnership with the British Council, all students will gain proficiency in English and enthusiastically welcomes the fact that students are exposed to research in two ways: through contact with doctoral students from the ENS from the first year of the cycle and through doctoral students from the ENS from the first year of the cycle research internships.

24. It is encouraging that all PSL students are able to obtain the PSL undergraduate diploma, and the SDC hopes that PSL will in time (and ideally as soon as possible) be able to issue a PSL Licence. This is essential if PSL is to be recognised internationally as a university as is normally understood. In this context, it is encouraging that the École de Chimie, for instance, has agreed that their students could be registered as PSL students with no extra enrolment fee and would be able to obtain the PSL diploma with the grade of a Licence. However, it must be a priority for PSL that it persuades the relevant ministerial authorities and other stake-holders of the need for PSL to award its own Licence and other degrees.

25. As noted above, PSL has already achieved much that is innovative and genuinely ground-breaking in its development of new approaches to research and research-led education.

Recommendation 6: SDC urges PSL to create a PSL-wide doctoral programme on the ITI model, i.e. with a pre-doctoral year and with each student having two tutors, one from PSL and the other from an appropriate company, government department, NGO, arts organisation, etc.

Recommendation 7: PSL should work to ensure that the doctoral programme secures strong on-going financial and political support from both Government and industry both for the obvious reason of sustainability of the programme and in order to establish the national and international credibility of the programme.

Recommendation 8: In order to strengthen and develop the SACRe doctoral programme, PSL colleagues should consider engaging with foreign practice-based research funding agencies which have developed expertise in the defining and funding of practice-based research in the creative and performing arts.

Recommendation 9: PSL should as soon as possible be made eligible to issue a PSL Licence and other degrees and should work with the relevant ministerial authorities to secure this outcome which is

important not only for PSL but more broadly for France's international position in the global higher education landscape (and world rankings).

Strategic development

26. The ambition to innovate is both laudable and necessary. However, since virtually everything in PSL is new (apart from its various member institutions), PSL will be challenged by the transaction costs and political liabilities of innovation. The PSL Board could therefore usefully think in terms of 'a mixed economy of development', i.e. refraining from being committed to any single formula or recipe of innovation. Thus some research or teaching innovations could be cross-federation innovations, while others could be initiated within a particular part of the federation - as long as they are represented as PSL innovations. Some innovations could be nationally directed, while others could be more international in terms of beneficiaries. Yet other innovations could be directed to internal stakeholders in PSL institutions, others to both internal and external stakeholders. PSL has started well, finding some good niche areas that are not fully occupied by the component parts of PSL and creating exciting new initiatives and processes. This 'acclimatisation without threat' approach is a good way of securing buy-in from members of PSL and is an important element in the vital work of institution building.

27. SDC thus recommends that, as it takes forward its institution-building work, PSL should explicitly adopt the principle of flexibility of response, in order to avoid becoming locked into routines which may appear in the short term to be beneficial, but which may in the medium term create problematic unintended consequences.

28. An important feature of this mixed economy of response will be to create innovative structures, processes and initiatives which meet several purposes and not just one. All innovations have high transaction costs, so it is important to seek to defray some of those costs by requiring all innovations to satisfy multiple purposes. In other words, innovations should not only meet instrumental goals but also meet the cultural purpose of signalling and establishing the values and identity of the new PSL. While this is clearly happening with the creation of such innovations as the engineering doctoral school, programme, the SACRe programme or the undergraduate cycle, our discussions with some academic members of PSL revealed that they were seeing innovations mainly in instrumental terms and not in terms of institutional culture or identity-building.

29. While major structural changes in research and education can take time to take forward, much can be achieved through smaller 'quick wins' initiatives which build community as well as potentially resulting in new and interesting synergies. Examples could include research 'speed-dating'/'get to know you' events where faculty can meet and discuss their current and future research plans, 'town meetings' to which all PSL staff are invited on significant individual topics, be these regarding research areas, educational priorities, governance or whatever, etc.

30. A key issue for the short, medium and long term is how to maintain the commitment to shift the paradigm of what a university, and especially a research university, can be in France. SDC welcomes and applauds the confidence shown by the PSL leadership in envisaging and implementing high-risk, high-impact projects in research and education; it considers also that in order to maintain this momentum, equal imagination and boldness should be shown with regard to the estate.

31. The core engineering institutions in ITI already form something like a campus, and it should be possible to link the engineers through buildings and walkways as building plans are taken forward. It would be useful to go even further and promote the ‘physical emergence’ of a PSL campus through astute urban development interventions in the main geographical area where the PSL institutions are located. These possibly relatively simple interventions could include, for example, a clear and highly visible unifying sign-posting of buildings and areas and wifi available for students and faculty on the ‘campus’, and even the establishment of a pedestrian zone among the main buildings. While this latter idea would entail considerable time spent in discussion with the planning authorities of the Ville de Paris and other external stake-holders as well as internal consultation, there is evidence from around the world that such strategic pedestrianisation can bring massive social and economic benefits not only to the institutions involved but also to the city.

32. A world-class student experience is vital if PSL is to become and be recognised as a world-leading university. The innovative degree programs and the engagement of all students with research from the first year of the undergraduate cycle are clearly the foundation and the vital dimension of their experience. Now that these are largely in place, PSL should consider offering all its students a holistic student experience which is on a par with the world’s leading universities and in which they gain a broad portfolio of transferable, ‘life’ skills as well as learning, research and entrepreneurship skills. This would, for example, entail encouraging doctoral students as well as faculty to take part in public engagement activities, incorporating experiential learning in all degree programs, supporting students to participate in community service through volunteering programs , and enabling undergraduate students from all disciplines to take laboratory and experiment classes.

33. An important dimension of PSL’s strategic development will be its international positioning. Teaching in English will be vital – as long as the classes are genuinely interactive in English both the faculty and the students reflect on what they learn from working in English and translating mentally from French into English. However, the use of French will be essential in some areas of the humanities; furthermore, teachers and examiners will need to develop policies about and communicate to students explicit statements on how the quality of English is to be assessed.

34. All of the member institutions of PSL have significant, if differing, international profiles. In order to position itself as a new and internationalised ‘federal’ research university, PSL should consider targeting a few strategic and long-term international partnerships rather than a multiplicity of opportunistic short-term contract-based partnerships – and these partnerships should be with other world-leading universities who share the values as well as the research excellence of PSL. One way of simultaneously achieving a strategic operating international presence and furthering its vital institution-building is for PSL to envisage identifying several PSL research Grand Challenges that would involve colleagues and research groups from across the PSL institutions in working together and with international partners to address global problems.

Recommendation 10: As PSL develops and innovates as an institution, it should explicitly adopt the principle of flexibility of response, in order to avoid becoming locked into routines which may appear in the short term to be beneficial, but which may in the medium term create problematic unintended consequences.

Recommendation 11: A programme of ‘quick wins’ events could be put in place to complement the major cross-PSL initiatives in order to involve as many individual faculty as possible in thinking in new, collaborative interdisciplinary ways.

Recommendation 12: Active consideration should be given to urban development interventions and how these can benefit the growth of PSL as a ‘campus’ university and as a complex but also highly and innovatively efficient university. This will involve both much consultation with the PSL community and considerable discussion with the Ville de Paris planning authorities and other external stake-holders, but the rewards would be significant and on multiple levels, both to PSL and to the city of Paris.

Recommendation 13: In order to compete for the world’s best students, PSL will need to offer a world-class, holistic student experience in which they can gain transferable ‘life’ skills as well as academic skills.

Recommendation 14: While the use of English in teaching and learning will be a key element in establishing PSL as an international university, PSL should ensure that all teaching and learning is truly interactive and that students know exactly how their use of English is evaluated and assessed.

Recommendation 15: In positioning itself internationally, PSL should target a few key strategic and long-term international partnerships with other world-leading universities who share the values as well as the research excellence of PSL. It should also envisage identifying several PSL Grand Challenges that would involve colleagues and research groups from across the PSL institutions in working together and with international partners to address global problems.

Identity and image

35. A core issue in our discussions in Paris was how PSL can build a distinctive and additive purpose and identity whilst at the same time building and sustaining effective relationships with all the members of the PSL federation.

36. A further challenge is that of constructing and communicating a narrative. The historical, political and aspirational aspects of that narrative are already being powerfully articulated by the Director and senior figures in PSL. Fundamental to the development of the narrative will be the choice of language and the values implicit in the chosen language. Obvious key words are Paris, Sciences, Lettres, University and Research, which are emblematic of PSL’s physical and symbolic presence, direction, identity and merit, but further words and images will be needed as PSL grows and develops. Here again it will be useful to think in terms of a ‘mixed economy’ – in this case of words and ideas which are culturally potent and which will underpin PSL’s on-going narrative of identity, ambition and direction.

37. It will be for the PSL leadership to choose these new words and the lexicon from which to draw them. Possibilities will be the language of engagement, of impact, of synergistic thinking and working, of crossing intellectual boundaries and international borders, of the nature and challenges of innovation, etc. As they develop the next stage of PSL’s vision and its representation in language, the PSL leadership should choose words and a discourse which speak to different audiences in different ways.

38. In our encounters with people from the various PSL institutions, we became aware that the sense of belonging to this federal, meta-level body needs to grow and that shared, ‘corporate’ values need to spread horizontally and vertically through the university. Internal communication is an essential first step, led by the heads of the various institutions, with overall direction given by the Director of PSL. Leadership on brand/identity/vision must come from the top, but it is vital also that active buy-in is

secured from across all of the PSL institutions and that all colleagues feel that they can contribute in a 'bottom-up way.

39. It will be important to maintain the identity of the various institutions in PSL, whilst also building a clear and strong identity for PSL itself – which must not be seen as stifling what the Schools are doing, but, rather, strengthening and developing existing work and bringing more of it clearly under the PSL banner, as with, for example, the PSL Chair in Computer Science (based at ENS) or the Civilisations Institute in the Collège de France, where membership of PSL undoubtedly was key to it being awarded funding for its major renovation project.

40. Evidence from other large and complex research universities (e.g. Imperial College and UCL in the UK and/or the emerging Hamad bin Khalifa University in Qatar) shows that it is eminently possible to maintain the historic identities of constituent Schools who have chosen to join, whilst simultaneously developing and celebrating the identity of the host university. PSL is, of course, different in that its member institutions retain their autonomy, but the lessons are nonetheless valid regarding how to help past and new identities to live and work together, mutually supporting and reinforcing each other.

41. SDC was unanimous in considering that it is vital that all students exit from PSL with some form of PSL certification. We recognise that there are significant hurdles to be overcome with regard to PSL awarding degrees at all levels of the L-M-D cycle, but wherever this is not (yet) possible, some form of PSL certificate or recognition of PSL's role on transcripts should be provided.

42. The website is a valuable tool for both communication and community building, and as such needs to be more than just 'instrumentally' bilingual in French and English. Given PSL's decision to use English language as the main medium of teaching, it is important the English language web presence is strengthened and conceptualized in terms of English-speaking audiences, as this will help to attract more excellent foreign student and encourage overseas researchers to become engaged.

43. It would be helpful if greater co-ordination could be managed between individual School websites and the PSL website, when there is important news, e.g. winning of Nobel Prizes or Fields Medals, significant research break-throughs, new degree programs, winning of major research funding, etc.

44. Another initiative to promote the image of PSL would be to organize four to five highly visible public lectures per year: the "PSL Lectures", given by leading academics, which will ideally be live-streamed as well as archived on the PSL website.

Recommendation 16: As the PSL vision is taken forward, its representation in language ('the PSL narrative') will need to be modified; this will be the responsibility of the PSL leadership with input from across the university. Care should be taken to choose words and a discourse which speak to different audiences in different ways about PSL's core values and key ambitions.

Recommendation 17: Lessons about how to manage the co-existence of the established identities of the PSL member Schools and the identity of the new research university that is PSL could be drawn from the experience of foreign universities, e.g. Imperial College and UCL in the UK and/or the emerging Hamad bin Khalifa University in Qatar.

Recommendation 18: SDC was unanimous in considering that it is vital that all students exit from PSL with some form of PSL certification.

Recommendation 19: The English language web presence should be strengthened and conceptualized in terms of English-speaking audiences, in order to attract more excellent foreign students and encourage overseas researchers to become engaged.

Recommendation 20: Greater co-ordination between the Schools' websites and the PSL website to achieve great impact both internally and externally.

Recommendation 21: As part of its profile-raising and community-building activities, PSL could organize four to five highly visible public lectures per year: the "PSL Lectures", given by leading academics and both live-streamed and archived on the PSL website.

Attracting and retaining talent

45. Through the Idex, Labex, Équipex and associated initiatives, the French Government has invested significantly in Higher Education, with a special focus on centres of excellence. It has also granted greater autonomy to higher education institutions and is encouraging greater high-level collaboration in research and education.

46. Despite these much more propitious circumstances, universities in France still face the challenge of attracting and retaining significant numbers of top faculty and top students from across the world. Given PSL's ambitions, it is vital that it succeeds in attracting the best, and therefore it will need to develop strategies to achieve this on an on-going basis.

47. Its own academic excellence will be the main magnet for attracting faculty and students, but in the highly competitive world of international higher education, it needs to be vigorously and creatively pro-active in its recruitment activities.

48. SDC did not have time to discuss the challenges in depth with PSL colleagues at its meeting in Paris, but it suggests that in order to formulate a robust recruitment strategy, PSL should undertake a 'force field analysis' of the issue.

49. Questions to address would include, for instance: what are the driving forces at the moment encouraging top students and faculty to come to PSL? what are the equivalent restraining forces inhibiting such talent from joining PSL? how big a role do salaries play in the decision-making of potential faculty? what extra-academic positive 'draw' factors can determine a decision to choose PSL over another world-class university? how important a positive driver or a negative restrainer is the decision to use the English language? How powerful will the PSL Excellence Chairs be as an instrument to attract top researchers? PSL will know which other questions need to form part of this analysis.

50. One of the most important lessons taken from industrial uses of such force field analysis is that the key to the successful management of problems and challenges lies not only in building up the number of positive drivers, but in reducing the potency of the restrainers.

51. An excellent example is that of INSEAD, which has been very astute in managing this particular variant of the ‘talent wars’. First of all, it saw this as a long-term problem, one which needed a repertoire (a mixed economy) of responses. It knows the market well and responds to it, indeed even perhaps keeping ahead of it. It offers salaries comparable to those of the top US Business Schools. Notably, for a long period, it has been building and nurturing relationships with top US-based scholars, inviting them over on short-term visits and then persuading them to encourage their top PhD students to come to INSEAD. PhD students at INSEAD are also offered visits to top US Schools during their training and a virtuous cycle of building of intellectual and social capital occurs. The INSEAD story is one not only of playing the market in economic terms, but one of long-term relationship-building founded on reciprocal benefits. PSL will not want to imitate INSEAD exactly, but it can undoubtedly learn useful lessons from INSEAD’s experience. And PSL must remember that it has the incomparable asset of the cultural, intellectual and diplomatic riches of Paris.

52. Students will be attracted by the academic excellence of PSL and its focus on interdisciplinary thinking and working and its increasing engagement with business and industry. Attention will need to be paid to student funding issues, especially at the doctoral level, where ‘allocations doctorales’ are essential if PSL research groups are to build world-leading teams – and even higher doctoral student funding packets will be needed enough as competition grows globally for the best students.

Recommendation 22: PSL could usefully conduct a ‘force field analysis’ of the issue of attracting the best faculty and students.

Recommendation 23: With regard to the ‘talent wars’ for the world’s top researchers, useful lessons could be learned from the experience of INSEAD.

Recommendation 24: As part of the recruitment strategy for students, attention will need to be paid to student funding issues in the context of global competition for the best students as all levels.

Conclusion

53. SDC was enormously impressed by all that PSL has already achieved and by all its plans and the scale of its ambition. There is, of course, much to be done, but we were very encouraged by the enthusiasm of the PSL colleagues whom we met and by their determination to realise PSL’s ambitions.

54. By Spring 2015 when we meet again, SDC expects PSL and all of its member institutions and its staff and students to have a deeper and fuller sense of shared identity. We also expect it to have established a reputation both in France and internationally for being committed to excellence, interdisciplinarity and innovation in research and education and for engaging pro-actively and creatively with government, business and industry.

55. PSL has set itself an ambitious programme of work and faces many challenges in the months ahead. We trust that this report will help in this work, although we are aware that our recommendations entail adding to the programme of work!

56. We look forward to following closely its progress and to continuing to offer what guidance we can.

Appendix

Membership of the PSL Strategic Directions Committee

(Those marked with an asterisk were unable to attend the meetings in Paris on 8-9 December 2013)

*Professor Sir Tony Atkinson, Research Professor of Economics, University of Oxford

Professor Dame Jocelyn Bell Burnell, Astrophysicist, Fellow of the Royal Society

Professor Gérard Ben Arous, Mathematician, Director of the Courant Institute, New York University

Professor Dame Julia Higgins, Chemical Engineer, Faculty of Engineering, Imperial College London

Professor Pierre Magistretti, Professor of Neuroscience, Director of the Brain Mind Institute, École Polytechnique Fédérale de Lausanne

*Neil McGregor, Art Historian, Director, British Museum

Professor Andrew Pettigrew, Professor of Strategy and Organisation, Saïd Business School, University of Oxford

Professor Michael Worton, Emeritus Professor of Arts and formerly Vice-Provost, University College London (UCL)

APPENDIX XIII - 2nd Report of the PSL Strategic Directions Committee

November 2015

Background: Strategic Directions Committee (SDC)

1. The SDC was set up by the PSL Directorate to offer commentary, insights and guidance on PSL's vision and goals and to offer recommendations for the short, medium and long term. This is its second report, the first being delivered in January 2014. During the past year, one member, Mr Neil McGregor, formerly Director of the British Museum, resigned from the SDC due to the level of his other commitments. Three new members were appointed to SDC this year.⁴
2. The members of the SDC were invited to Paris on 25-27 October 2015. In advance of the meeting, the PSL Directorate circulated to us a series of presentations about PSL, including some describing individual initiatives. These documents proved a very helpful foundation for the Committee's deliberations and discussions in Paris with colleagues from the PSL Directorate and from member institutions of PSL. The SDC members are very grateful to all PSL colleagues who gave of their time and engaged very openly and creatively with us.
3. This report is based on our reading of all the documentation provided, on background research carried out by members of the SDC, on our discussions and deliberations in Paris, and on follow-up documents and information provided after our interview visit by colleagues in various PSL institutions.

Context

4. Higher education is evolving and changing rapidly across the world in order to meet the new demands and expectations of national and regional governments, employers and students. As a result, traditional models of what a university is are being questioned, challenged and modified, and new models are being tested in different parts of the world. Yet so far, no single model seems fully fit for purpose in our increasingly complex, globalized world.
5. It is widely recognised that partnership-working must be at the heart of the 21st-century university, but it is also recognised that strategic and long-term partnership-working is very difficult to achieve, especially when striving to do this on the multiple levels of research, education and training, enterprise, knowledge exchange, and public engagement.
6. The PSL initiative is of great importance to France and the future of its higher education ecology. Its success is also very important to the wider world of higher education, which needs proven new models of what a comprehensive research university can be and do.
7. While PSL's creation was motivated in part by a desire for institutional self-preservation in a potentially threatening national as well as global higher education landscape, it emerged equally from a shared desire on the part of the member institutions to do something different

⁴ See Appendix 1 for current membership of the Strategic Directions Committee.

within a close, ‘federal’ structure which enables innovative and interdisciplinary collaborations.

8. The PSL vision continues to impress and excite the SDC. However, as the PSL Leadership recognises, there still remains work to be done on both the strategic and organisational levels. The recommendations in this report seek to help with this crucial work.

Developments over the last two years

9. PSL has developed considerably over the past two years, growing to include 24 member institutions; notably, between December 2014 and January 2015, four world-leading institutions in the humanities and the social sciences joined PSL. This has created an admirable balance between the sciences and the arts, humanities and social sciences and offers the prospect of many new and exciting interdisciplinary collaborations across PSL. It also means that, in terms of coverage, PSL now compares well with the best of the world’s top universities.
10. A new President, M. Thierry Coulhon, has been appointed to succeed Mme. Monique Canto-Sperber. The President is now President of both the PSL Foundation and the PSL ComUE. A new team has been set up: while the Dean for Education and the Dean for Enterprise and Industrial Partnerships joined the new presidential team, a new Vice-President, a new Dean for Research and a Vice-President for Digitalization were recently appointed.
11. In parallel with the development and refinement of organisational structures, policies and procedures, many research and educational initiatives have been established or are at the discussion or planning stages.
12. Of particular importance is the fact that the accreditation of doctorates has now been transferred to PSL and is now the exclusive prerogative of PSL. The fact that all doctoral students will graduate with a PSL doctoral certification, featuring both the PSL logo and the logo of the relevant institution, is a significant step forward in PSL identity formation and shared institutional pride.

Feedback from PSL to the first SDC Report

13. SDC noted with appreciation the very full response to its January 2014 Report and was pleased to note the depth of the engagement by PSL colleagues with the Report. Significant progress has been made and account has been taken of almost all of our recommendations, though there are a couple of areas where we would recommend that PSL consider again our suggestions.
14. One area is that of the nature of the student experience. In Recommendation 13, we suggested that, in order to compete for the world’s best students, ‘PSL will need to offer a world-class, holistic student experience in which they can gain transferable “life” skills as well as academic skills’. Considerable thought and investment have been given to expanding the students’ experience of campus life (‘PSL Happy Hours’; ‘PSL Day’; the PSL Symphony Orchestra and Choir; PSL Sports, etc). We applaud this, and we encourage PSL to continue expanding the number and range of extra-curricular activities available to students.

15. Nonetheless, we would urge PSL again to enhance further the students' learning and personal development experience and to consider how they could offer students development opportunities in transferable and 'life' skills, such as global citizenship, leadership, team-working, enterprise, communication, etc. A useful example is to be found, for example, in the ITI doctoral programme, but a university-wide programme, with some development opportunities embedded within courses and others offered discretely, would be of enormous benefit to students on all courses and at all levels.
16. On research, we suggested that PSL 'should [...] envisage identifying several PSL Grand Challenges that would involve colleagues and research groups from across the PSL institutions in working together and with international partners to address global problems' (Recommendation 14). As the PSL Research Strategy takes shape in the context of the expanded PSL, such an approach, allied to a public engagement strategy, would greatly strengthen PSL's global standing. In this context, we are delighted to note PSL's recent decisions on research planning and funding (see paragraphs 27 and 28 below).

Recommendation 1: The student experience and the long-term employment prospects of PSL students would be greatly enhanced by a PSL-wide programme of development opportunities in life and transferable skills.

Governance

17. Issues of governance continue, understandably, to pre-occupy PSL and its member institutions. Underlying all the discussions and debates, there is a clear sense of the vital importance of the autonomy of member institutions, allied to a shared commitment to working under principles of federalism and subsidiarity in order to achieve innovative collaborative initiatives in research and education.
18. The principle of unanimity was described to us as a 'life or death' principle for the institutions. Here, while understanding the contextual reasons for this, we consider that such a principle is not sustainable for a global university, could create perceptions of institutional frailty, and could have negative unforeseen consequences as PSL develops. It seems to us important that the conditions for the necessity of a unanimous vote be made abundantly clear. We believe also that PSL should over time define itself and its workings as driven by consensus and transparency, reserving the absolute of unanimity for truly mission-critical issues.
19. Throughout the documents that we were sent, embedded in the additional documents that were presented to us in October and recurring in many of our interviews in October was a commitment to the all-importance of 'bottom-up' approaches and activities in all spheres. While the recognition of the academic and institutional creativity role of scientists and scholars is admirable, 'top-down' approaches and interventions are also necessary in order to shape the institution's direction and identity.
20. There is much vital yet inevitably time-consuming work of persuasion and consensus-building still to be done as PSL develops its new university model. At the same time, PSL and its President must be able also to give leadership, shaping PSL as a new exemplar of an integrated university, rather than simply providing a funding function and a convening function. In this

way, PSL will become a powerful catalyst, an agent for change in the world of higher education in France and beyond.

Recommendation 2: While PSL is committed to ‘bottom-up’ approaches, ‘top-down’ approaches and interventions are also needed to provide leadership and direction as the university seeks to become a new model of integrated research university.

Community-building

21. PSL is rightly proud of the wide range of disciplines and prestigious institutions that make it up. In many ways, the main engine of the PSL academic enterprise is the complementarity of the member institution – which enables them to achieve things in research and in education and training that would be impossible to realise alone.
22. Nonetheless, PSL as a federal university is still in ‘start up’ phase, and the institutions and, especially, the colleagues cannot yet know each other fully in all of their specificities and differences. The new PSL website and the PSL Explore website will make a significant contribution here, but are only part of the solution. A variety of approaches to building collective knowledge of the ‘big picture’ and shared pride in PSL as well as in their individual home institutions could be deployed to help to build a deeper sense of the PSL community.
23. Effective internal communication will be imperative, through websites and newsletters, etc. Real-time events also have an institution-building role to play. For instance, receptions hosted in different member institutions could be held to bring together people from across PSL to celebrate institutional or individual successes (the winning of major research funding or of academic honours, etc), networking opportunities could be offered after university-wide consultation meetings, and so on. These social gatherings will complement the academic meetings and help to build the sense of belonging to PSL as well as to a member institution.
24. Common graduation ceremonies would be another way of strengthening the human dimension of the university as a community. Also, the creation of honorary fellowships of PSL would offer an annual opportunity for colleagues to participate in nominating candidates and to attend the conferment ceremonies and receptions – as well as increasing PSL’s visibility nationally and internationally.
25. Internally, PSL has recovered very well from the turbulence caused by the leadership ‘crisis’, and confidence has been rebuilt in the project - and in the new leadership. This process has undoubtedly been strengthened by the enthusiasm for the PSL project of the recently-joined members. It is now, in our opinion, urgent to formulate a persuasive ‘directional narrative’ for PSL. This narrative would respond to the fundamental questions of ‘Who? What? Why? When?’, setting out PSL’s great vision, a short history of its major achievements so far, and, crucially, laying out a road-map with clear milestones for the next few years.
26. While this directional narrative will have significant impact internally, it is vital for the wider world, to whom PSL’s vision and purpose remain somewhat invisible. The formulation of such a narrative seems to us one of the top priorities for PSL if it is to achieve global recognition as a paradigm-shifting integrated research university.

Recommendation 3: Online internal communications have a vital role to play in building a sense of community, though they would benefit from the complementarity of frequent institutional events of a celebratory nature which bring colleagues across PSL together in different PSL venues.

Recommendation 4: A directional narrative setting out PSL's vision, major achievements and a road-map for the next few years should be formulated as a matter of urgency. This will have considerable value both for the internal PSL community and also for the wider world.

Research

27. The framework for facilitating world-class research is currently being defined. SDC recognises the importance of defining a governance structure for research with clear instruments. However, we had some concerns during our interviews in Paris in October that there was yet no research strategy beyond a commitment to a 'bottom-up' approach. We realise that many national research strategies, including that of France, necessarily take a 'top-down' approach and that many scholars and scientists can have resistance to such an approach. However, we felt that, in its capacity as a highly interdisciplinary, federal university, PSL should capitalise on its potential to do more than simply facilitate research and that it could and should create a purposeful framework within the research takes place.

28. We felt that its research strategy should set out a conceptual framework for the creation and support of research programs. We are therefore delighted (and impressed) that since our visit, PSL has crystallised its strategic thinking on research and has decided to invest the majority of its available research funds in a series of PSL 'Grand Programs', all of which will be resolutely inter-institutional in nature and will address issues of national and global significance.

Recommendation 5: We commend PSL on its conceptualisation of its research responsibilities in today's complex global world and on its creation of PSL Grand Programs in research, which will mobilise PSL's incomparable strengths in research in an outward-facing and strategic way.

Public engagement

29. Now that it is well established, PSL should think strategically about how it wants to relate to society at large. Does it, for instance, want to contribute to solving global problems or national or local problems? Or to solving problems at all of these levels? In other words, how will it engage with the world?

30. PSL remains very inwardly focused. This is perhaps inevitable, given the need to build a sustainable and integrated research university. Now, however, it needs to engage much more with the external world and it has to work hard at improving brand recognition.

31. Many of the former students of the PSL institutions are now active at the highest levels in government, public administration, business and industry. They often have great loyalty to the institutions where they studied and, of course, know them well. However, they may not all be

aware of, or fully up to date with, PSL as a federal research university of 24 institutions. Many of these alumni already give great service to their 'home' institutions through existing institutional alumni organisations. However, they also have enormous potential as persuasive ambassadors for the research university that is PSL. Consideration should now be given as to how best to mobilize them in a coherent and structured way, possibly through the umbrella PSL University Alumni Association.

32. While many of the member institutions have vibrant relationships with the business and industrial communities, active knowledge exchange with industry is less well established at the shared ComUE level than is desirable for a research university.
33. SDC applauds the pre-doctoral programme in the Institute of Technology and Innovation (ITI) for students from engineering schools, ENS or science masters programs, where students choose courses in 3 out of 10 disciplines, attend courses on how to create a start-up company, and undertake internships or are placed in laboratories, concluding with a 1-month team exercise to develop a start-up concept that they then pitch to actual investors. We would urge PSL to consider including internships in more postgraduate programs. This would be of enormous benefit to the students and also bring considerable benefit to the university, in terms both of profile-raising and of offering possibilities of long-term strategic partnerships with business and industry.
34. Around the world, there is a growing expectation that universities will engage more fully with the general public – who are, after all, funding them to a great extent through their taxes. Public engagement goes much further than dissemination of research or even knowledge and involves researchers in listening to, developing their understanding of, and interacting with, non-specialists and ultimately, wherever possible, involving members of the public in the formulation of research questions before planned research begins.
35. Many PSL member institutions are experienced in research dissemination, most notably the Collège de France, which has nearly 5 centuries of experience of giving lectures to the general public, many of which are now streamed online. The challenge now lies in moving from a transmission mode to a pro-actively dialogic engagement mode.
36. With the outstanding intellectual and scientific forces that it musters across its member institutions, allied to a strategic commitment to public engagement, PSL could gain a national leadership role in France as a pioneer of participatory research.
37. Much of the fundamental research in PSL has considerable public policy implications and several institutions already have considerable experience of advising law-makers, decision-makers and opinion-shapers. We therefore suggest that PSL develop a public policy strategy, which will establish it as the 'go to' university in France for Government, local and regional authorities and other decision-making agencies seeking evidence-based advice.

Recommendation 6: As part of its outreach and profile-raising work, PSL should seek to involve the alumni of its member institutions as ambassadors for PSL as well as for the member institutions. Consideration should be given as to how best to engage them in a coherent and structured way, possibly through the umbrella PSL University Alumni Association.

Recommendation 7: Public engagement should become an integral part of PSL research and its dissemination – and a defining characteristic of PSL.

Recommendation 8: Building on its leadership position academically in France, PSL should work to become a national pioneer of participatory research.

Recommendation 9: We also recommend that PSL develop a public policy strategy that will enable it to become France’s pre-eminent ‘go to’ university for evidence-based advice.

Education and Training

38. SDC is very impressed by the undergraduate CPES programme, which exemplifies the PSL commitment both to interdisciplinary and to the intrinsic link between research and teaching. We hope that the programme will, as planned, grow and will diversify further its disciplinary and interdisciplinary offerings.
39. SDC met informally with some CPES students and were extremely impressed by them, by their reasons for choosing the CPES ahead of the ‘*classes préparatoires*’ route, by their enthusiasm for their courses and by their mature modes of thinking. It is very encouraging that students go on to study at postgraduate level at a diverse range of institutions, including prestigious overseas universities as well as in PSL itself.
40. There are many areas in which PSL could create interdisciplinary undergraduate programs beyond the CPES. Our discussions revealed that there is a need for the biologists of the future to be identified earlier in their academic careers, and one example could be that of biology and physics, where cross-working between biology and physics in a PSL programme across Institut Curie, ENS and ESPCI could deliver an innovative degree programme.
41. In this context, it was very encouraging to hear research scientists in Labexes state how eager they would be to undertake some teaching at the Masters and even the undergraduate level, even though this is not part of their contracts. It was gratifying also to learn that Collège de France colleagues would be willing to undertake teaching on PSL programs.
42. It is disappointing that progress on the shift of Masters degrees to PSL has been delayed. However, we understand the intra-institutional dynamics behind the delay and we urge the Task Force to think strategically both about the nature of PSL-stamped masters programs and about what their place should be within PSL’s B-M-D offer. We also support the creation of one masters degree per discipline within PSL by 2018.
43. Furthermore, we urge the Task Force to undertake work to map out the educational terrain, identify the gaps that exist in learning today and evaluate the employment and societal needs of France and globally. It will then be possible to formulate an Education and Training Strategy to fill those gaps, to create and implement new teaching models, and thereby to meet those needs.
44. In order both to enhance the course choices of existing students and also to accelerate the creation of new interdisciplinary programs, it will be essential to have a common course calendar among the institutions. We regard this as of the highest priority and urge PSL to meet its target of September 2016 for achieving this.

Recommendation 10: We recommend that PSL, building on the success of its flagship CPES degree, should develop more interdisciplinary undergraduate degrees. We offer one suggestion that arose out of our discussions in Paris, but there will be many other possibilities.

Recommendation 11: We urge the Task Force to think strategically about the nature of PSL-stamped masters programs and what their place should be within PSL's B-M-D offer. Also, we support the creation of one masters degree per discipline within PSL by 2018.

Recommendation 12: We urge the Task Force to formulate an Education and Training Strategy that will set the context and lay out the milestones for the development of new degree programs.

Recommendation 13: We give our full support to the introduction of a common course calendar among the institutions by September 2016.

Identity and image

45. The major questions asked by those outside PSL are (a) what differentiates PSL? and (b) what is it that is more than the sum of its parts? At present, answers to these questions are somewhat long and complex, and work on internal and external communications should seek to distil those answers into a series of 'key messages' that are accessible to all and will be used by all colleagues when speaking publicly.

46. It is good to see that progress is being made in the use of a common signature in publications and in public engagements, with movement from 5% of papers being thus signed at the end of 2014 to 15% in March 2015 and 23% in September 2015, with a projected 30% by the end of December. We urge PSL to do all it can to maintain this momentum and to persuade the Collège de France, who is a member only of the PSL Foundation, to use the signature also.

47. It is encouraging that all ComUE member institutions now include the PSL logo on their websites, and we would urge all PSL colleagues to include the PSL logo on their business cards.

Recommendation 14: We recommend the distillation of 'key messages' from PSL's vision and mission statements and strategic documents, which all colleagues should be encouraged to use in all public engagements.

Recommendation 15: PSL is making steady progress in encouraging colleagues to use the PSL common signature in all publications; PSL should do all it can to persuade all colleagues, including those in the Collège de France to adopt this signature.

Recommendation 16: We urge all PSL colleagues to include the PSL logo on their business cards.

Conclusion

48. SDC was very impressed by all the progress made by PSL since our last report and by the way in which the President and his team have gained the confidence of the community.
49. Our discussions with those whom we interviewed in October and our various independent conversations and other communications with members of the PSL community have confirmed that they have a growing sense of pride in and commitment to PSL as well as their respective home institutions. We found the same pride in the students with whom we talked.
50. We see as key priorities for the next months the following:
 - further action on integration and transparent consensual decision-making
 - the development of 'content-rich' strategies which will set the course for PSL's development over the next few years
 - further action on building institutional cohesion, identity and sense of belonging
 - greater engagement with the wider world beyond PSL.
51. We hope that our Report will be of help to PSL, both in the long term and in its final preparations of its submission to the international jury.
52. Finally, we would like to express our admiration for PSL and for its leadership and colleagues and students.

29 November 2015

Appendix

SL Strategic Directions Committee (SDC)

(Those marked with one asterisk were unable to attend the meetings in Paris on 25-27 October 2015 but have seen and approved the Report; those marked with two asterisks are new members of SDC)

**Professor Dudley Andrew, R. Selden Rose Professor of Film and Comparative Literature, Yale University

Professor Sir Tony Atkinson, Fellow of Nuffield College, University of Oxford

**Dr Jo Beall, Director of Education and Society and Member, Executive Board of the British Council

Professor Gérard Ben Arous, Director of the Courant Institute, New York University

*Professor Dame Jocelyn Bell Burnell, Astrophysicist, Fellow of the Royal Society

**Professor Hubert Girault, Professor of Analytical and Physical Electrochemistry, École Polytechnique Fédérale de Lausanne

Professor Dame Julia Higgins, Physicist, Professor at Imperial College London, and Fellow of the Royal Society

*Professor Pierre Magistretti, Professor of Neuroscience, Director of the Brain Mind Institute, École Polytechnique Fédérale de Lausanne

Professor Andrew Pettigrew, OBE, Professor of Strategy and Organisation, Saïd Business School, University of Oxford

Professor Michael Worton, CBE, Emeritus Professor of Arts and formerly Vice-Provost, University College London (Chair)

SPECIFIC INDICATORS FOR PSL Research University EXCELLENCE INITIATIVES

The scope of data collection for the year 2015 only covers the first three quarters, in fact minimising the results for the last year of the probation period and consequently their comparison with fixed target values in Q4.

Indicator reference	Title	Targets announced in the project			Value at Q4
		Q0	Q4	Q10	
I - EI International Performance					
I-01	Place occupied by PSL among the French leaders in the international rankings after data consolidation	1-3	1-3	1-3	1
I-02	Number of foreign students enrolled in PSL institution courses compared to the number of applicants	1 out of 8	1 out of 10	1 out of 12	1 out of 4
I-03	Number of international applications selected meeting the PSL teaching and research tenders (lecturers and teams)	0	4	8	11
I-04	Number of international partnerships established by PSL with institutions at the top of the international rankings	0	6	10	5

Indicator reference	Title	Targets announced in the project			Value at Q4
		Q0	Q4	Q10	
II - Research Excellence					
I-05	Rating A+ or A of the PLS institutions' Joint Research Units	90%	95%	100%	No rating in 2015
I-06	Number of publications, selective tenders (ERC) and PSL chairs of excellence	20 685 publications 45 ERC 0 chairs	+10%	+20%	+15%
I-07	Number of tenders on innovative subjects in environmental, engineering, theoretical physics, and control research and translational health research, etc. to the credit of EI	Number reported among members	+10%	+20%	+55% compared to 2012

Indicator reference	Title	Targets announced in the project			Value at Q4
		Q0	Q4	Q10	
III – Appeal of the courses					
I-08	Number of students integrated in PSL courses compared to the number of applicants across all stages	N/A	1/20	1/30	15%
I-09	Percentage of scholarship students at PSL compared to the number enrolled at PSL	20%	26%	30%	19%
I-10	Number of students from the partner Secondary School Preparatory Classes affiliated to PSL compared to the total number of students from these partner Secondary School Preparatory Classes	0	60%	90%	Choice of a new partnership model N/A
I-11	Number of students enrolled in undergraduate studies out of the number of applicants		60%	90%	85%
I-12	Number of courses (degrees and masters) ranked A or A+ by AERES (Evaluation Agency for Research and Higher Education)		80%	100%	No rating in 2015
I-13	Number of cross-institutional courses offered to students as MASTER at PSL	0	10	20	69
I-14	Number of PhD students enrolled at PSL (routine enrolment and allocation of doctoral contracts with EI)	0	2 000	2,500	1 234 (following the opening of the Doctoral School)

Indicator reference	Title	Targets announced in the project			Value at Q4
		Q0	Q4	Q10	
IV - Socio-economic impacts					
I-15	Total number of patents filed by PSL (per year)	50	80	100	66
I-16	Number of start-ups created	4	10	10	21
I-17	Number of multiple support partnership contracts negotiated with businesses	Number reported among members	+10%	+15%	1047
I-18	Expert assignments entrusted to PSL by public institutions or private bodies	0	10	15	31
I-19	Cultural and scientific events organised by PSL (rate of permanent PSL events)	0%	50%	80%	66%

Indicator reference	Title	Targets announced in the project			Value at Q4
		Q0	Q4	Q10	
V - Efficiency of Governance					
I-20	Percentage of these indicators and dashboards covered by the decision-making information system	0%	40%	100%	35%
I-21	Rate of "work processes" covered after introduction of information system in the PSL management	0%	100%	100%	50%
I-22	Scope of costs covered after introduction of cost control and PSL management audit tools	0%	75%	100%	40%
I-23	Facilities, multi-support operations pooled and made available to staff of the PSL institutions in these facilities	2%	20%	40%	155%

Indicator reference	Title	Targets announced in the project			Value at Q4
		Q0	Q4	Q10	
VI - Sharing knowledge					
I-24	Introduction of digitalisation equipment for library document collections	Partial	Performed	Performed	53 000 digitisations of document collections as part of Digital Document Week
I-25	Resource viewing rate by the student and researcher community	0%	60%	90%	471 332 resources were viewed by the student and researcher community.
I-26	Number of visitors to the web portal	0	10 million/year	20 million/year	134 637 visits to the PSL website
I-27	Number of course and lecture downloads	0	4 million/year	10 million/year	21,4 million/year

Indicator reference	Title	Targets announced in the project			Value at Q4
		Q0	Q4	Q10	
VII - Campus life					
I-28	Setting up and evaluation of the PSL Alumni networks	Qualitative data			The PSL Alumni network has been created
I-29	Number of cross-institutional student initiatives and students involved in mentoring programmes for disadvantaged socio-economic classifications	Qualitative data			80 new student initiatives supported by PSL, among which are programmes for disadvantaged SECs.
I-30	Feeling of belonging and satisfaction indices of French and international students	Data to be prepared			The feeling of belonging and the satisfaction index of French and international students with the PSL courses from the Institute of Technology and Innovation (ITI) syllabus has been evaluated by PSL and are very satisfactory.