Pre-selection phase

Acronym of the project	**CPS**
Project title in French	*Campus Paris-Saclay*
Project title in English	*Paris-Saclay Campus*
Project manager	**Paul Vialle** **Fondation DIGITEO TRIANGLE DE LA PHYSIQUE** **Les Algorithmes - EURIPIDES** **Route de l'Orme des Merisiers** **RD 128** **91190 Saint Aubin**
Institution leading the project (Project leader)	**Digiteo Foundation for scientific cooperation – Physics triangle**
Capital grant requested (a)	**1500 Million €**

(a) see the regulations pertaining to the means of awarding grants in the context of the call for Excellence Initiative Projects (§ 4.1)

Structure of the Idex partnership

Table a

The foundation for Scientific Cooperation and its twenty-two members

Higher education and research institutions	Research Organisations	Other
Paris-Sud 11 University	Atomic Energy and alternative energy Commission (CEA[2])	Foundation for scientific cooperation « Digiteo Triangle of physics»
Versailles Saint-Quentin University	French national aerospace research center (ONERA)	SYSTEM@TIC Paris region Competitiveness cluster
AgroParistech	Institute for Higher Scientific Studies (IHES)	
Ecole Centrale Paris	National Institute for Agronomic Research (INRA)	
HEC Paris	National Center for Scientific Research (CNRS)	
Ecole Nationale Supérieure des Techniques Avancées ParisTech (ENSTA ParisTech)	National Institute for Research in Data Processing and Automation (INRIA)	
Ecole Normale Supérieure de Cachan		
Ecole Polytechnique		
Institut d'Optique Graduate School		
Institut Télécom		
Mines Paris ParisTech		
National School of Economics, Statistics and Finance (ENSAE Paris tech)		
Supélec		
PRES ParisTech		
PRES UniverSud Paris		

Table 1b

Additional partners (see section 2.6.2)

Higher education and research institutions	Research Organisations	Other
		Ile de Science
		IncubAlliance
		Optics Valley
		Scientipôle Savoir Société
		Soleil

Table of Contents

1 AMBITION AND STRATEGY OF THE PROJECT-

1.1 A shared ambition

1.1.1 Vision

Over the last fifty years, human societies have been confronted by unprecedented upheavals in their ways of life, in particular as a consequence of progress in knowledge and technological evolutions. For individuals as for organisations, knowledge is more than ever an essential factor of development. This situation has a deep impact on the relationship between activities and territories: the attractiveness of the latter has an ever increasing dependence on intellectual resources, as can be witnessed by the "clusterizing" dynamics of research activities, learning and development observed throughout the world.
In this context, the ambition of the *Paris-Saclay Campus* developers is to create, in the southwest of Paris, one of the first human communities devoted (dedicated) to higher education, research and innovation, which is to be integrated and maintained at the level of world-class leader of multi-theme and multidisciplinary university campuses, capable of attracting the best talents. Resolutely committed to this project since nearly three years, nineteen higher education and research institutions, together with the collaborative mechanisms they have already implemented and a competitiveness cluster, have decided to bid in the Excellence Initiative call for projects, in order to accelerate their cooperative dynamics and progress more rapidly towards their common objective. They have included in this effort the 'Soleil' synchrotron, and four associations in which they have a strong influence, which have activities corresponding to the themes developed in this project.

1.1.2 The Paris-Saclay Campus Project

The Paris-Saclay Campus project associates nineteen institutions representing the diversity of the French higher education, research and innovation system, with the backing of a highly significant financial commitment from the state, which has the ambition of transforming the university environment and facilities, and endowing France with world class multidisciplinary clusters of excellence. At the crossroads between the country's policies in terms of education-research-innovation, and land planning, this project benefits from the contributions of the recovery plan, the campus plan, and the "investments for the future" program which will finance the transformation of the Paris-Sud 11 University, the arrival at Saclay of seven higher education and research institutions, and the creation of a series of joint laboratories as well as shared facilities related to these activities. The dynamics of bringing these institutions, which are recognised for the excellence of their research and teaching, physically closer together is accompanied by the implementation of actions aimed at synergizing their skills. Following the arrival of the project's partner institutions, the Saclay site will represent 30 000 students[1] and altogether 20 000 engineers, researchers or research professors. The Versailles-Saint-Quentin University, representing a total of 18 000 students and more than 2000 researchers or research professors, is also a partner in this project.

The ambition of the campus stakeholders is to capitalize on this potential in order to raise Saclay to the level of leading European campuses and to position it among the first ten in the world. The project is based on the conjugation of talents from a significant and varied pool of *national champions*, in order to bring to fruition and to development a major, attractive, international site, thanks to the implementation of novel cooperative mechanisms. In this perspective, the *Paris-Saclay Campus* partners wish to be positioned at an international level in five major domains:

- Mathematical Sciences and natural sciences

1 *Engineering school, or Masters 1 or 2 university course*

- Climate, Earth Sciences, Science for Energy,
- Computer Science, Systems and Engineering Science,
- Basic and Applied Life Sciences,
- Economics, Management, Humanities and Social Sciences.

In the first four of these domains, Saclay is a highly visible cluster, with more than 1% of worldwide publications. This group of institutions is capable of competing with world-class sites such as MIT, Stanford or Cambridge. Although the last domain has a relatively lesser weighting, with approximately 0.5% of worldwide publications, it is judged to be vital for a campus dominated by so-called 'natural' sciences. In terms of scientific excellence, the first three sectors are globally above (sometimes considerably so) the worldwide average, and will represent pivotal themes around which the partners will develop the campus (see Table 4, page 23).

1.1.3 A shared strategy

In 2008, the Campus plan of the French Ministry for Higher Education and Research launched a strong, irreversible movement towards the integration of its institutions, which has resulted in a common project for the future *Paris-Saclay Campus*, which takes scientific as well as real estate aspects into consideration[2]. Over the last two years, these institutions have elaborated the following strategy:

- Collectively ensure the reinforcement of research excellence for a selection of single-discipline themes and extensive multidisciplinary themes with major societal implications.
- Launch a global teaching approach, with the aim of developing course offerings to a very high scientific level and with strong social relevance, thus contributing to the improvement of the country's competitiveness, and very significantly raising the campus' attractiveness for students and research professors, on a world-wide level.
- Bring the academic world and that of industry closer together, through the encouragement of collaboration between research workers and engineers on shared infrastructure projects, by strengthening the efficiency of valorisation mechanisms, and by implementing a shared monitoring activity at the crossroads between scientific domains and major themes of social or economic interest.
- In liaison with the other involved actors, transform the Saclay campus into an attractive, pleasant place to stay.
- Develop a strong international image for the *Paris-Saclay Campus*.

In the past three years, many steps have been taken towards the construction of a working community, and the management of change. Through modifications to the statutes of the Foundation for Scientific Collaboration, which is the project leader, a governance mechanism taking the dimensions of the campus into account is currently being adopted[3]. The present "Initiative for Excellence" project takes advantage of this new framework, thus advancing a further step in the direction of stronger mutual integration of its activities. Two levers are used: a series of six ambitious transverse projects led by the institutions, and the implementation of an organisation growing by experience, with four and ten year phases.

2 http://www.campus-paris-saclay.fr/content/download/499/3123/version/1/file/Rapport-PlanCampusSaclay-Tome1.pdf
http://www.campus-paris-saclay.fr/content/download/498/3120/version/1/file/Rapport-PlanCampusSaclay-Tome2.pdf

3 ***xx*** institutions from the 23 partners listed in Table 1 had given their approval, on the submission date of the project.

1.2 The Initiative for Excellence

1.2.1 The Perimeter of Excellence and the projects

The Initiative for Excellence is a set of processes aimed at transforming the complete site, raising its level to that of world-class campuses, with a strong impact on the French national territory. The driving force of this transformation, the initiative for excellence perimeter, is made up from several components:

- Firstly, the full set of projects submitted to various calls for projects from the "investment for the future" programme (LABEX[4], IHU[5], IRT[6], IEED[7], EQUIPEX[8],...) listed in Table 2, page 10.

- Then, a set of novel projects, selected for their contributions to the Campus' strategic project, which have been put in place to organise the transversal aspects between the various institutions and disciplines, and to structure their external partnerships. With different presentations, corresponding to their objectives, they are related to education, research and innovation, and to the improvement of the attractiveness of the *Paris-Saclay Campus*.

It is within this perimeter that most of the means arising from future investments in the Campus will be concentrated. On the other hand, the actions will be implemented in order to create mutual stimulus between all of the Campus components, and reinforcing their common good.
The initiative for excellence will be implemented in the form of a project, run in the framework of the foundation's new structure. It will be broken down into six transverse sub-projects: 1) reinforce excellence in research, 2) develop a global approach in teaching, 3) develop innovation, 4) improve life on the campus, 5) develop the TICE and 6) promote the Paris-Saclay Campus at the international level. After a period of four years, with the hindsight of their acquired experience, the partners will pass on the project structure to a possibly renewed organisation, in order to achieve a more permanent implementation of the structuring and incentive tools. The ten-year objective is to achieve a governance organisation allowing a new phase to be launched, leading to the pooling of teaching, and the coordination of research and innovation.

1.2.2 The structuring momentum

Over recent years, a stronger collaborative momentum has become commonplace on the Saclay site. To cite just two examples, 19% of publications in 2008 involved intra-campus collaborations, of which half involved different sites (this rate was 14% in 2004). In 2010, the calls for projects of the "investment for the future" program will lead the partners to turn a new corner. Indeed, they are resolutely committed to favouring a site-oriented policy, with the FPRD (European Framework Programme for Research and Technological Development and the ANR (French National Research Agency) preferring networked programs. This event will transform the Saclay site, by introducing two new dimensions.

- Firstly, unprecedented collective work through the creation of common entities, or major inter-institution projects such as the six sub-projects described in the above

4 French acronym for "Laboratory of excellence", a call from the French programme "Investments for the future"

5 French acronym for "University-Hospital Institute" a call from the French programme "Investments for the future"

6 French acronym for "Institute for technological research", a call from the French programme "Investments for the future"

7 French acronym for "Institute for Excellence in the field of low carbon energy", a call from the French programme "Investments for the future"

8 French acronym for "Facilities for excellence", a call of the French programme "Investments for the future"

list. They will thus be implemented by a first circle of **xxx people** recruited from all of the institutions.

- In addition, this project will for the first time involve a large number of employees and students, who will be the actors of the site's construction and image.

In terms of the site's structure, the effect will be considerable:

- **An acceleration of the site's innovative capacity**, with projects such as the creation of technological institutes (IRT[6] and IEED[7]), the strengthening of the common infrastructure for the management of intellectual property and research exploitation (SATT[9]) and the arrival of research and business start-up centres, the growth of industrial partnerships, including SMEs, and the accompaniment of young technology start-ups.

- **The structuring of scientific activities** to an unprecedented scale, whether this be from the impetus of the LABEX[4] and EQUIPEX[8] programs, or be foreseen in the Initiative for Excellence (see Section 3.1, page 21).

- **Structuring of the global course offering**, which goes beyond the strategies of each of the Institutions and encourages a rapprochement between universities and engineering schools, promoting the transition between the Masters and PhD levels, and assuring their affiliation with research of an excellent standard.

- The construction of an **international image**.

1.3 Socio-economic sphere

1.3.1 Impact on the socio-economic sphere

Within a radius of approximately fifteen kilometres, the Campus benefits from the presence of numerous R&D centres belonging to large industrial groups (aeronautics, agribusiness, automobile and transportation, energy, computing, health, security and defence, telecommunications). Demonstrating their confidence and interest, numerous companies are currently studying direct partnership opportunities. By 2015, five companies will already have installed their research centres within the campus area, involving more than 2000 research engineers. The dense network of SMEs also represents a significant asset. The objective set by the campus stakeholders is to turn the *Paris-Saclay Campus* into an outstanding location for innovation and technology transfer. Among the foreseen actions:

- A strong intensification of exchanges with industrial R&D. The Campus will take advantage of the ecosystems already put into place by the competitiveness clusters[10] and company clusters[11], and will become more strongly involved with the chambers of commerce and industry of the local area, in particular those of the French departments of Essonne and Yvelines.

- Research and exploitation interactions, with the generalisation of "technological maturation" actions. The tools associated with this action will correspond to the SATT[9] and the Carnot institutes.

- The development of a spirit of entrepreneurship, in particular with students and research workers. The target is to achieve the opening of around fourty start-ups per year on the site.

9 French acronym for "Company for acceleration of technological transfers", a call from the French programme "Investments for the future"

10 ADVANCITY, ASTECH, CAP DIGITAL, FINANCE INNOVATION, MEDICEN, MOV'EO, SYSTEM@TIC PARIS-REGION

11 Optics Valley, Teratech, etc.

- Participation in the various jurisdictions involved in the elaboration of territorial policies related to Innovation and Economic development: regional SRDEI[12], territorial development contracts within the EPPS[13] framework, etc.

- Public decision-making, including a contribution towards the elaboration and evaluation of public policies, support towards establishing standards; accompaniment of processes related to the exercise of democracy related to scientific and technological options.

1.3.2 Societal impact of research

A major stake of this shared ambition is to achieve a very considerable improvement in our capacity to meet major societal challenges, especially those put on the forefront by the French national strategy for research and innovation:

- Health, Well-being, Food and Diet, and Biotechnologies

- Environmental urgency and Ecotechnologies

- Information, Communication and Nanotechnologies

The impact of this will be all the more extensive if the following conditions are met:

- A multidisciplinary approach: taking the major questions into account often requires the coexistence of highly varied disciplines (understanding of living beings and the environment, abilities in abstract thinking and modelling, ability to design technical objects). To cite just a few examples taken from the LABEX projects: a joint approach between physics and medicine, nanomedicine, the merging of agronomy and ecology, links between mathematics and industry…

- The strong relationship between research and industry, contributing towards the elaboration of rapidly and effectively implemented solutions. In return, by translating the engineer's problems into scientific problems, engineering sciences will lead to the emergence of new fields of knowledge, at the interface between basic disciplines, and will lead to the progression of these disciplines by testing the predictability and complexity of their concepts and models.

Finally, the partners will work towards the intensification of communications with the general public, and the implementation of discussion forums.

2 Structure and characterization of the Initiative for Excellence

2.1 Presentation of the project leader

The Scientific Cooperation Foundation (FCS) was created in 2007 to provide two government-approved Advanced Research Thematic Networks (RTRA) with a legal personality: one deals with information and communication technologies (DIGITEO), and the other with physics (the so-called "Triangle of Physics"). At that time, these networks involved nine "founding" institutions and their associated partners. These two networks were among the first examples in Saclay of a large-scale mobilization of the institutions, to share common programmes. The FCS was thus able to receive funds intended to stimulate scientific cooperation projects in the Plateau de Saclay area, for a yearly expenditure of the order of 8 M€.

In 2009, the foundation expanded its field of activities by becoming a promoter for the "Paris-Saclay Campus project", on behalf of twenty-two institutions: research organizations,

12 French acronym for "Regional strategy for economical and innovation development"

13 French acronym for "Public institution Paris-Saclay"

higher education and research establishments, a competitiveness cluster and two Research and Higher Education Clusters[14]. The number of "founding" organizations remained unchanged (nine) and the project was ruled by a consortium agreement between the Foundation and the twenty-two research organizations.

In 2010, the "Fondation Mathématique Jacques Hadamard", hosted by the FCS, is created. It will have the specific task of coordinating action by mathematicians and opening the way to broader activities at the interfaces.

The next step, at the very beginning of 2011, amends the statutes of the FCS. All of the institutions become members of the foundation, allowing simplified management of the "project Paris-Saclay Campus". The statutes also fully include the additional mission of coordinating actions aimed at the emergence of the Paris-Saclay Campus project, and acting in the field of training, research, and innovation in the frame of a common strategy (see section 4.2 page 42). It is in this new framework that the foundation is submitting an Initiative for Excellence project, the aim of which is to implement large-scale collective actions in order to bring the Paris-Saclay Campus to the highest level. The resources collected for the "Initiative for Excellence" (including those from the partners) represent a fifteen-fold increase in the budget for collective actions.

In the medium term (4 years and 10 years), it is expected that further steps will be taken towards an even stronger cooperation, taking into account the experience gained during the collective actions described in the present proposal.

2.2 Application to the actions of the "Investments for the Future" programme

The project partners are involved in approximately fifty projects, submitted to the "Investments for Future" calls for Projects, which can be broken down as follows:

- Twenty LabeX projects of which eighteen are part of the "Initiative for Excellence" and two are regional or national networks (IPSL and CARMIN);
- Thirteen EQUIPEX projects which have been accredited by the Foundation;
- Two Institute of Excellence projects in the field of low carbon energies (IEED);
- A project from the IRT (Institute for Research and Technology);
- One project for a Technology Transfer Acceleration Company (SATT);
- Two University Hospital Institutes (IHU);
- Five "cohort" projects;
- Five "Biotechnology, bio-resource" ("bio-bio" in Table 2) projects;

Table

Projects submitted to the "Investments for the Future" programme.

Call
Project acronym
Coordinator

14 The twenty two first institutions listed in table 1 page 2

Consortium (in red = partners not listed in table 1page 2)
IDEX

P. VIALLE
FCS-AgroPT[15]-CNRS-CEA-ECP[16]-X[17]-ENS Cachan-ENSAE[18]-ENSTA[19]-HEC-IHES-INRA-INRIA-Institut Telecom-IOGS[20]-Mines[21]-ONERA-Paristech-UniverSud Paris-Supélec-System@tic[22]-UPS[23]-UVSQ[24]
SATT
SATT
D. VERNAY

AgroPT, CEA, CNRS, X, ECP, ENS Cachan, ENSAE , ENSTA, HEC, IHES, INRA, INRIA, Inst. Telecom, IOGS, Mines, ONERA, Supélec, UPS, UVSQ

- **Basic and Applied Life Sciences**

About 3000 researchers or faculty members - 57% are involved in these projects

- This field represents 30% of Saclay's publications

LABEX
ACTE
B. NEY
AgroPT-CEA-CNRS-FCS-INRA-UPS-UVSQ
LABEX
ALIAS
G. TRYSTRAM
AgroPT-CNAM-FCS-INRA
LABEX
IDEEV
P. CAPY
AgroPT-CNRS-FCS-INRA-IRD-UPS
LABEX

LERMIT
R. FISCHMEISTER
CEA-CNRS-ENS Cachan-FCS-INSERM-IGR[25]-UPS-AP-HP –Marie Lannelongue Surgery Center
LABEX
LIPHYMED
J. BITTOUN
CEA-CNRS-FCS-INSERM-UPS-Paris Diderot
LABEX
MOLCELL
F. BOCCARD
CNRS-CEA-X-ENS Cachan-FCS-INRA-UPS
LABEX
NeuroScaleX
P. VERNIER
CEA-CNRS-X-FCS-INSERM-UPS
LABEX
SPS

15 AgroParisTech

16 Ecole Centrale Paris

17 Ecole Polytechnique

18 ENSAE ParisTech

19 ENSTA ParisTech

20 IOGS ParisTech

21 Mines ParisTech

22 System@tic Paris Région

23 Paris-Sud 11

24 Université de Versailles-Saint -Quentin

25 Institut Gustave Roussy

L. LEPINIEC
AgroPT-CNRS-FCS-INRA- UPS-UVE
EQUIPEX
Métagénel
J. DORE
AgroPT-INRA
EQUIPEX
MORPHOSCOPE
J.-L. MARTIN
X-CNRS-INSERM
IHU
IHU-Cancer
A. EGGERMONT
Institutes: UPS- INSERM- CNRS
Companies: ARIIS, Roche, Servier - IG R&D
NGOs: *Association for Cancer Research(ARC)*+ ..
IHU
IHU Foie
D. SAMUEL
UPS, AP-HP- INSERM
Cohorts
E4N
BIO-APPLI
F. CLAVEL-CHAPELON
UPS-INSERM
Cohorts
HOPE-Epidémiologie
J.CLAVEL
UPS-Inserm-Social Welfare- Marseille Hospitals- and University of the Mediterranean

Cohorts
CKD-Rein

B. STENGEL

UPS-Inserm-Biomedicine Agency Arbor Research-Univ. de Picardie- Univ. de Bordeaux -« Hospices Civils de Lyon »- Hôpital universitaire de Nancy-Univ. de Lyon 3-Biobanque de Picardie-National Genotyping center.
Cohorts
SAGE
B. FALISSARD
UPS and Sanofi-Aventis
Cohorts
NutriNet
S. Hercberg

Infra
CRB Anim

M. TIXIER-BOICHARD
INRA
Infra
FRENCH METABOPOLE
C. JUNOT
CEA, INRA
Infra
PHENOME
C. MEYER
INRA
Infra
GENOSCOPE 2020
P. WINCKER,
P. RENAULT
CEA- INRA
Infra
ICNG

M. LATHROP
D. BRUNEL
CEA-INRA
Infra
RENABI-IFB
J –F GIBRAT
CEA-CNRS-INRA-UPS
Infra-
FRISBI

B. ROBERT,
CNRS
Infras

France Bioimaging

N. PEYRIERAS
B. SATIAT-JEUNEMAITRE
CNRS
Bio-bio
AMAIZING
A. CHARCOSSET

Bio-bio
GENIUS
P. ROGOWSKY

Bio-bio
BREEDWHEAT
C. FEUILLET

Bio-bio
HYBRIDOIL
M. RENARD

Bio-bio
BIOMASS
H. HÖFTE

- **Climate, Earth Sciences, Sciences for Energy**

About 1500 researchers or faculty members, 43% are involved in these projects.

- This field represents 9% of Saclay's publications[26]

LABEX

IPSL
H. LETREUT
CEA-CNRS-CNES-ENS-X-FCS
IRD-UPMC[27]-UVSQ- Paris 12 - Paris 7
EQUIPEX
PACEC
C. COLIN
CEA-CNRS-UPS-UVSQ
IEED

CLAIRE

Y. CARISTAN
AgroPT- CEA-CNRS- X-ECP-ENS Cachan-ENSTA- INRA-Mines, ParisTech-UniverSud Paris- Supélec- UPS-UVSQ
IEED
IPVF
X. MICHEL
CNRS-X-Chimie ParisTech + Industriels

- Computer science, Systems and engineering Sciences and nanotechnology
- About 2900 researchers or faculty members involved - 63 % involved in these projects
- This field represents 32% of Saclay publications[28]

IRT
SYSTEM X

D. VERNAY
AgroPT- CEA- CNRS- X- ECP- ENS Cachan- ENSAE - ENSTA- HEC- IHES- INRA- INRIA- Inst. Telecom- IOGS- Mines- ONERA- Supélec- UPS- UVSQ- Paris 6 et Paris 7
LABEX

Digitex

H. COMON-LUNDH

26 Not including "science for energy" which cannot be separated from "Engineering"

27 Université Pierre et Marie Curie

28 Scope: Computer Science, Materials Science, Engineering (Nanotechnology is not an ESI discipline)

CEA-CNRS-ECP-X-ENS Cachan-ENSTA-FCS-INRIA-Mines-Inst. Telecom-Supelec- UPS-UVSQ
LABEX

LaSIPS

P. BOMPARD
CEA-CNRS-X-ECP-ENS Cachan-ENSTA-FCS-Mines -EdF-ESPCI-Supelec-ONERA-UPS
LABEX
Nano Saclay

C. CHAPPERT
CEA-CNRS-ECP-X-ENS Cachan-FCS-IOGS-ONERA-INRIA-UVSQ-SOLEIL-Thales- UPS-UVSQ
EQUIPEX
Digiscope
M. BEAUDOUIN-LAFON
CNRS-INRIA-ECP-ENS Cachan-FCS-Inst. Telecom-Supélec- UPS-UVSQ
EQUIPEX
MATMECA
D. ABBE
ECP-ENS Cachan-ENSTA-X-Mines-Onera
EQUIPEX
Innov-Xes
M. DURANTON
CEA-CNRS-ENS Cachan-ENSTA-INRIA-Inst. Telecom-Supélec-UPS

Mathematical Sciences and natural sciences About 3600 researchers or faculty members - 50 % are involved in these projects This field represents 52% of Saclay's publications			
LABEX	**CARMIN**	C. VILLANI	UPMC-CNRS-IHES-MESR-SMF-UNESCO
LABEX	**FMJH**	Y. LASZLO	CEA-CNRS-X-ENS Cachan-ENSTA-FCS-IHES-INRIA-Inst. Telecom-UPS
LABEX	**P2IO**	G. WORMSER	CEA-CNRS-X-FCS-UPS
LABEX	**CHARMMM**	J-P MAHY	FCS, UVSQ, X, ENS Cachan, CEA, ECP, UVE[29], UPS
LABEX	**PALM**	M. MEZARD	CNRS-CEA-ECP-X-ENS Cachan-ENSTA-FCS-ONERA-Institut d'Optique-Soleil-Thalès-UPS-UPMC
EQUIPEX	**THOMX**	VARIOLA	CEA-CNRS-ESRF-SOLEIL-THALES-UPS-Bordeaux 1
EQUIPEX	**CILEX**	F. AMIRANOFF	CEA-CNRS-X-ENSTA-IOGS-UPS
EQUIPEX	**TEMPOS**	O. STEPHAN	CEA-CNRS-X-IOGS-UPS
EQUIPEX	**COGIS**	J-P MEYER	CEA-CNRS-X-UPS
EQUIPEX	**C2M**	B. POUMELLEC	CNRS-ENS Cachan-X-UPS-UVSQ
EQUIPEX	**Rapsody**	P. BOURGINE	AgroPT-CNRS-X-INRA-INRIA
Economics, Humanities and Social Sciences About 1200 researchers or faculty members- 37% are involved in these projects This field represents 3,2% of Saclay's publications[30]			
LABEX	**6S**	P-P ZALIO	CEA – CNRS-X-ENS Cachan-ENSAE-FCS-HEC-INRA-UVSQ-UPS
LABEX	**ECODEC**	A FRACHOT	X-ENSAE-FCS-HEC
LABEX	**LISI**	M. AKRICH	X-FCS-HEC-Inst. Télecom-Mines
EQUIPEX	**CASD**	A. FRACHOT	INSEE-ENS Cachan-X-GENES-GIS Réseau Quetelet-HEC

2.3 Excellence perimeter, environment, prospects and added value

2.3.1 Perimeter of the Initiative of Excellence and its evolution

The basis of the Initiative of Excellence is composed of mechanisms derived from calls for projects of the Investments for the Future programme, which will have been selected. These are already the product of intense, mainly multi-institutional work, the promotion of the strengths of the Campus, and the development of projects designed to reinforce the latter. The following aspects also contribute to this basis:

29 Université Evry Val d'Essonne

30 The publication database used for this study was not adapted to this disciplinary field.

- Research-teaching and innovation projects, designed to accelerate the emergence of new skills in the selected fields of innovation, according to their quality and strategic nature;
- Permanent coordination and pooling processes, committed to dedicated task forces, in order to amplify the collective action capability of the institutions.

Starting from this initial framework, which affects nearly 6500 persons (i.e. 50% of the total staff) inside the institutional perimeter of the *Paris-Saclay Campus*, the dynamic forces of the Initiative of Excellence will create a virtuous circle, applying its force both within the Campus, and beyond, through its association with stakeholders located in the associated areas.

2.3.2 Evolution of the perimeter

The researchers and research-professors at the *Paris-Saclay Campus* will be directly concerned by the Initiative for Excellence, through the influence of two different factors:

- Firstly, some of the implemented tools (see section 2.4.1, page 14) are intended to be used by the researchers and research-professors of the entire campus, and in some cases from beyond, as described below. In the first instance, this concerns collective activities and actions related to the infrastructures. Special mention should be made of the assistance mechanism for the creation of high-level teams (see section 3.1.2, page 24). Although the LABEX projects are a natural target for this mechanism, this will not be an exclusive situation. Through this mechanism, new teams will have access to the highest international level. The same applies to the training actions which, although implemented by a limited circle of actors, are destined to the structuring of the complete system. Finally, the mechanism developed to amplify links with industry, in particular the IRT and SATT, are of relevance to the whole site, with the expectation that the LABEX projects will become particularly dynamic partners.
- **The perimeter of excellence** itself is destined to evolve. Firstly, as a function of the evolution of the "instruments" funded by the Investment Programme, such as the LABEX projects, which will be able to integrate new teams. Moreover, the foundation's stakeholders, who were not initially included in the perimeter of excellence, will in turn be mandated through the Initiative for Excellence with the responsibility of some projects. In the longer term, the perimeter of the LabeX will need to evolve, and other thematic programmes similar to the current LabeX will emerge within the ten-year time frame.

2.3.3 Openness to the outside world

The knock-on effect of the Initiative of Excellence extends far beyond the context of the site.

In the first place, the *Paris-Saclay Campus* is at the heart of a region. A noteworthy statistic is given by the fact that 29% of the campus' publications are already produced in collaboration with laboratories from the Ile de France area, mainly Paris (18% of publications have a "Parisian" author), Essonne (5%) and the Val de Marne (4.4%). Saclay is thus at the heart of a node with strong regional collaborations, which are:

- Institutional, with the region being reinforced by the presence of two PRES partners in the project. Several "Initiative for Excellence" actions are included in the region's priorities, in particular: the living and study conditions of students, support for scientific employment, reinforcement of research in the Ile-de-France area, through networking of its actors, the improvement of student living conditions, and the development of a dialogue between Science and Society.
- Scientific. There are areas of strong collaboration with the Satory Plateau, related to the theme of mobility (IEED Vedecom), health with the "Val de Bièvre", the

University of Evry-Val d'Essonne and the Genopole, the sustainable city theme with East Paris and Versailles. *Intra muros* Paris is a privileged partner for a wide range of disciplines. Saclay is thus included in varied regional networks: first and foremost, the PRES and the University of Versailles Saint Quentin are developing activities in the region. More generally, scientific activities are often integrated into regional networks (Pierre Simon Laplace Institute, Ile-de-France Federation for the mechanics of materials, …).

It should be noted that the aforementioned activities include the most relevant regional partners. The same applies to the various French "Large Public Loan" projects: In Table 2, page 11, the Ile-de-France partners are indicated by the use of a red font colour. The site's partners are strongly involved in the mechanism of the fourteen "DIM"[31] fields of major interest (DIM) of the Ile-de-France regional council, and actively contribute towards the activities of 7 of these.

Secondly, the Saclay site is included in a growing set of collaborative circles. Firstly at the national level, through the organisms and national alliances which link Saclay to national policies, but also through numerous collaborations. According to a study released by the INIST, the most favoured collaborations of the partners outside the Ile-de-France area are thus established with the Rhône-Alpes region (7.9% of publications), the Provence-Alpes-Côte d'Azur region (3.8%) and the Midi-Pyrenees region (3.3%). International collaborations are dealt with in section 2.7, page 19.

2.4 Added value of the Initiative for Excellence

2.4.1 A coordinated set of projects

The evolution of the *Paris-Saclay Campus* is based on a series of coordinated projects, which are presented in Table 2, page 10. There are three types of project:

- Projects designed to generate excellence and structuring in specific fields: EQUIPEX[8], LABEX[4], IHU[5], IEED[7], …
- Tools providing specialised functions (SATT[9] and IRT[6]), but able to relate to many disciplines.
- The "Initiative for Excellence", which is a set of six projects: 1) reinforcement of excellence in research, 2) development of a global approach to education, 3) development of innovation, 4) improvement of campus life, 5) development of TICEs, 6) promotion of the *Paris-Saclay Campus* at the international level. These six projects make use of the other tools of the "Investments for the Future" programme, whilst at the same time providing them with a meaning, by coordinating their activities similarly to the conductor of a symphony orchestra.

2.4.2 The tools of the Investments for the Future programme

Eighteen LABEX projects were presented by the partners in the context of the Paris-Saclay "Initiative for Excellence" (see summary in Table 3). Among the actions adopted by the LABEX projects:

- Elevate research to the highest level: this translates to essential tools for the promotion of fields of excellence and for the development of the research structure, whether it involve excellence related to disciplines[32] or research into the challenges of

31 Des présentations annuelles des activités et des projets des groupes d'établissements seront effectuées, notamment devant le CA de la FCS, afin de mettre en exergue ces convergences partielles et leur cohérence avec la démarche générale de la FCS, et visant à développer sur le Campus l'indispensable « affectio societatis » la plus large.

32 PALM, P2IO, CHARMMM, MolCell, Nano-Saclay, NeuroScaleX, FMJH, ECODEC,LISI, 6S, IDEEV , SPS

society[33]. In particular, they have a strong structuring role and the real capacity to renew the fields of research. They devote nearly 73% of their budget, in terms of full cost, to this theme.

- Educational Excellence: This is organised around a given theme, a meeting place between teams with various horizons, for the preparation of new pedagogical projects, with an international visibility, involving numerous institutes. They use 19% of their full cost budget for this theme.
- Innovation: the LABEX projects are designed to reinforce the innovative capabilities of the campus by supplying a forum for collective thinking on these themes. Above all, they will be the stepping stone to the major mechanisms (SATT, IRT, Carnot Institutes) established on the campus. They spend nearly 8% of their full cost budget on this theme, which can be explained by the fact that most research exploitation actions will be dealt with centrally (see below).

Table 3

Mean data per LABEX (average of 18 projects related to IDEX)

Researchers and Research-Professors	305
ITA[34] and IATOS[35]	150
PhD students	212
Post-doc students and fixed-term contracts	77
Aid requested per year	1.54 M€
Of which, for the personnel …	0.86 M€
Full yearly cost of the LABEX (M€)	43.31 M€
% of the full cost applied to research	72.8%
% of the full cost applied to teaching	19.0%
% of the full cost applied to innovation	7.6%

In parallel, major projects in terms of innovation have been submitted. The annual full cost budgets associated with these instruments represent a total of the order of 80 M€[36].

- **The technological research institute** IRT System X, which will unite the strengths of several partners on a large, system-devoted industrial research platform. It will accommodate development projects based on technological building blocks, either between campus partners, or in partnership with industry.
- **The SATT**[37], which will unite the research exploitation activities of higher education and research institutes, in particular those which did not previously have the critical size. This will manage the technological maturation (analysis of the possibility to innovate, starting from a scientific result, either from the technological point of view, or from that of the market). It will also generate its members' patent portfolio.

33 ACTE, ALIAS, LIPhyMed, LERMIT, LASIPS, Digitex et les projets IHU et IEED, LASIPS, Digitex

34 *Engineers, technicians, administrative agents*

35 *Engineers, administrative agents, technicians, workers and staff members*

36 Total for all of the proposed projects: IRT 30 M€, SATT 20 M€, 15 M€ for each IEED

37 French acronym for company for acceleration of technological transfer

- The mechanism will be complemented by other tools, designed to generate the critical mass needed by technological research projects in more specialised fields. Among these, are **two IEED projects**[38] (CLAIRE and IPVF), of which the former is dedicated to the field of energy and greenhouse gases, and the other is related to the field of thin film photovoltaic energy. Mention should also be made of the **Carnot Institute projects** currently being prepared, in the light of the experience gained since 2006 by the six Carnot Institutes located on the campus[80].

2.4.3 Contributions of the Initiative for Excellence

- ***In the field of research***

The contributions of the Initiative for excellence will be made on generic topics:

- It will integrate the LABEX projects into a broader mechanism of activities, centred on broad thematic topics (see Table 2, page 10). Symmetrically, the LABEX projects will be perceived as an excellent transmission belt between teams and the campus. The pooling of infrastructures, in sectors (e.g. biology) in which the infrastructures exceed the context of a single LABEX, will also be integrated into this context.
- It will establish the organisation of meetings between the LABEX for the exchange of experiences, and of ideas concerning good practice.
- A flagship action of the Initiative for Excellence will be the provision of assistance in the creation of young teams. This includes measures designed to establish young, high potential researchers on the site. This action is perfectly complementary to the LABEX projects. The latter have a high capacity to attract top-quality researchers to temporary positions, such that it will be possible to offer a tenured position to some of these researchers, within the framework of the Initiative for Excellence. The LABEX projects can thus be complementary to the assistance provided by the campus, to young teams formed through this action.

- ***In terms of education***

The "Initiative for Excellence" will be based, on one hand, on novel, change-generating education projects, with a stronger integration, and national and international visibility, and on the other hand, on education projects proposed in the different LABEX, IRT, and IEED structures. The contribution of the "Initiative for Excellence" to these projects will be a series of flagship actions (see section 3.1.2, page 24), and the internationalisation of the course offering, through the high quality hosting of foreign students and the promotion of strongly attractive excellence scholarships.

- ***In terms of innovation***

This subject clearly needs to be treated globally. Indeed, it requires:

- Strong growth, and above all professionalization, of the associated staff. This translates, in particular, into the creation of dedicated structures (pooling of research exploitation, SATT and IRT, Carnot and incubator services).
- Actions of a generic type, such as better education of students, and an improved accompaniment of researchers in this field. Some of these provide financing with standardised procedures (technological maturation, introduction into incubation, …)

The LABEX projects are clearly based on tools established at the scale of the campus. They forecast modest spending on this theme, because the personnel will be located elsewhere. On the other hand, the LABEX will play a key role between the campus and the teams (education, detection of ideas, …).

38 French acronym for Institute for excellence in the field of low carbon energy

2.5 Involvement of the partners

2.5.1 Preamble

The partners in the initiative for excellence are involved in the "Investing in the future" program in three different ways:

- They are involved in the projects listed in Table 2, page 10,
- They will participate in the six sub-projects of the initiative for excellence,
- Their aim is to achieve integrated operation of the site within a period of ten years.

2.5.2 Governance

The new statutes of the foundation, directly involving the twenty two research institutions listed in Table 1, page 2, have been adopted by the **all** partners. The future governance organs, as well as the foreseen consultative authorities, will be directly involved in the management of the initiative for excellence. The key points include the following points:

- The assembly issues its opinion concerning the strategic orientations of the foundation.
- The board of directors makes decisions relating to major orientations. In particular, these attributions foresee the definition of a scientific strategy, the validation of an annual program of actions, and the creation or modification of the departments.
- Two committees (committee for scientific strategy and innovation, and committee for student life and campus life) contribute towards the optimisation of the project.
- This local governance is an integral part of a national context. Firstly, five of the partners are organisms which are installed on several sites[39], and which organise their local policies in accordance with national objectives. Similarly, a certain number of themes are conducted in the framework of national alliances (STIC, health, energy, environment).

2.5.3 A project structure with delegated packages

In an initial step, the initiative for excellence will be managed by the foundation, similarly to a project. It will rely on two statutory authorities: a steering committee and a scientific council. The financial management aspects will be centralised in a management structure, at the level of the foundation.

The foundation will lead some of the projects directly, but will need to delegate a significant portion of the packages to various institutions, in particular those which will be making major facilities available. The "initiative for excellence" project will be broken down into sub-projects (listed in Table 5, page 47). Each of these (whether they be delegated or not), will be governed by a specific agreement between the foundation and the involved partners, who will in particular specify:

- The nature of the deliverable item(s) and eventual indicators,
- The "supporting" institution in charge of the sub-project,
- The operational constraints (some projects require the creation of dedicated structures within the institutions, which act on behalf of the community),
- The reporting mechanisms,
- The means provided by each partner.

The foundation will coordinate the global progress of the project. This will be regularly reported on during the general meetings.

39 CEA, CNRS, INRA, INRIA, ONERA

The LABEX also correspond to project structures, in the sense that funding is controlled by their own scientific governance. For each LABEX, an agreement will govern the manner in which financial exchanges and management auditing procedures are organised.

2.6 Involvement of the other public and private partners

The partners members of the foundation are working in close collaboration with other public and private partners. Some of them, listed in table 1b are fully involved in the initiative for excellence.

2.6.1 Competitiveness clusters and businesses

The technology or market-oriented competitiveness clusters have two main activities. The first of these is to run a "collaborative project factory", these projects being thereafter submitted for funding. The other one consists in coordinating the ecosystem formed by enterprises (large and small), and the higher education institutions and research laboratories. These clusters are the Campus' natural partners on such topics as applied research, innovation and training (in particular for the identification of needs).
Enterprises will interact with the site in a number of different ways, according to their size and the issues they are faced with: partners for R&D and prospection, clients of technological platforms and prospective research, participation in the management of the campus' innovation tools, student employers, etc.).

2.6.2 S3 and Ile de Science

The Knowledge and Society Science Pole (*Scientipôle Savoirs & Société* = S[cube]) founded in 2007 at the initiative of the Plateau de Saclay *Communauté d'Agglomération,* was established around the main public and private institutions of the local area, in order to develop a science-society dialogue, and to share scientific culture. The aim of S[cube] is to bring citizens from the scientific world closer together, allowing them to become aware of the stakes represented by research and technological development, and more generally so that science and technology can be perceived as cultural objects, which are accessible to all citizens. Similarly, the Ile de science association, which includes some of the partners, intends to develop and promote the scientific image of the geographic space occupied by the Ile de Science.

2.6.3 Optics Valley

Created in 1999, Opticsvalley brings together all of the industrial, academic and local stakeholders who work in optical, electronic and software technologies. Its mission it to federate and coordinate the optical, electronics and software communities with the ultimate objectives of economical development and job creation in the Ile-de-France area. In particular, it provides support to actors of innovation in their development, and plays a counselling role in different fields such as strategy, funding resources, human resources, markets.

2.6.4 SOLEIL

The SOLEIL synchrotron is a research centre installed on the Plateau de Saclay area at Saint Aubin. It is an extremely powerful light source used in the exploration of inert or living matter. This multidisciplinary tool has now become essential: in the field of fundamental research (physics, chemistry, materials, life sciences, earth and atmospheric sciences), applications (pharmacy, medicine, environment, nuclear physics, automotive industry, etc.). Funded by two main stakeholders: CEA, CNRS and its other partners, the Ile de France region, the Essonne department, the Centre Region and the French Government (Ministry of

Research), SOLEIL has the private statute of a "Civil Partnership". SOLEIL is host to nearly 2500 users each year.

2.6.5 IncubAlliance

IncubAlliance, an incubator accredited by the Ministry for Higher Education and Research, gathers nearly all of the research and higher education institutions present on the Plateau de Saclay territory. Installed in Orsay, IncubAlliance makes an infrastructure available to project leaders from innovative technological companies, assists them in transforming their project into companies, provides entrepreneurial training, makes a network of qualified service providers available to these projects, and helps them reinforce their management. So far, IncubAlliance has coached more than 180 projects, of which 80 are being incubated, and has lead to the creation of more than 135 start-ups.

2.6.6 Stakeholders participating in the campus' development

All actions connected to the site's development benefit from the support of various stakeholders. First of all, Paris-Saclay is a public Institution, whose missions are in particular to develop the Campus and support the construction of teaching and research infrastructures. This valuable proximity allows the usage modes, needs and innovation-related attractiveness factors to be converted into actual master plans and, in future, into real achievements, thus making the identified initiatives and proposals credible, viable and coherent. In parallel to this, the link with local authorities as regards the topics directly concerning the campus (transportation, lodging), and also all issues related to the campus' insertion and mutual contributions between the campus and its environment (new and shared infrastructures, cultural life, access to new resources) is a strategic dimension for the creation and sustainability of the campus.

The “Caisse Des Dépôts” Bank also contributes its ideas concerning the campus. It has concluded a collaborative agreement with the Foundation, for the co-funding of some of the studies relating to campus life. It also brings expertise to the Foundation in this field.

2.7 International Policy and European positioning

The world research/education system is evolving towards the coexistence of major flagship campuses, which concentrate tens of thousands of stakeholders, and strive to attract students, researchers and industries. Their attractiveness relies on their research and educational notoriety, as well as on their visitor hosting quality. Fundamental to this, is the general visibility, which depends on a variety of factors such as geographical unity, clearness of the organization and above all, the existence of a "hallmark" common to the different involved stakeholders. Based on this observation, the initiators of the "Initiative for Excellence" have organized themselves in such a way as to develop international excellence in research and education. Three comprehensive projects will give meaning to this entire approach, as detailed in following the three sections.

2.7.1 Developing the site's visibility

Although the international weight of the *Paris-Saclay Campus* and its excellence in research are significant, they are barely visible at an international level. For example, the results shown in Table 4, page 23 were obtained only after the publications from all of the partners had been aggregated. Two actions will be implemented:

- Firstly, a "common hallmark" for the site will be put in place and used, in particular in scientific publications. It may be shown that, provided certain precautions are taken, it is possible to display a "*Paris-Saclay Campus*" affiliation in a paper, without diluting the impact of each partner institution.

- The second action will be to provide the campus with the capability to represent the site as a whole, with respect to foreign peer entities and public and/or diplomatic institutions (universities, ministries, embassies, economic missions, the European commission, etc.). It will be supplemented by international communication and promotion actions for the site (website, leaflets, participation to forums and shows, presentations in partner sites whenever possible, etc.).

2.7.2 Improving the hosting of students and researchers

The development of the campus will strongly improve this location's attractiveness in the medium term (transportation, services, student housing). The institutions wish to rapidly pool their resources in order to improve hosting quality. The envisioned pilot projects will include:

- In liaison with the Essonne prefecture, the creation of an outpost of the prefecture manned with staff from the prefecture together with personnel from the involved institutions, in order to improve the hosting services offered to foreigners.
- The development of a campus-wide capability for assisting students and visiting scientists in their search for accommodation.
- The provision of linguistic support to foreigners through language courses.

2.7.3 Partnership agreements with certain targeted sites

To confirm the *Paris-Saclay Campus* as a flagship site, it is the partners' desire to rapidly sign agreements with a number of sites comparable to Saclay, which would be of interest for each institution. The targets are a small number of large research sites comparable with Saclay, and distributed throughout Europe, America, and Asia, with which agreements and many exchanges already exist, which could be consolidated.

3 PROJECT AND PROSPECTS

4 3.1 Research

4.1.1 Five key sectors

One of the *Paris- Saclay Campus*' objectives is to bring the most prestigious "Grandes Ecoles" (Ecole Polytechnique, Ecole Normale Supérieure Cachan, ENSAE ParisTech, Ecole Centrale Paris, Mines-ParisTech, Supélec, Telecom-ParisTech, ENSTA Paristech, HEC, Institut d'optique, Agro Paristech…) together with the top French university, Paris-Sud 11, to raise five of its major fields of activity[40] to the highest level:

- ***Mathematical Sciences and natural sciences***

The Saclay-Orsay-Palaiseau- Bures-sur-Yvette site already enjoys a high reputation in some of the fundamental sciences such as Mathematics and Physics. Three Fields Medals have been awarded to mathematicians from University Paris-Sud 11 and five from the Institut des Hautes Études Scientifiques, and two Nobel Prizes to physicists whose domains of competence were connected to condensed matter physics. The mathematical sciences ensemble in the Campus Paris-Saclay covers a very broad range of subjects at a very high level and with a high visibility as the number of ERC grants won, as well as many other prizes, show. The ambibition is to use this very solid and highly recognized basis to explore very actively further interfaces. Natural sciences represent a large weight in the worlwide research effort while the citation rate for the Campus teams in this domain and other indicators are well above average (see Table 4). In these two domains at large, in terms of

40 This decomposition into five fields, similar to what is done elsewhere (with "schools" or "divisions" has been introduced for sake of clarity.
The scientific animation described later often crosses the borders between these fields.

qualification and research projects, the already existing personnel compares favorably with what can be found in the Boston or the San Francisco regions. The ambition of the Campus Paris-Saclay is to push these activities at the highest level worldwide.

- ***Climate, Earth Sciences and Science for Energy***

The French node of the Climate-KIC[41], "Mitigation and adaptation to climate change", is located on the Campus and enables networking within a cluster of five European scientific and technological research centres. Furthermore, the Campus is strongly involved in low-carbon energy sciences with a scientific community of more than 2000 persons, half of whom work in the field of nuclear energy. The partners intend to strengthen interactions between academic research and the industrial partners, through a global synergy with the fields of climate and environmental science, thereby significantly contributing towards the development of a low-carbon energy society. The ambition of the Campus is to become one of the key world players (research, education, innovation) in the context of these environmental challenges, and to significantly contribute to the European Energy Research Alliance. This activity is already highly visible, with more than 1% of worldwide academic publications and a citation rate above the world average[42].

- ***Basic and Applied Life Sciences***

In the field of life sciences, the *Paris-Saclay Campus* offers a broad and in-depth range of skills, taking all levels of the organization of life forms into account — from the sub-cellular level to that of ecosystems and the biosphere. Issues related to public health, as well as to agriculture and food, are at the centre of the challenges being addressed, thus placing Saclay at a very prominent position in worldwide academic rankings, since these two topics are rarely studied on a single campus. Finally, Saclay benefits from the presence on, or in close proximity to its site, of large and exceptional facilities (the Génoscope in Evry, Neurospin, Soleil). The partners' ambition is to focus the campus' activities on themes of excellence: vegetal biology and food, and the interfaces between the "natural" sciences and biology/health (pharmacy and medicine, imaging, neurosciences, systemic biology).

- ***Computer science, Systems and Engineering Sciences***

In these domains, the *Paris-Saclay Campus* already represents a significant proportion of worldwide research (about 2% of publications. The Ile-de-France Region ranks first in Nanosciences in Europe[43]), with a fair citation rate. In addition, large-scale facilities such as C2N[44] are planned, in association with the NanoInnov initiative, an Institute for Research and Technology (IRT) in Saclay[45]. This cluster will be the largest in Europe, at the very time when the Saclay project is being launched. Because of their multidisciplinary approach, research projects are expected to foster cross-fertilization, and progress in all other scientific domains on the Saclay Campus. Information and communication, engineering and "Nano" technologies are indeed "technologies that disseminate", and have interfaces with most other research activities (*via* micro-nanotechnologies, simulation, imaging…), whether they be related to health, energy, food, or agronomy.

41 One the three "Knowledge Innovation communities" funded by the European Institute of technology

42 The analysis based on ESI disciplines in Table does not allow a comprehensive analysis since the ambition here is to aggregate geosciences, environmental sciences and partly engineering sciences.

43 See http://www.nanoeconomics.eu/index.php/newslettersrock/8-nanotrendfebruary2009/download

44 Centre for nanoscience and nanotechnology

45 Based on LabEx such as Digitex, Nano-Saclay, LaSipS, the RTRA Digiteo and the EIT ICT La (see page 28).

- ***Economics, Management, Humanities and Social Sciences***

The partners' ambition is to bring these fields to the foreground, as far as their interface with science and innovation is concerned, since both of these fields will be at the campus' focus of activity. Economics, management, humanities and social sciences are central to the campus, as can also be observed on other major campuses such as MIT. The currently existing offer is already wide-ranging since, on one hand it covers the fields of theoretical economics and sociology, at the frontier with exact sciences in which the Paris-Saclay campus excels (mathematics, neurosciences, life sciences), and on the other hand it incorporates an experiment-based approach in social sciences. All of the players involved in these disciplines on the campus (ENSAE, ENS Cachan, Ecole Polytechnique, HEC, Agro, INRA, Université Paris XI, CEA) already benefit from its close proximity with the corporate world and public decision makers. High-level courses are provided in economics and management.

Table 4
Bibliometric data form an INIST[46] analysis of 43,020 papers published between 2004 and 2008 by the partners listed in Table 1.

ESI[47] Discipline	Weight of Saclay publications 2004-2008		Citation of 2004 publications (normalised to the whole world)	Other indicators
	World	**France**		
Chemistry	1.20%	14%	0.95	20 European Research Council grants[48] i.e. 33% of a total of 61 French grants. **5**
Mathematics	2.78%	17%	1.62	
Physics	2.99%	22%	1.36	
Space Science	4.38%	25%	1.25	
Biology & Biochemistry	1.72%	12%	0.82	7 European Research Council grants[49], i.e. 8% of a total of 85 French grants
Molecular Biology & Genetics	2.82%	14%	0.58	
Microbiology	1.48%	11%	0.82	
Immunology	0.98%	5%	0.54	
Neuroscience & Behaviour	0.71%	6%	0.84	
Psychiatry/Psychology	0.42%	6%	0.98	
Clinical Medicine	0.56%	5%	0.96	
Pharmacology & Toxicology	1.13%	9%	0.80	
Agricultural Sciences	0.97%	11%	1.17	
Plant & Animal Science	0.70%	9%	1.54	
Environment/Ecology	0.87%	9%	1.02	3 European Research Council grants[50], i.e. 23% of a total of 13 French grants.
Geosciences	2.21%	15%	1.14	
Computer Science	2.44%	13%	1.07	

46 French acronym for Institute for Scientific and Technical Information

47 Essential Science Indicators (http://www.esi-topics.com/)

48 Panels ERC : LS1 à LS9 et SH4 (« The Human Mind and its complexity » because, in Saclay, topics close to neurosciences are studied)

49 Panels ERC : LS1 à LS9 et SH4 (« The Human Mind and its complexity » because, in Saclay, topics close to neurosciences are studied)

50 Panels ERC : PE9-PE10

ESI Discipline	Weight of Saclay publications 2004-2008		Citation of 2004 publications (normalised to the whole world)	Other indicators
	World	France		
Engineering	*2.79%*	*14%*	1.29	8 European Research Council grants[51], i.e. 29% of a total of 28 French grants
Materials Science	*1.21%*	*13%*	0.88	
Economics & Business	*0.82%*	*13%*	0.82	
Social Sciences, general	*0.41%*	*4 %*	0.65	

Of the five sectors presented above, those actors which will predominantly contribute to this research momentum are the eighteen LABEX projects. Judging from the indicators listed in these LABEX projects as a whole, it can be seen that these include 2 Nobel prizes, 6 Fields medals, 5 CNRS gold medals, 25 silver medals, 30 members of the Academy of Sciences, 40 members of foreign academies, 77 prizes from the Academy of Sciences, approximately 200 prizes from French learned societies, and 45 prizes from foreign societies.

The "Initiative for Excellence" will relay their action, as described in detail in the following sections.

5.1.1 Strengthen the campus' positions

In addition to its capacity to attract talent, the strength of a campus relies on the recognition of its teams. Many mechanisms are available to offer brilliant young researchers temporary positions, including those made available by the LABEX projects (each of these will fund an average of twelve fixed-term contracts per year). However, there are very few mechanisms which can be used to help maintain these researchers in their positions.

One of the flagship IDEX initiatives (which also deals with education, since it pertains to research professors) will be to implement such a mechanism. Every year, the partners will organize a contest to "create an innovative team" reserved for the best researchers or research professors. The modalities (awarded funds, possible themes, rules) may change over time (see section 4.1, page 41). This will be based on the following principles:

- A "young high-potential researcher[52]-institution[53]" pair would be elected. The institution would initiate research activities centred on the chosen promising young researcher, recruit him/her, and commit to strengthening these activities over the years in the form of other enrolments (at least one more position within five years),

- The campus would provide significant resources (up to 0.2 M€ per year over a period of 4 years) for the formation of this young team, which would be complemented by the environment offered by the institution itself.

Based on the assumption of this initiative being provided with an annual budget of 12 M€, it would be able to support approximately 15 new teams a year. The real number of selected teams should not be much higher than this, since such a system needs to be sufficiently selective. In the 5-year term, this mechanism would lead to the creation of 75 top-level

51 Panels ERC : PE6-PE7-PE8

52 The LabEx postdocs are well recognised, but the contest could be open to any young scientist (ERC, other persons on fixed-term contracts or persons on fixed-term contracts from other sites). The Young scientist may have been recruited only recently, or may be in the process of being recruited, in which case the payment of the corresponding sum would be made once the recruitment became effective.

53 Or a group of institutions in the case of a Joint Research Unit (UMR).

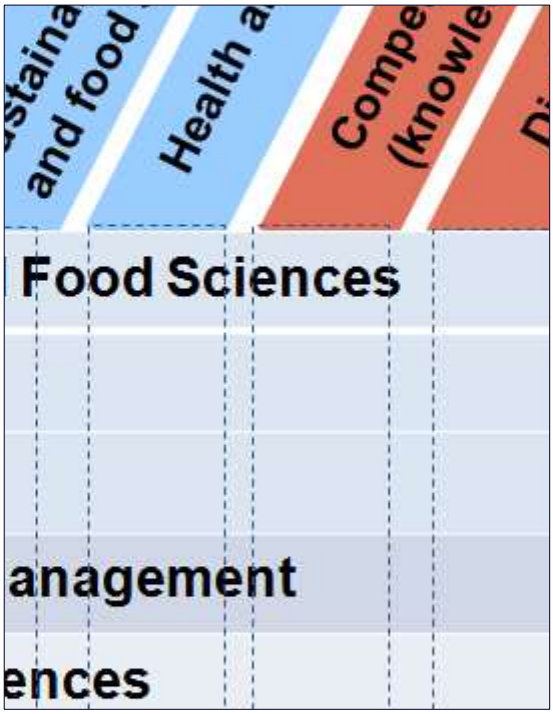
teams, representing 150 permanent staff (one additional person per team is to be enrolled), that is 10% of departures occurring during this same period of time (see section 4.6 page 49).

5.1.2 Collective activities

It is not sufficient to raise individual groups of researchers to the highest level. One of the major challenges to be met by the partners is to implement an organization that would encourage the holding of meetings, the pooling of resources, the emergence of new ideas, and assistance in the building of large-scale projects involving widely varying skills. It is in this spirit that the partners will develop collective activities, the practical implementation of which is described in section 4.1, page 41. Two examples corresponding to these actions, which have already been partially initiated, are described below.

- ***Transverse programmes***

To address topics related to "societal" challenges, such as energy, health, and food, knowledge is required in various disciplines (environment or biology, engineering, economics, sociology, innovation, etc.). Similarly, in order to structure any discipline, foster its development, and stimulate creativity, the creation of communities of researchers and professors is also a fundamental requirement.



Matrix representation, emphasizing crossbreeding between disciplines and the targeted research activity.

In order to respond to this challenge, the partners intend to launch transverse programmes covering broad ranges of challenges, whether they pertain to society, disciplines, or the stimulation of innovation. The aim is to generalize what has already been initiated in the context of the two RTRA projects in terms of common activities (see page 9), and two "experimental transverse programmes launched in 2009 ("SIVAAE[54] " and PCEE[55]). The aim may also be to reach critical masses in new domains, as is the case for the present LABEX projects, for instance systemic biology, for which the combined availability of all required

54 French acronym for "Science and engineering for agriculture, food and environment"

55 French acronym for "Climate Energy and Environment"

skills is "probably a unique asset, available only on the *Paris-Saclay Campus*[56]". Part of the budget in table 6 page 52 is dedicated to the emergence of nex LABEX like structures.

These programmes will be the environments in which the involved institutions will manage these activities as a whole. They will naturally resort to:

- the laboratories, or even sites which encompass groups of institutions;
- the LABEX projects, which through their integration of large groups of teams will be key elements;
- other mechanisms put into place within the framework of the "investments for future" programme, such as University-Hospital Institutes (IHU), the Society for the Acceleration of Technology Transfer (SATT), the Institute of Excellence for Low-Carbon Energies (IEED), etc.
-

It is also at this scale that networks will be forged with other large centres in the Paris area (Paris-Centre, Paris-East, the Bièvre valley and the competitiveness clusters in the Ile de France region).

- ***Pooling of platforms***

The scientific renown of a campus is also based on the quality of the facilities made available to researchers. The Campus Paris-Saclay is well known for its large scale facilities (neutron sources, the Soleil Synchrotron, large laser facilities, neurospin, close link with large scale computers). Medium scale facilities also play a significant role for a wide range of disciplines. The thirteen Equipex (see table 2 page 10) proposals are a significant step for pooling and coordination of such equipments.

The campus will be a place where the policy for managing platforms will be discussed, in particular whenever a topic falls outside the scope of a single institution or LABEX project. A pilot project will be launched in the field of life sciences, where infrastructure plays an increasingly crucial role in terms of competitiveness of the laboratories and attractiveness for researchers and students. The technologies necessary for exploring living beings require costly and necessarily shared facilities and infrastructures. Based on this observation, the institutions taking part in the *Paris-Saclay Campus* project have set out to implement a specific action related to the resources and experimental equipment needed for life sciences[57]. This will come in addition to the investment effort made by the institutions, by means of a financial incentive system designed to promote the coordination of procurements, and the pooling and harmonisation of organizational methods. There is an already rich fabric of existing mechanisms[58] for that purpose, which will be reinforced by the "Facilities of Excellence" and "Infrastructure" projects, to be implemented on the campus. This action, which is clearly designed in such a way as to be consistent with the national coordination effort, exemplified by the existence of the IBISA GIS in particular, is an indispensible addition to the deployment of a biology-of-systems initiative.

5.1.3 Strategy for the development of international collaborations

- ***Brief overview of the situation***

Research at Saclay is strongly rooted in international cooperation. Each year, the site accommodates some 2200 foreign visitors for stays of more than six-month. An analysis of the 2004-2008 publications provided by INIST confirms this outward opening, since it shows that 45% of the site's publications involve at least one co-author from a foreign country. The

56 Report by P. Tambourin to the Ministry of Higher Education and Research

57 *In particular, very high throughput sequencing, proteomics, animal units, bioinformatics and imaging*

58 To cite but a few examples: Imagif, neurospin,..

proportion of European collaborations is naturally substantial: 31% of the campus' publications are with a European co-author, including 9% from Germany, 8% from the United Kingdom, 7% from Italy, and 4% from Spain.

In addition, Saclay is a reference campus, home to many European-level infrastructures or working locations (large lasers, the Léon Brillouin Laboratory, SOLEIL, ICOS, etc.), where numerous visiting scientists come to work. Similarly, the site is directly involved in two of the three "Knowledge Innovation communities"[59] retained within the frame of the first European Institute of Technology call for applications: Climate KIC, of which Saclay is the French hub, and the EIT ICT Labs[60].

Table 5

Percentage of Saclay publications involving a foreign co-author

Co-author's location	2004-2008
European countries (other than France)	**31%**
North America	**15%**
Asia	**8%**
Others	**6.2%**

- ***Developing an international identity***

International collaborations have been developed to a high level thanks to Saclay's excellence, often as a result of independent initiatives. The partners will focus on one aspect, which they have stressed since the very outset of the projects, namely the creation of a "*Paris-Saclay Campus"* identity, which would enhance the site's image. The strategy to be developed, which extends beyond the scope of "research", is discussed in section 3.2.6 page 33. In particular, the research aspect relates to the use of a "*Paris-Saclay Campus*" signature in publications, and the enhancement of the site's European visibility through the creation of new infrastructures or collaborative network nodes. Mechanisms will be developed to strengthen the involvement of the campus in the construction of a Research and Higher Education European space: interactions with other campuses and the European commission, and shared tools for the incubation of European projects.

5.2 Training

5.2.1 3.2.1 Preamble

The institutions signatory to the "Plateau de Saclay" project include two universities listed in the Shanghai rankings, one teacher training school (Ecole Normale Supérieure), and ten "Grandes Ecoles": one sixth in Times Higher Education[61] European rankings (Ecole Polytechnique), the first European Management School (Financial Times ranking) [62] and some of the most prestigious engineering schools. These offer a wide spectrum of

59 http://eit.europa.eu/kics1/kics-call.html

60 www.eitictlabs.eu

61 Times Higher Education World University *Rankings (*http://www.timeshighereducation.co.uk/world-university-rankings/2010-2011/europe.html*)*

62 http://rankings.ft.com/businessschoolrankings/european-business-school-rankings-2010

outstanding courses, recognized for their high quality both at the national and international levels, often multidisciplinary, in the forms of Bachelor's and Master's degrees, "Grande Ecole" degree. The partners' ambition in the framework of the "Initiative for Excellence" is to collectively take better advantage of these resources, in order to:

- coordinate and make this range of course offerings clearer, by expanding the availability of varied curricula, fulfilling students' aspirations and employers' needs;
- develop links with research by involving top level research teams,
- attract high-level students (whether from France or other countries) and facilitate their integration and success at every stage, through individual coaching,
- stimulate pedagogical innovation, in widely varying forms,
- develop continuing education offerings by exploiting the campus's human and technological potential and expanding experience accreditation,
- bring higher education institutions present on the campus closer together and create an identity based on the sense of belonging to a Campus of Excellence, at the staff, student and graduate levels.
-

5.2.2 3.2.2 Coordinate, rationalize and enrich the training provision

The partners will set up structures in charge of coordinating and clarifying the course offering, and will provide the impetus for the necessary changes. These structures will involve curriculum directors[63] from the various institutions or their federations, and will closely interact with the persons responsible for the LABEX, IRT and IEED projects. Their actions will cover:

- ***Undergraduate training***

Undergraduate studies are a key period for students. It is the time when important decision are made, which define the future graduate curriculum, and where there is still some room for leverage to increase the recruitment diversity at the Master's level, or in Engineering Schools[64].

- ***Master's and engineering programs***

For several years, the partners have taken actions to achieve closer collaboration. Nearly 40% of the Master's specialties in the Paris-Sud 11 University are co-accredited with other institutions. The partners are engaged in a strong action towards making their Paris-Saclay Campus Master's curriculum clearer. In particular, this will comprise:

- identifying redundancies and complementarities, and pursuing co-accreditation dynamics for second-year graduate courses;
- implementing flagship[65] courses by generalizing the actions proposed in some of the LABEX projects.
- developing gateways between the curricula supported by the different institutions, in particular by building mixed curricula between universities and "Grandes Ecoles"[66].

63 "Graduate level, Engineering schools"

64 *Some experiments have already been performed. These include the Supélec Engineering School, which has instated a system for the integration of undergraduate students at the second year level of the Paris-Sud 11 University.*

65 *Some already exist. (http://www.campus-paris-saclay.fr/Formation/Formations-emblematiques).*

66 *Conventions already exist between the Paris-Sud University 11 and the Ecole Polytechnique, Ecole Centrale-Paris and Supelec.*

- With regard to engineering courses, this field will be specifically addressed because of the concentration of outstanding engineering schools on the site. The institutions will consult one another on the practical framework and modes for their "cooperation, in order to strengthen the social usefulness, influence and attractiveness of French engineering on the world stage

-

- ***PhD training***

A coordination/structuring effort will be implemented at two levels.

- In the short term, there will be a common presentation effort: with respect to the PhD training, a "Paris-Saclay" catalogue of courses will be made available and the organisation of good practice will be generalised.

- A restructuring effort: the geographical proximity and arrival of seven other institutions on the site will lead to discussions concerning the reorganisation of the PhD schools in the Saclay area. The aim is to draw up a renewed distribution of PhD schools and to optimize their links with research. A number of approaches are contemplated, in particular site-specific PhD schools, and "Paris-Saclay" theme-related PhD schools.

Also envisioned, is the creation of a college of the Paris-Saclay PhD schools, which will combine all of these schools, in particular with respect to PhD training, and the implementation of PhD scholarship policies as described below.

3.2.3 Develop "flagship" innovative and structuring actions

- ***"Custom" undergraduate curricula:***

The objective is to set up two pilot pedagogical structures within the four coming years, which will provide solutions to help students succeed at the Bachelor's level:

- **An innovative undergraduate training institute**: In a new and ambitious collaboration, stemming from their shared concern to diversify the profiles of students joining their institutions, ParisTech, Paris Sud-11 and Paris Descartes universities have decided to become partners in order to create a new undergraduate training institute in partnership with industry. According to their choice and abilities, students will pursue their studies at the engineering and master's levels, and will gain experience in the world of business. The courses will rely upon project-based learning, supported by practical applications, and will leave considerable latitude to personal training. This experiment could ultimately be duplicated.

- **Custom organisation of the undergraduate curriculum:** The aim is to help the greatest number of students to successfully complete their studies. One of the purposes of this curriculum is to diagnose the origin of certain difficulties. Another aim is to propose solutions: guidance, provision of adapted curricula with experimental or formal major courses. After level testing, students in difficulty will be guided towards a four-year undergraduate curriculum. A common agreement will define the student's curriculum, including any additional courses as well as reinforced pedagogical support and tutoring.

- ***Demanding "dual-disciplinary" undergraduate courses:***

Many professional sectors require multiple skills. To better prepare students, the partners are considering the development of dual-disciplinary curricula, which will be selective starting from the second year of undergraduate courses. "Science and language" and "science and law" courses will thus be made available.

- ***Developing a network of Graduate Schools:***

The partners to the "Initiative for Excellence" intend to bring about the strong emergence of a small number of Graduate Schools. These will increase the visibility of the site's course offering, and will favour the students' sense of belonging.

The partners share the same vision and objectives, namely:

- unified PhD training policies, fostering exchanges between the relevant disciplines,
- strong support to the best research teams,
- an on-going interdisciplinary approach, open to transversal collaborations,
- the pooling of classes, practical courses, and projects, between the undergraduate and graduate courses, in particular for training in innovation, and optional classes, in partnership with universities and engineering schools,
- a continued will to provide professionalising guidance to the students, whilst maintaining the ambition of a substantial enhancement of training through research, and by creating educational programs which combine demands stemming from the socio-economic world with research advances.

These Graduate Schools will form a network, which will help improve the coordination and steering of the training offered on the campus. Each of them is provided with its own governance and will contribute to the Campus organization:

- through a coordinated representation, which each school will put into place within campus-wide structures,
- through the pooling of its respective staff and facilities.

The project stakeholders wish to experiment this concept, by specifically addressing major challenges for the campus: industry, and gateways between universities and Grandes Ecoles at the graduate level. This experiment would lead to the construction of a network of two Graduate Schools, which will be backed by the LABEX projects. These schools would be associated with two sites, each of which is characterised by a population of several thousands students:

- A *Science, Technology and Management* Graduate School, benefiting from a transformation project supported by the ParisTech colleges, which will be part of a training continuum approach engaged between the Grande Ecole, the master's and the courses for PhD.
- An *Engineering, Systems and Management* Graduate School based on the Engineering and Systems Sciences colleges of the Moulon area. Its aim will be to raise the research and training activities in engineering, systems and management sciences to the highest level of excellence.

Based on these experiments, after four years, the partners will develop an overall strategy for the campus.

- ***Develop life-long learning:***

The partners have a desire to develop several projects, such as:

- A “life-long learning“team. This will develop the expertise indispensible for such a project, and make it available to the various actors: a course offering covering skills, potential professionalization, and skill demand. In particular, it will strive to provide "tailor-made" training.
- The development and deployment of two tools common to the involved actors. The first of these would be a passport listing the skills accumulated by students throughout their curriculum. The experience acquired by a few institutions in this matter will be capitalised upon, and generalised throughout the campus. The second one is a

platform for Validating the Acquired Experience. Based on elements existing in one of the PRES[67], the partners will develop a common tool, which will be complemented by the Saclay Campus' course offering.

6 3.2.4 Develop innovative tools and methods.

The project also comprises the development of innovative tools and methods for the benefit of the institutions' students and pedagogical staff, but also in favour of the campus' recognition.

- ***Set-up a House of Course Offerings for the Paris-Saclay Campus***

This structure will play a role in the guidance, promotion and professionalization of students attending higher education institutions at Saclay, with respect to both initial and continuing education. It will extend the existing Information and Guidance services of each of the institutions, and will be combined with international relations activities, as detailed in section 2.7 page 20. Its three-fold mission will be as follows:

- coach college and university students in a reasoned construction of their curriculum, both in initial and continuing education, by directing them to the information and guidance services of the various institutions,
- promote the courses offered on the Paris-Saclay campus, from the local to the international levels for various audiences (high schools reporting to local academies; large international campuses, networks of partner European universities; companies and other socio-economic actors; etc.),
- accompany and prepare students throughout their pathway to professional training. This House will serve as an interface between the professionalization services of the different institutions and will pool the contacts established with companies.

All of these actions require this "Training House" to be manned by a team of approximately ten persons.

- ***IT tools***

Various activities rely on IT technologies: content distribution platforms, analysis and mapping tools. The partners will strive to develop common tools. These are described in detail in section 3.4.2 page 40, and are dedicated to information and communication technologies for education.

- ***The development of tutoring students on the campus will be a collective challenge***

Tutoring will be promoted in different ways:

- A significant effort will be devoted to bachelor's, IUT[68], CPGE[69] students to support institutions which are currently lacking in tutors. A wide mobilization of students (master's and engineers) will help reinforce the graduate students' cohesion within the campus, whilst contributing to an increase in the success rate, and to a decrease in the number of dropouts and curriculum changes.
- Coaching, followed up by a referring professor, will be made available to each student. For graduate students, this person will be a referring researcher, who will provide them with a broader awareness of the challenges of research.

67 Validexper Platform in the Universud Paris Pres

68 *French acronym for University Technological Institute*

69 *French acronym for the preparatory undergraduate curriculum for engineering schools*

6.1.1 3.2.5 Promoting equal opportunities

- ***Professionalization of tutoring in secondary schools***

The objective here is to set up a long-term, attractive and efficient organization for the benefit of the three main players contributing to this ambition, in particular within the framework of the "Cordées de la Réussite" (the "climbing to the top" initiatives): schools, higher education institutions, and students. They will create an "equal opportunity domain" within the "House of Training" at Saclay, which will have among its missions: 1) to offer tutors recognised training, which will include methodology, practice and critical thinking, project management, scientific mediation, and construction of a portfolio of experience and skills; 2) to develop external partnerships: pedagogical, cultural, financial, ..., 3) to evaluate the existing systems: at the level of pupils, students and tutors.

- ***Creating experimental classes in high schools***

The primary objective here is to reinforce the links between secondary schools and higher education institutions. Our proposal is to provide coaching by researchers and students (at the M/D level) in sequences of practical work, thus allowing the evolution of new programs to be introduced. The main themes developed within these programs aim at removing the barriers between the different disciplines. This action is very much linked to the **continuing education for secondary school teachers**. It will be carried out in close collaboration with the Commissionner of education offices Education Office [70] so that it can be generalized.

6.1.2

6.1.3 3.2.6 International

The institutions on the Saclay site are already active at an international level, whether it be at the level of research partnerships, or for the accommodation of foreign students. Approximately 20% of the students at Saclay are foreigners, with the largest proportion being found at the master's or PhD levels (see Table 6). Their presence on the campus contributes to the development of its international image and cultural influence, but also represents an opportunity for laboratories and companies wishing to recruit international profiles. One of the objectives the partners have set out to achieve is to further develop the number of foreign students, in particular at the master's level. Within five years, their ambition is to raise the number of master's students by 25 to 30%, with a particularly strong emphasis on the training of excellence "through or in research".

Several actions will be undertaken. First of all, those described under section 2.7, page 20, that is, enhancement of the campus' international image, improving the accommodation of students, and framework agreements with sites that are comparable to Saclay. With specific regards to training, these actions can be broken down as follows:

- Partnerships with major foreign universities in order to implement a small number of selective international courses of excellence, such as courses at the European master and PhD levels, which have the Erasmus Mundus accreditation. At the PhD level, PhD co-tutorships will be implemented.
- Reinforce the international visibility of the Paris-Saclay Campus by organising international summer schools with top-level international scientists. The aim is to globalise a practice, which is also proposed in certain LABEX projects.
- Actions to attract the best students towards master's and PhD degrees. For example, a yearly amount of 6 M€ would make it possible to award 54 students contracts each costing 110 k€ (over the duration of a PhD), that is 3% of the annual turnover. Similarly, a yearly amount of 9 M€ would make it possible to award 450 scholarships of 20 k€ each (over one year), that is about 10 % of the number of foreign master's students.

Table 6

70 In French « Rectorat"

Number of students enrolled in the campus's establishments

	Total	Foreigners	Europeans[71]
Engineer courses	8597	18.5%	4.6%
L1-L2-L3	14814	8.2%	1.0%
M1-M2	18264	25.1%	3.8%
PhD students	5986	35.1%	7.5%
Total	47661	19.9 %	3.5%

7

7.1 Exploitation of research and socio-economic partnerships

8 3.3.1 Preamble:

The *Paris-Saclay Campus* is characterized by disparities between the various situations of its constitutive parts. Research organizations (such as CEA, CNRS, INRA, INRIA and Onera) have their own research exploitation services and have traditionally collaborated with industries. Higher education and research institutions have been practicing research exploitation and industrial partnerships only in more recent times, with much less funding dedicated to that purpose. However, certain engineering schools have quite outstanding rankings, in particular those with the Carnot[72] label. With respect to the research staffing level, indicators such as the yearly patent filing rate (180 in 2008) are notably smaller than those of major world campuses[73]. It should however be noted that there is a clear trend towards an increase in this figure. According to the partners, this situation has mainly to do with:

- technological research which is too weak (compared with upstream research), and scattered across too many institutions, too often with subcritical teams that are only rarely equipped with cutting-edge facilities and equipment,
- unnecessary scattering of the research exploitation effort, with the required critical size being available only in the case of national research organizations,
- the perception of the public research system by businesses, especially SMEs, as being complex and difficult to understand,
- widely subcritical investments, in particular as regards human resources.

In this light, the partners are putting into place a coherent and ambitious plan for innovation, research exploitation and partnerships with the corporate world. To address the above deficiencies, the partners to the "Initiative for Excellence" are backing two large, unprecedented, mutualised projects in Saclay, the IRT System X[74] and SATT[75] projects. Both entities will build up a critical mass and provide fertile ground for the professionalization of

71 *From the European continent (EU and non EU)*

72 Label awarded by the Government to public laboratories or organizations that adopt a proactive policy for applied research, for instance Mines Paristech, Télécom ParisTech, Ecole Centrale Paris and Supelec, IOGS.

73 When expressed in numbers of patents per €M funding of research

74 French acronym for institute for technological research

75 French acronym for Company for the Acceleration of Technological Transfer

activities (see 2.4, page 14 They are complemented by other such projects, for instance the IEED[76] and the Carnot Institutes. Two actions are being implemented at the Campus level.

9 3.3.2 Define a strategy to be deployed on the Campus

Whereas inventing results from an individual initiative, its translation into economic value, that is innovation, requires the implementation of managed processes and financial and human resources which must be assigned in a clear-sighted manner. These processes will be put into place by well-defined bodies, four of which will be funded by the Investing in the Future Program:

- the LABEX projects for emerging new ideas;
- the SATT for technological maturation and intellectual property management;
- the IRT and IEED, and the six Carnot Institutes[77];
- Incubators, in particular IncubAlliance, which is one of the partners to the project.
- All of these bodies will often have to work in series during the maturation of an innovation, but also collaborate with one another, since the simultaneous contribution of various skills will often be necessary. The actions developed within the framework of the "Initiative for Excellence" aim at enhancing the coherence of the building blocks listed below. The site will be provided with the range of instruments needed to ensure the strong development of innovations and industrial transfers.
  -
- The overall system will be steered by the Foundation and will associate, within a steering committee, the circle of those in charge of the involved bodies (see section 4.1, page 41). It is at this level that modifications to the system will be proposed, in particular by adding other research exploitation bodies that would complement it. The Foundation will further ensure coordination of “innovation” at the site’s level. Researchers, engineers and research professors all contribute towards an invention. They make discoveries and develop new technologies, some of which lend themselves to industrial transfers or business start-ups. One of the objectives set out by the partners is that they should be better equipped for the exploitation of research. The LABEX projects will be natural and non-exclusive transmission belts for these developments. The foreseen actions include:
- actions designed to raise awareness and improve training, conferences;
- collective foresight exercises to reflect on various themes;
- organizing thematic seminars gathering researchers, economists and business representatives with the required knowledge in application-specific sectors, with the aim of combining “technology push” and “market pull” approaches;
- a campus-wide innovation contest.
- it is within this framework that high potential discoveries will be detected and possibly proposed for technological maturation actions.
-

76 French acronym for institute for excellence in the field of low carbon energy

77 Mines Paristech, Télécom ParisTech, Ecole Centrale Paris and Supelec, IOGS, CEA/LIST et ONERA

9.1.1 3.3.3 Industrial partnerships

The foundation will also be in charge of organizing:

- a simple (non exclusive) "access portal" for SMEs in liaison with the Opticsvalley and IncubAllliance associations, in addition to the chambers of commerce and industry.
- access to industrial companies interested in collaborative projects, assistance in the setting-up of partnerships, with technology platforms, such as those that are related to nanotechnologies (Nano-Innov, C2N), engineering, processes, chemistry and materials.
- a private Funders' Club assisted by the organizations and competitiveness clusters (Business Angels, venture capitalists and banks).
- search for public funding at the Regional and European levels.

The organization described below relies on the assumption that both the SATT and the IRT have been retained, with the Foundation acting mainly as a coordinator. Failing this, the partners should redefine their strategies by lowering their ambitions. Funding of intellectual property, of its exploitation and of technological research would then be transferred to the "Initiative for Excellence".

9.1.2 3.3.4 Deploy courses for innovation and business start-up

- ***The Paris-Saclay student entrepreneurship cluster***

Accredited by the Ministries of Higher Education and by the State Secretariat for Small and Medium Enterprises, the Paris-Saclay Student Entrepreneurship Cluster is an initiative which combines twenty-four institutions from the Paris area, among which twelve are partners to the "Initiative for Excellence". It relies on the Campus' ecosystem and is linked up with the Saclay SATT. This cluster provides a continuum of basic training courses on business creation, by fostering the will to create businesses, to take risks, and to work within groups. Its objectives are as follows:

- Initiate a profound change in attitudes towards entrepreneurship. By showing (in the longer run) a positive image of entrepreneurship to the entire Paris-Saclay Campus population, through far-reaching actions to raise awareness (of 7000 technology (DUT) and PhD students), whose basis and approach will gradually be adopted by all higher education institutions within the site.
- Create a coherent and coordinated continuum to increase entrepreneurship awareness, and the development of businesses, in particular medium size enterprises, with the support of the local economic stakeholders (incubators, Chamber of Commerce and Industry, business centres).
-

- ***Creating a social network***

The aim of such a network would be to bring businesses, students and researchers and/or engineers together. It provides:

- companies with a means to present themselves and the possibility to create privileged relations with all students, helping them find interns, apprentices and new employees;
- students with a forum on which they can exhibit their passport, listing their acquired skills, as well as a (virtual) meeting point for exchanges with senior persons and companies, and for the discovery of incubators.

9.2 Support and campus life

9.2.1

9.2.2 A collective action

The partners to the *Paris-Saclay Campus* have set out the objective of creating an attractive environment, which contributes to the site's international reputation. This objective will be very much present in the future statutes of the Foundation, which will include, in addition to the scientific and innovation strategy committee, a campus and student-life commission. Many other stakeholders will be involved, such as the Paris-Saclay Public establishment and local authorities (see section 2.6.6, page 20).
With the financial support of the French Ministry for Higher Education and Research and the "Caisse des Dépôts" bank, the partners had already set up a task force in 2009, in order to investigate the characteristics of the campus which could be improved. In particular, they commissioned a large-scale survey on "transportation and housing usage", with more than 10,000 respondents[78]. They will strengthen this approach to working within the framework of the "Initiative for Excellence", by creating a "campus life team", with a mission to:

- Form an interface with the Paris-Saclay Public Institution;
- Consolidate opinions and views related to campus life, and coordinate actions taken by the institutions and organizations;
- Ensure that the planning and construction principles of the campus are consistent with user needs;
- Impulse and sustain prospective investigations and international comparisons with peer campuses (planning principles, setting-up of new services such as a concierge service, newsletter, student helpdesks, researchers from outside the plateau area, as well as their families) in order to devise common strategies and plans of action;
- Organize and maintain arrangements for consultation with students and staff.

Furthermore, in the medium term, the partners will need to create coordinating structures, enabling the use of existing facilities to be optimized. The partners will pay particular attention to the following five topics:

- ***Catering***

The partners' objective in this regard is two-fold: to meet the catering needs corresponding to 23,000 additional meals (by 2020), and to make the restaurants "interoperable" so that each employee or student can be free to make use of any of the restaurants on the campus' different sites. Further changes will then lead to the creation of two shared entities, one supervising the management of catering and the other serving as a compensation fund to direct the subsidy flow from the different institutions towards each restaurant.

- ***Sports equipment***

The arrival of new institutions will strongly increase the number of those practicing sports (involving an estimated total of 10,000 persons, of whom 4,000 will be on the Palaiseau site and 6,000 on the Moulon site). A consequence of this is that many new sports facilities will have to be built. The partners will manage all of these facilities according to an organization based on pooling at three levels: the institution, the site (for reasons of close proximity) and the campus. Indeed, for certain highly specific facilities, this pooling approach can only be used at the campus level or even beyond (neighbours), possibly in connection with other partners such as local authorities (swimming pools).

78 Algoel/LH2 Study (available in French). Results available in French at http://www.campus-paris-saclay.fr/Le-projet/Quel-campus-pour-demain/Enquete-sur-le-futur-Campus)

- ***The communications ressources***

The arrival of seven new institutions, and the increase in the number of collaborations, implies that a digital "teaching and research[79]" network be established, with the aim of:

- Connecting the institutions together through ultra-wideband connections in order to facilitate collaborative work and scientific computation;

- Through wideband/ultra-wideband links, connecting the academic community to the RENATER network, the Bruyère le Châtel computation centre, and other academic networks in the southern Paris area;

- Offering students and researchers some of the most innovative services, so that each one of them can connect to his/her professional computing environment, whenever they are present on the campus of any institution.

This issue has technical, organizational and legal implications. A study has been planned on this topic in early 2011, in partnership with the Caisse des Dépôts Bank. It will be followed by a commissioning phase and probably, in the longer term, by the creation of a common body, which will manage the Paris-Saclay network.

- ***The documentation centres***

All of the documentation services of the present institutions, or those which ultimately arrive on the site represent a significant volume (see Table 7). The partners will strive to bring their activities closer together.

- One of the projects under study concerns the pooling of part of the documentation and helpdesk centres into one entity, which may become the site's flagship building. As is the case for any facility of this type, its role may have to change according to usage and breakthroughs resulting from digitization, and from major changes in student lodging patterns. This building will also house the shared storage centre and could additionally house the common TICE activity (see below).

- Another large-scale project is intended to establish a common policy for resource materials. In particular, this implies that the institutions consult each other so that the site can be seen as a single virtual client "institution" within the framework of national agreements of the Couperin type [80], or in order to meet the needs of other disciplines such as mathematics, with more specific negotiations.

Table 7

Data on the documentation centres at the Paris-Saclay Campus[81]

	Total for all centres
"Potential client" students	46 000
"Potential client" researchers-research professors	14 000
Size of public areas	29 800 m²
Seats	3 860
Number of referenced books[82]	1 245 000
Ongoing subscriptions to paper periodicals[83]	24 000
Periodical electronic journals[84]	100 100

79 Note that some research facilities require high data rate networks (CASD and Digiscope EQUIPEX of table 2, and access to large scale computer facilities).

80 Consortium gathering most of higher education establishments in charge of negotiating access to documentary resources for its members

81 Including all Univesity of Versailles Saint Quentin Centres

82 Possibly including multiple copies

83 Possibly including multiple copies

Staff of all categories	150

- ***The dissemination of scientific culture***

The Paris-Saclay Campus' vocation of becoming the largest European science and technology campus leads, in the development of a territory and a living environment, to the major challenge of establishing a dialogue between science and society, and sharing and disseminating scientific culture. The current situation is that associations, communities and research and higher education institutions have already been pursuing diverse actions for the dissemination of scientific culture, by offering the outside world a rich and diversified image. However, these actions are relatively fragmented. The stakeholders involved on the campus (research institutions, communities, associations, industrial companies) wish to equip themselves with the tools needed for structuring, pooling and strengthening their knowhow and actions. They will collaborate with the associations (such as S[cube], Ile de Science, Sciences Essonne) that are closely linked to the institutions and well rooted within the territory.

9.2.3 The E-learning project

Many institutions, in particular those not yet located at Saclay, have developed, whether individually or through PRES projects, computer tools that are in some cases highly effective and useful: remote conferencing, "opencourseware", digital work environments. The partners intend to capitalize on the clustering of institutions, in order to establish a policy in the field of TICE[85]. The tools developed will contribute to the strengthening of the image of the entire *Paris-Saclay Campus*.

The E-learning project intends to pool these activities, in order to provide the 60,000 academic users of the *Paris-Saclay Campus* with a learning system in which the learner would be the central element, surrounded by a network of objects and communicating machines organized around minimal standards for the management and distribution of educative contents. This system would also serve the purpose of distributing content in order to foster the dissemination of scientific culture (as explained below).

The first step in this project will last a year. The partners will establish a working group whose task will be to draw up an inventory, and then a roadmap, which will ensure convergence between the partners' efforts and define the funding possibilities. This action would also consider the development of common software, in particular tools helping to map the course offerings.

After the partners have validated this roadmap, an implementation phase would proceed, as follows:

- Bring together the teams from the various institutions, and establish a collaborative approach;
- Federate existing resources (a portal for online courses, catalogue of proposed training programs - whether online or face-to-face, resource library;
- Create new tools, through a digital resource production service, and a content distribution platform;
- Organize pedagogical experiments, a part of which would be directly linked with the curricula presented above.

84 Possibly including multiple copies

85 French acronym for Technologies de l'information et de la communication pour l'enseignement (Information and Communication Technologies for Education).

This activity would be linked-up with research activities (not funded by the "Initiative for Excellence") pertaining to management and content aggregation methods, human-machine interfaces, usage, and serious games, and could provide a framework for experimental deployment.

10 GOVERNANCE, ORGANISATION AND MANAGEMENT

10.1 Organisation of the "Initiative for Excellence"

- ***The governance bodies***

The "Initiative for Excellence" will be managed in the form of a project, which will be steered by the governance authorities of the Foundation, as defined in the new statutes.

- the assembly, which brings together the funding or associated institutions, staff and company representatives, and various qualified individuals. Its responsibilities will include advising on the Foundation's strategic direction,
- a reduced board of directors comprising fourteen members[86], for close and efficient management of all actions,
- two committees: "scientific and innovation strategy" and "student and campus life".
-

In addition, to ensure appropriate everyday coordination, the Foundation will rely upon **executive and scientific bodies** with a scientific director in charge of the cohesion of scientific coordination, and **one management body** supporting a delegate director of administrative and financial matters.

- ***A project structure***

The project is broken down into six sub-projects (see Table 8 below), which will be managed by staff from the various partner institutions. Part of this will be delegated to the institutions (see section 2.5). Each of these six sub-projects will be run by a project manager, supported by a steering committee composed of persons with responsibilities in the institutions related to the relevant sectors (for instance, scientific directors, curriculum directors, international relations directors, etc.). The whole structure will be coordinated by an "Initiative for Excellence" project manager. Progress of the "Initiative for Excellence" project will be presented on a regular basis to the Foundation's administrative board, which will advise on the major decisions to be made. Furthermore, for those choices which rely on scientific expertise (scholarships, young-team grants), a peer assessment system will be implemented.

- ***An evolving structure***

This project structure is evolutive:

- Following a period of four years, the six sub-projects will be assessed. Some of these, having led to the creation of pooled structures, will evolve towards more permanent structures.
- In addition, before the ten-year due date, the partners could need to bring to the forefront new projects, of similar importance to the current LabEx projects.

These changes will be decided on by the board of directors of the Foundation, which could in certain cases consult two committees: "science and innovation strategies", and "student and campus life".

86 Eight representatives from the 19 academic founding institutions, 2 elected researchers/professors and 4 qualified individuals and representatives of the economic world

The Foundation's new statutes provide that *"…activities relating to each project, network or foundation accommodated by the Foundation are conducted within departments, according to their own governance …"*. In the short term, the Foundation's department-based structure will comprise[87] the three entities incorporated into the Foundation, namely the two RTRAs, "Digiteo" and "Triangle of Physics", in addition to the Jacques Hadamard Foundation. Its organisation will be adapted according to requirements. Two domains, whose activities are strongly integrated on the site, could thus lead to the creation of departments:

- The first of these, which will pertain to the field of climate-environment-energy, would be responsible for the scientific coordination of this sector, which encompasses, in particular, the Climate KIC[41] and three LaBex or IEED[88] projects.
- The second entity is the "innovation and partnership" department. The deployment of the latter activity (see section 3.3, page 29) indeed requires the fast implementation of strong and professionalized coordination. This department, which will be aimed towards the definition of a strategy and the piloting of specific tools (SATT, IRT, incubators, etc.) will be backed by a strategic board composed of persons skilled in the art, national and international economists and experienced individuals.

10.2 Governance

Backed by the dynamics of these first-rate national stakeholders, the *Paris-Saclay Campus* wishes to take advantage of the potential synergy developed around their complementarities, thereby creating an innovative project which distinguishes itself from traditional French modes of action, and creating a three-fold challenge:

- **Ensure that strategically positioned symbiosis is established between the research organisations and the higher education institutions**, thus reaching beyond their traditionally more fragmented relationships;
- Improve the permeability and **synergies between French universities and "Grandes Ecoles"**, thus making a broader diversity of course offerings available to French and international students;
- Develop the **innovation / technology development component** of the triangle of knowledge by creating strong interactions between education and research.

This project, which by its very nature is new, requires the strengthening of a well-adapted and original governance, **which it would be unrealistic to totally define *a priori*, without taking the time to benefit from acquired experience**, all the more so since numerous stakeholders are themselves undergoing major changes as a result of their installation on the campus. The removal schedule, which will take place over many years until 2020, necessarily influences the rhythm of the collective construction. In this context, and starting from a principle of reality, meaning that it is difficult to achieve significant progress in twenty three institutions during time-limited preparative phases, the definition of a schedule and a 4-year milestone imposes the use of **a pragmatic approach, backed by groups of institutions**, in order to achieve more rapid structuring of some of their activities, whilst at the same time ensuring the collective cohesion of the project.

- ***Four-year vision***

During the first four-year period, the *Paris-Saclay Campus* must pursue discussions in view of the targeted organisation at the ten-year milestone. For that purpose, the SCF (Scientific Cooperation Foundation) will be backed by experimental efforts carried out by groups of institutions or voluntary organisations, which are already initiating with determination, steps towards significant changes to their governance, with the view to achieving a more strongly integrated collective organisation and governance. To achieve shared success, these

87 A definitive decision will be made by the future Foundation's board of directors.

88 IEED CLAIRE, IPVF and IPSL LabEx (see Table 2, page 10).

steps must comply with the **specifications** organised around three chapter headings, which are to be applied to all persons, groups and institutions:

- **Coherence and coordination** with the above-described projects, in particular insofar as the unified image of the site is concerned: a **common signature** for the complete set of SCF institutions, coordination of the doctoral schools within a **single College**, harmonisation of international strategies, coordination by FCS with the regional authorities for the campus projects.
- **Transparency** of all campus institutions, with the commitment of partner institutions to include, on a regular basis, all of the institutions in their discussions.
- **Ability to progress**, allowing the *Paris-Saclay Campus* to be adapted to the ten-year structuring objectives, extending beyond the experimentations, and transferring those elements which can be pooled to all of the institutions.

The immediate commitments made by the voluntary institutions, **within each group of institutions**, in order to encourage progress in its governance and define the **more strongly integrated, confederated operating principles** are as follows:

- The groups of institutions decide on a coordinated representation within the SCF and its various authorities and committees;
- A more strongly integrated pedagogical and added-value creating project is developed, in the form of co-accredited diplomas;
- The hiring of researchers and research professors is collegial;
- An "Academic Senate" type of common and elected representation of the working communities, according to the relevant activities, is established;
- Student recruitment actions, in particular at the international level, are pooled;
- The SCF is represented within the decision-making authorities of each group of institutions;

Annual presentations of the groups of institutions' projects and activities will be organised, in particular in the presence of the Board of Directors and the SCF, in order to highlight such partial convergences and their consistency with the SCF's general approach, and with the aim of developing the broadest possible, and indispensable *"affectio societatis"* on the Campus.

- ***Ten-year vision***

At the end of this first four-year phase of experimentation and convergence, based on a philosophy of collaborative emulation, the institutions united by the Saclay project will propose **a new 10-year phase**, ensuring enhanced integration, in accordance with a **confederate model** the exact details of which still remain to be collectively determined. This model will necessarily be original. Based on the preceding approach, which will need to be reinforced and augmented, it will simultaneously involve the research organisations, and higher education and research institutions, together with the economic world.

10.3 Integrating new stakeholders

The Saclay Campus is being built, with seven other partners due to arrive on the site, from a total of nineteen research or higher education institutions[89]. Other institutions from the Paris area, with which the campus has established privileged partnerships, will be influenced by

89 Agro Paristech, Ecole Centrale Paris, ENS Cachan, ENSAE ParisTech, ENSTA ParisTech, Institut Télécom, Mines Paristech

the activity of the *Paris-Saclay Campus*, especially through scientific coordination actions and various collaborations (see, in particular, the institutions shown in red in Table 2, page 1),

A formal integration of these institutions into the "Initiative for Excellence" requires them to become founding or associate members of the Foundation, a possibility which has been foreseen under the Foundation's new statutes. This decision will be made by the Foundation's assembly (see 4.1.2, page 41) according to a simple majority, with regard to the application of new associated members or a ¾ majority for new founding members.

10.4 Milestones and indicators

During the four first years, the "Initiative for Excellence" will be organized as a project, and thereafter, a more sustainable management mode of operation will be instated. Associated to it will be:

- Milestones making it possible to provide an objective-oriented description of actions. They mark objective achievements and evolutions in governance;
- Indicators of the obtained results.
- Table 4, page 40 lists the milestones and indicators associated with the "Initiative for Excellence"[90].

10.5 Interfacing with the outside world

- ***The scope of excellence and the Paris- Saclay Campus***

The "Initiative for Excellence" presents itself as a project encompassing other "mechanisms" that can be funded by the "Investing for the Future" programme. It affects approximately 50% of the site's staff and the defined scope of excellence, but is also closely integrated within the site as a whole:

- - This project is clearly identified within the Foundation with a more general view of the site's development, with this view being supported by the Foundation's governing bodies which guarantee its functioning;
- - The "Initiative for Excellence" is aimed at providing impetus to the entire site. A significant portion of the sub-projects listed in Table 10 has a direct fallout on all researchers, research professors and students (anyone connected to the campus life, coordination actions in general, and infrastructures). Moreover, actions that will be subject to peer evaluation may benefit from the competences of all of the teams present on the campus (by creating young teams[91], and scholarships for high-level PhD students). In Tables 9 and 10, it is assumed that 20% of the funds will be spent outside the scope of excellence;
- - As they are not affected by the separation induced by the scope of excellence, the students will benefit from the mechanisms put into place;
- - The sub-projects defined as part of this project can evolve under the control of the board of directors and, in particular, be opened up to other people (new educative actions, new scientific coordination actions, etc.;). This topic has been discussed in section 4.1)

90 The site development project has a broader extent than the Initiative for Excellence. In particular, it encompasses all of the real estate projects on the site, the establishment of companies, the development of transportation and on-site services, with both of the latter depending mainly on the Paris-Saclay public institutions and local authorities.

91 In addition to the fact that the quality of the teams or courses followed will be assessed, these actions also take part in a more general action to promote the site internationally and to accumulate campus-wide skills.

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- ***The neighbouring population***

The *Paris-Saclay Campus* will also have a direct or indirect impact on neighbouring areas, in the form of certain aspects of campus life. These would include:

- - co-investing in equipment (for instance, sports infrastructures) in association with the neighbouring communities;
- - expanding services (shopping facilities, transportation);
- - strengthening actions to disseminate scientific culture.
-

10.5.1 Resource pooling

The partners' ten-year vision will be founded on a series of pooling actions:

- ***In terms of research***

Starting in 2007, they implemented voluntary actions for the purposes of pooling their resources. These include:

- - the creation of two Advanced Research Thematic Networks, which will extend to the scientific coordination actions described in section 3.1.2;
- - the current construction of common laboratories or facilities (the PCRI[92] and Digiteo, and Nano-Innov buildings), or planned constructions (C2N, Technology Hall, …);

The "Initiative for Excellence" extend the latter's actions by means of scientific animation, and the common management structure for the creation of Teams of Excellence on the site.

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- ***In terms of course offering***

There are many Master's degree co-accreditations (40% of the Paris-Sud 11 Master's degrees are co-accredited with other partners) and common projects such as the Paris-Saclay Student Entrepreneurship Cluster (section 3.3.4, page 36). A significant proportion of the actions described in the "Initiative for Excellence" project consists in the development of pooled structures, to ensure coordination between the curriculum directors or doctoral school managers, the house of education, the life-long training team, the Graduate Schools that are common to institution clusters, and tutorship organization.

- ***In terms of innovation***

This field is currently being affected by the most advanced pooling endeavours (see section 3.3, page 34). Thus, in 2010, the partners submitted large projects to the "Investments for the Future" program which, if retained, will support wide-ranging collective activities: the

92 French Acronym for "Common facility for research in information science"

SATT[93] project for technological maturation and intellectual property management activities, and the IRT system X[94] for technological research.

- ***In terms of services***

Since 2009, the partners have been working to pool their services in an effort to optimize future investments, for instance in the following items:

- - academic computer network;
- - catering through a future interoperable restaurant network;
- - sports facilities.

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- This work will be continued within the framework of the "Initiative for Excellence". Two new actions would be launched, one to reflect on the pooling of document subscription services, and the other to launch a common E-learning project, which would eventually lead to the pooling of the required resources.

93 French acronym for "Company for acceleration of technological transfers" a call of the French programme "Investing in the Future"

94 French acronym for "Institut Hospitalo-Universitaire", a call of the French programme "Investments for the future"

Table 4 : Mile stones and indicators[95]

Management of the Initiative for Excellence	**4 years:** Assessments of the management by FCS[96]
	10 years: Implementation of a confederal model **10 years :** Enlargement of the excellence perimeter
Reinforce Excellence in Research Section 3.1 and 4.1	**4 years**: Mechanisms for the coordination an creation of fully operational, young teams
	10 years: Enlargement of the excellence perimeter
	Indicator 1: impact factor of publications normalised to the world level, according to ESI discipline **Indicator 2:** number of publications involving authors affiliated with several partners (internal collaborations) **Indicator 3:** number of high-level young teams created by the new mechanism (efficacy of the "young team" mechanism) **Indicator 4:** number and global financial weight associated with the transverse programs (method of calculation?) **Indicator 5 :** Number of LABEX with excellent evaluation[97] **Indicator 6 :** Proportion of transdisciplinary programmes
Develop a global training approach, Sections 3.2 and 4.1	**4 years**: coordination and rationalization mechanism for the full course offering, to achieve improved visibility and operational efficiency **4 years:** collective mechanisms, house of training, life-long training team, tutoring, college of doctoral schools **4 years:** operational tutoring actions **4 years:** college of doctoral schools **4 years**: innovative actions at the undergraduate level, experimental classes **4 years:** launching of two graduate schools **4 years :** measures taken to promote equal opportunities including gender balance
	10 years: launching of courses associated with the *Paris-Saclay Campus* label **10 years:** launching of x graduate schools **10 years:** House for assistance in course selection, life-long further learning unit **4 years:** Launching of the VAE platform
	Indicator 7: Number Master's degrees co-accredited between institutions **Indicator 8:** Number of excellent evaluations of master and PhD school by AERES (French agency for quotation of research and education) **Indicator 9:** Employability of students (6 month)
Develop innovation, Sections 3.3 and 4.1	**4 years:** strong site-wide organization, deployment of the strategy throughout the campus **4 years:** operational IRT and SATT **4 years** : operational IEED
	10 years: substantial improvement of the campus performance in terms of innovation, and strengthening of industrial relations

95 Note that some of this milestones relie for the nominal time schedule of arrivals of seven research and higher education establishments (including funding and land availability)

96 with possible impact on its statutes

97 Method to be defined possibly AERES (French agency for quotation of research and education)

	Indicator 10: number of start-ups **Indicator 11:** number of technology transfer **Indicator 12:** number of declaration of invention, patent applications, patent licences (and equivalent for software) **Indicator 13:** financial value of partnership research with outside firms and of contractual research for companies
Improve campus life, Sections 3.4.1 and 4.1	**4 years:** establishment of collective operations in terms of sports facilities and catering **4 years:** digital Paris-Saclay academic network
	10 years: Networking of documentation centres
	Indicator 14: proportion of pooled referenced books **Indicator 15 : number of actions of disseminations towards the general public**
Develop the TICEs, Sections 3.4.2 and 4.1	**4 years:** unified master plan for the institutions
	10 years: pooled TICE team and high "cyber visibility" of the site
	Indicator 16: number of courses on line – number of accesses
Promote the *Paris-Saclay Campus* internationally Sections 2.7 and 3.2.6	**4 years:** International Paris-Saclay unit and various shared mechanisms (student assistance, course offering assistance) **4 years:** Fully operational high-level scholarships, to improve international attractiveness **4 years:** Implementation of a single signature policy **4 years:** Signature of agreements with major campuses
	Indicator 17: number of organized international colloquia **Indicator 18:** number of foreign master's students **Indicator 19:** number of foreign professors **Indicator 20**: number of partnership with foreign companies **Indicator 20 :** Site's (and partners) ranking among major international assessments **Indicator 21:** Number of publications with foreign coautors

11

11.1 Human resources

The scientific and pedagogical performance, and the innovation results of a campus are directly related to the quality, not only of the on-site staff, but also of that of the enrolled students. Aware of this challenge, the partners have been developing a specifically adapted mechanism:

- **Students.** In order to attract the best international students, the site will be promoted and accommodation will be improved (section 2.7.2), and high-level scholarships for Master's and PhD students will be awarded (section 3.2.6, page 33). In parallel with this, significant efforts will be made to diversify recruitment profiles (section 3.2.5);
- **Retain high-level researchers on the site.** The initiatives applied by the partners attract many high level researchers, as postdocs or visitors[98]. The yearly number of retiring researchers or professors is approximately 240 (2% of an estimated 12,000 researchers or professors), to which should be added those persons who leave for various other reasons. The partners are faced with the challenge of encouraging the most talented persons to stay, by hiring them in newly available positions, thus making it possible to rapidly accumulate the skills required in new emerging topics, at an international level. For that purpose they drafted a mechanism, described in section 3.1.2, which will allow young teams to be created at the highest international level, by filling approximately 10% of the positions vacated by departing researchers or professors.
- **Converging and coordinated human resource policies.** The partners will align their visions of human resources, by mapping available skills, identifying strengths and synergies which need to be further enhanced, developing gateways, devising coordinated recruitment policies (see 3.2.1), and improving skills (in particular by means of the life-long training tools described in section 3.2.3, and through innovation, as seen in section 3.3.4).
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1.1.1 Figure

Age structure of Saclay's population of researchers and research professors

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12 MEANS

12.1 Means associated with IDEX

1.1.2 *The means associated with IDEX are shown in Tables 8 and 9 below. These have been completed as follows:*

- Eighteen LabEx projects have been submitted to the "Investing for the Future" programme. The budget was determined by assuming that part of these would be retained, associated to an annual subvention of 15 M€. The calculations were made by taking the average values, some of which are shown in Table 3, page 13.

- The actions have in general been listed in Table 9. In Table 10 "other actions" lists those actions which play a significant driving role at the scale of the campus: actions linked to leadership or coordination between actors, the guidance teams designed for all users, and "campus life" actions. On the other hand, it has been assumed that 20% of the funding

98 For example, within the scope of the 18 LabEx projects, there are an estimated 1500 postdoc or fixed-term contract researchers. The partners also receive 1700 visitors yearly for long-term stays (>6 months).

assigned following external assessments would be directed towards activities outside the scope of excellence (in particular grants for the creation of young researcher teams).

- The IDEX contributions will be devoted to administrative expenditures, a small number of investments, and to the funding of support staff. The institutions mainly contribute manpower, which is affected to the various projects or pooled resources.

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12.2 Management

12.2.1 Management principle

The project will be followed-up by a management team from the FCS. Management will be entirely cost-based, thus making the institutions' contributions clearly identifiable. Expenditures will be made:

- at the level of the Foundation, for activities it manages directly;
- by the partner institutions in the form of LabEx projects or actions relevant to the "Initiative for Excellence", which will have been delegated to them (see section 2.5.3 page 15). For each sub-project, the Foundation will establish a particular agreement with the managing institution. This agreement will use ANR-specific management rules and specify the management information and supporting documents that must be passed up to the Foundation.

An information system will be available to the Foundation, allowing it to monitor expenditures on a per-project basis, whether it be its own expenditures, or expenditures required by third parties. This information system comprises the necessary reporting tools, in particular the dashboards and syntheses describing the project's overall operation. The Foundation's management team will convene periodically with those in charge of management in each institution. It will establish a management dialogue with the institutions.

12.2.2 Decision traceability

The general principle is that any expenditure should be made by means of a traceable decision mechanism.

- ***The LabEx projects:***

These use decision processes of their own. Decisions are arbitrated by a steering committee, itself backed by a scientific committee. Funding decisions should appear in the form of decision statements handed down by the steering committee. On the other hand, the FCS, being the coordinating partner, will maintain a specific management dialogue with the LabEx projects so as to ensure coherence between their procedures and actions.

- ***The Initiative for excellence***

The processes implemented within each of the sub-projects will be modified as appropriate by the Foundation's board of directors, which plays the role of a steering committee for the entire project. The operational activities will thereafter be handed over to the project structure. Each of the six sub-projects will have its own steering committee, which will make decisions of its own. "Scientific" arbitrations (grants, resource allocation) will be made in compliance with the recommendations provided by a scientific committee.

Table 5

List of resources and expenditures for actions relevant to the Idex scope of excellence, accumulated over a 10 year period (in millions of euros)

Name of the action	Resources			Content		
	IDEX	Other Investments for the future	Exter-nal	Investments	Manpower	
LABEX						
Research						
Education						
Innovation						
Campus life						
International						Visiting students

Table 6

List of resources and expenditures for other Idex actions, accumulated over a period of 10 years (in millions of euros)

Name of the action	Resources			Content		
	IDEX	Other Investments for the future	Exter-nal	Investments	Manpower	
LABEX						
Research						
Education						
Innovation						
Campus life						
International						