



Strategic Plan for Research and Innovation 2019-2022

LOOKING TOWARDS THE FUTURE

Research in biomedicine and health sciences is essential to improve quality of life, life expectancy, and wellbeing. Continuous scientific progress requires a multidisciplinary approach to ensure the development of a quality research process in which the work of basic and clinical researchers is aligned in a coordinated network of professionals.

New ideas frequently emerge in the hospital setting, where most clinical research takes place. However, the new, modern laboratories of the Research Institute Foundation of the Hospital de la Santa Creu i Sant Pau now allow us to conduct experimental research. In turn, this facilitates knowledge transfer from bench to bedside, thereby improving clinical practice and the health of the population.

Implementation of the 2014-2017 Strategic Plan (extended to 2018) has led to substantial growth in research activity at the Institute in recent years, especially in the area of innovation and technology transfer. The growing number of clinical trials performed at the hospital, especially at the Centre for Drug Research (CIM), is particularly noteworthy.

The year 2018 was extremely important due to the integration of the Catalan Institute of Cardiovascular Sciences (ICCC) on 1 January and the inauguration of the new facilities on 15 November. It is in this context that the road map for the next several years has been developed, with the aim of continuing our research trajectory, strengthening the translational aspects of this research, and focusing on innovation and internationalisation as two of the main strategic priorities.

To develop the new strategic plan, we undertook a cross-disciplinary internal review and reflection process involving numerous professionals. In this process, we evaluated both the internal and external contexts of the Institute, as well as health care priorities and the future vision of biomedical research.

*Improving health
begins with biomedical research*



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1. INTRODUCTION

1.1. BACKGROUND

The Research Institute Foundation of the Hospital de la Santa Creu i Sant Pau (HSCSP-IR), created on 4 June 1992, is a private, scientific foundation. Its mission is to promote basic, clinical, epidemiological and health care research in the fields of health sciences and biomedicine, with the ultimate aim of improving the health of the population.

On 10 December 2003, the government of Catalonia approved the HSCSP-IR as a University Research Institute affiliated with the Universitat Autònoma de Barcelona (UAB).

Currently, the Institute is one of the most active research centres in Catalonia, particularly for translational research and the application of new discoveries to clinical practice. **The Institute has formed part of the Catalan system of research centres (CERCA) since 2011.**

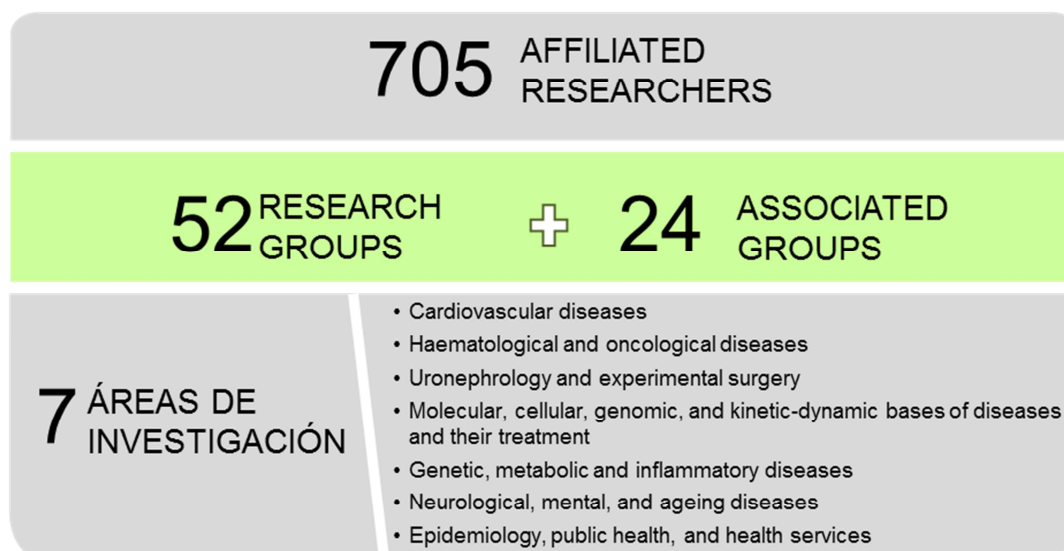
On 17 May 2009, the HSCSP-IR and nine other organisations created the **Sant Pau Institute for Biomedical Research (IIB Sant Pau)** to strengthen collaborative translational research and to bridge the gap between basic research and clinical practice, with the ultimate aim of improving patient care. This collaboration aims to strengthen relationships and promote knowledge exchange among researchers from different centres and thus position their research and innovation work among the most important in Catalonia. The HSCSP-IR is the managing body of this alliance, with the full legal capacity to achieve the objectives established. In 2011, IIB Sant Pau was accredited as a Research Institute by the Spanish Institute of Health Carlos III (ISCIII).



On 15 November 2018, the new building was inaugurated. This building houses the experimental research groups, the Centre for Drug Research (CIM), the scientific and technical services platforms, as well as common workspaces with research laboratories and support infrastructure. These facilities improve the support services provided to the research groups, thus strengthening relations between these groups and providing

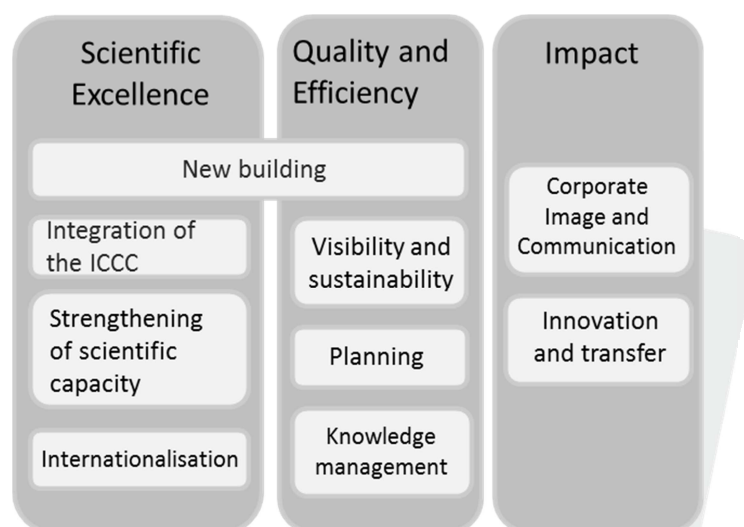
essential visibility to the scientific and innovation activity. This new building has many advantages, opening the door to enormous opportunities for the Institute.

The Institute’s research activities are organised into 7 areas, with 52 consolidated research groups accredited by the scientific committee and 24 associated groups, forming a total of 76 research groups with scientific output.



1.2. STRATEGIC PLAN 2014-2017

During the 2014-2017 period, IIB Sant Pau followed the guidelines established in the prior strategic plan. This was based on three areas of action: 1) scientific excellence, 2) quality and efficacy, and 3) impact. These three areas contained 9 main strategic objectives, as shown below.



This Strategic Plan was extended to 2018 in order to complete construction of the new building.

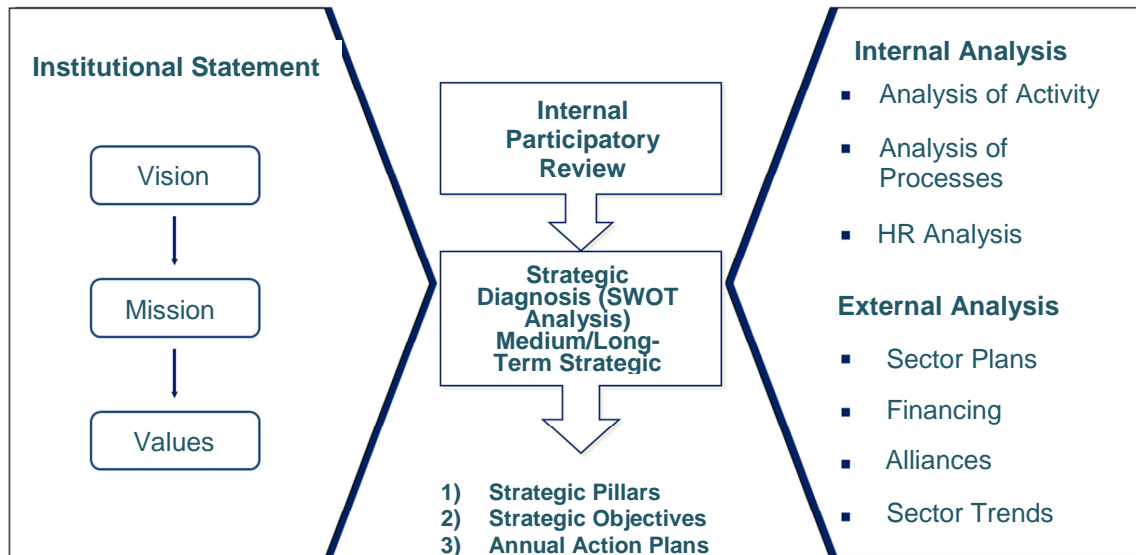
The main milestones in the development of the Strategic Plan 2014-2017 (extended to 2018) were:

- ✓ Construction of the new building, inaugurated at the end of 2018.
- ✓ The Suma Project, with the integration of the Catalan Institute of Cardiovascular Sciences (ICCC) in January 2018.
- ✓ The new website with the IIB Sant Pau logo, launched in 2015.
- ✓ Implementation of an action plan for the Human Resources Strategy for Researchers (HRS4R) and its accreditation in 2015.
- ✓ Consolidation of the Research Institute as a member of ISCIII's ITEMAS Platform, increasing its innovation activities in recent years and creating a more stable innovation structure.
- ✓ Consolidation of the original groups included since the creation of IIB Sant Pau, while also defining a strategy for emerging groups.
- ✓ Definition of evaluation criteria of the groups for use by external evaluators and the Internal Scientific Committee (CCI).
- ✓ Implementation of management software to systematise project management and obtain a scorecard for scientific activity.
- ✓ Reaccreditation of HSCSP-IR as a CERCA centre of the government of Catalonia and of IIB Sant Pau as an ISCIII Research Institute.



2. WORK METHODOLOGY

Following the example of the good work carried out during the 2014-2017 period, a classic analysis and design methodology was used to develop the new strategic plan:

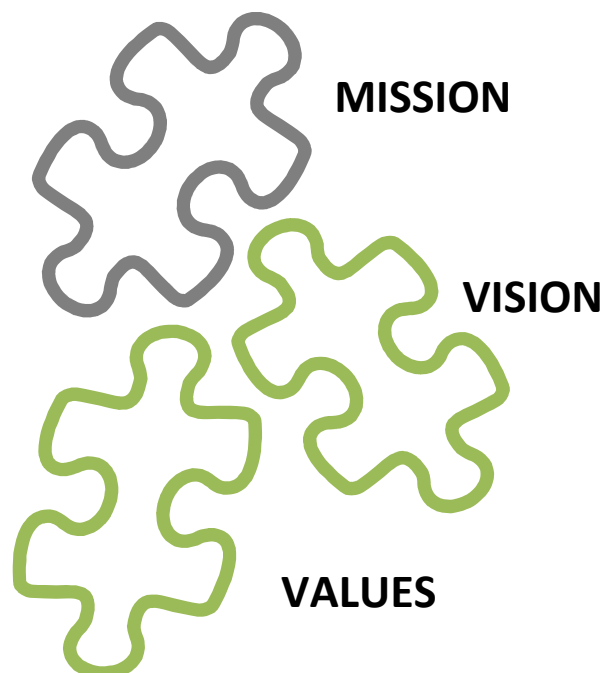


Following this methodology, the design of the Strategic Plan 2019-2023 began with an internal analysis of the strengths and weaknesses of IIB Sant Pau, and identification of the main opportunities and challenges for the next four years. An internal review and reflection process was conducted among the Institute's strategic groups, involving the participation and contribution of approximately 70 professionals from the various groups and organisations that comprise IIB Sant Pau. In addition, we surveyed 97 professionals from these same organisations within IIB Sant Pau.

This initial phase helped to identify the priorities and objectives that should define our vision of the Research Institute in 2023.



3. MISSION, VISION, AND VALUES



MISSION

The mission of the Research Institute of the Hospital de la Sant Creu i Sant Pau (HSCSP-IR), the managing organisation of IIB Sant Pau, is to improve people's health and quality of life through the production of scientific knowledge, training of researchers to international standards, health care innovations, and the application of these advances to clinical practice and health care policy.

VISION

The Institute's vision is to become an international leader in translational biomedical research.

VALUES

- ▶ Excellence
- ▶ Collaboration and multidisciplinary
- ▶ Transparency
- ▶ Efficiency
- ▶ Ethical and social commitment
- ▶ Responsibility
- ▶ Continuous improvement and innovation
- ▶ Flexibility and adaptability
- ▶ Application of knowledge gained

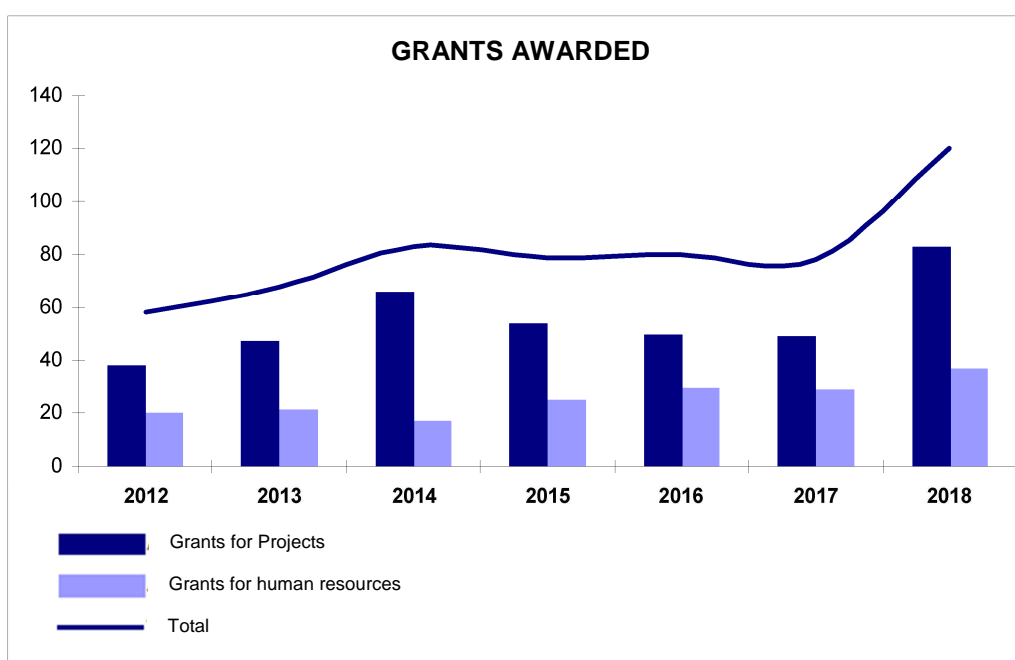
4. DIAGNOSIS. INTERNAL SITUATION

For the internal diagnosis, the following aspects were considered:

- Results and evolution of research activities
- Research structures: human and material resources
- Opinions of staff
- Results of internal and external audits
- Financial results

4.1. RESEARCH AND INNOVATION ACTIVITY

With regard to the scientific and innovation activity in recent years, one of the main aspects to highlight is the Institute's capacity to obtain funding for the various research groups. Over the last eight years, IIB Sant Pau has maintained a stable volume of projects, obtaining funding for the research projects and associated human resources through competitive grants.

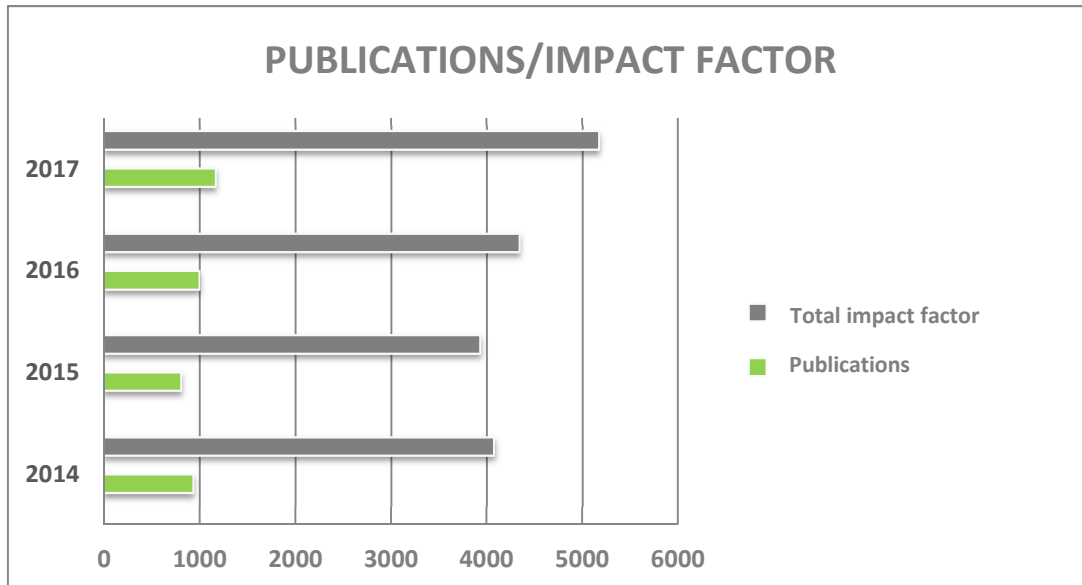


The data presented in this chart include both national and international projects, 98% of which are national grants.

In the past 5 years, the Institute has been awarded 1-2 new projects annually and managed 3 to 5 international projects per year. Clearly, at the international level, we still have a lot of work to do.

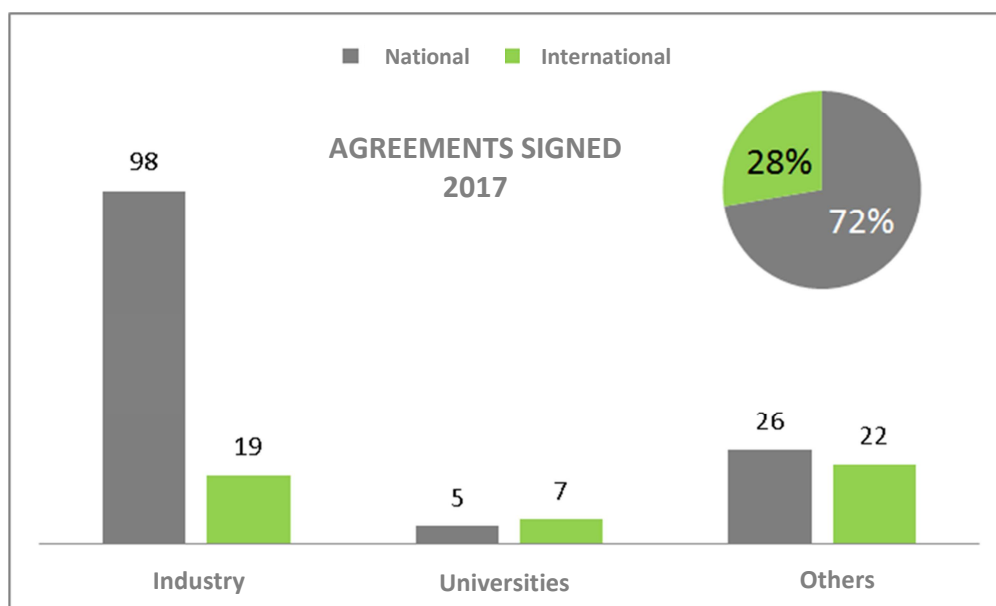
The main indicators used to assess research results are the number of publications and their impact factor (IF).

The following figure shows the improved results of the IIB Sant Pau for these two indicators (publications and IF), both of which have been increasing for several years.



Many of the projects at IIB Sant Pau would not be possible without the collaboration of other organisations. Most of these collaborative agreements are with national organisations, mainly from industry.

In 2017, 117 national and international collaborative agreements were signed with industry. These collaborations include the provision of services and collaboration on research projects and intellectual property. Importantly, 28% of these agreements were with international partners, a figure that provides an idea of the Institute’s potential if it were to focus on this area when participating in competitive projects.



It is also worth highlighting the growing trend for activities managed by the Transfer and Innovation Unit. In recent years, the unit has tripled the number of new patents, the creation of technology-based companies, and licence agreements

Currently, 13 patent families are being managed, 8 more than in 2016, in addition to 8 intellectual property registers, such as software and trademarks, utility models, and clinical scales.

In the last two years, the Institute's research work has led to the creation of four companies; in addition, eleven technology transfer agreements have been signed with industry, demonstrating the translational aspect of research at Sant Pau.

In summary:

✓ Intellectual Property:

13	Patent families
1	Utility model
1	Software registration
1	Trademark registration
5	Other registrations (guides, databases, scales...)

✓ Transfer:

10	Transfer agreements
2	Spin-offs
2	Start-ups
€65 000	Economic return

Despite the excellent results in innovation, the financial returns obtained to date have been limited because we are still building the structure, which will eventually allow us to reap the benefits. Extensive work is required on the business side in terms of transfer agreements.

To conclude this point, we can state that the traditional research indicators at the IIB Sant Pau are excellent; however, if we compare the IIB Sant Pau to other centres, we still have a long way to go, especially given the increasing need for the capacity to transform research findings into advances applicable to clinical practice.

All these results, together with details on the research groups' scientific output, can be consulted in the Scientific Report:

<http://www.recercasantpau.cat/wp-content/uploads/2018/10/IIB-Sant-Pau-Scientific-Report-2017-2.pdf>

4.2. STRUCTURE OF HUMAN RESOURCES

IIB Sant Pau began to implement the HR Strategy for Researchers (HRS4R) in October 2014 with the creation of a working group involving researchers and research managers from the Institute.

During this process, the working group analysed the level of compliance with the forty principles outlined in the Institute's Charter and Code, defining priorities and creating an action plan for the next four years. The action plan includes 19 measures whose focus is on the following areas: the new research facilities, providing better internal and external information, improving the training plan, fostering researcher involvement in decision-making, evaluating researchers and support structures, and establishing procedures to defend researchers, among others.

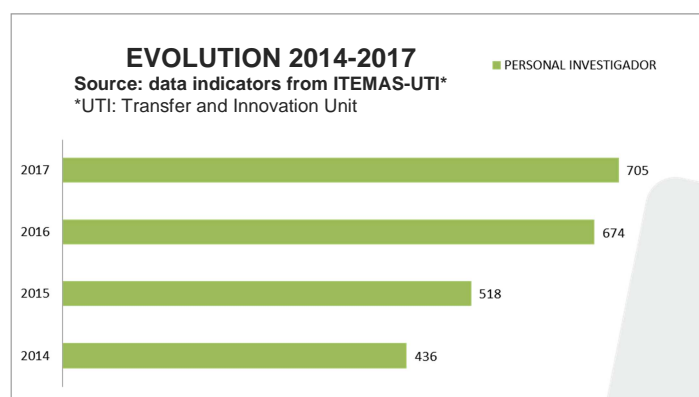
This action plan is available at the Institute's website, via the following link:

<http://www.recercasantpau.cat/recerca/informacio-per-al-personal-investigador/>

The ultimate aim of this process was achieved on 23 May 2015 when IIB Sant Pau was awarded the Human Resources Excellence in Research seal.

The HRS4R strategy, which focuses on continuous improvement, does not end after receiving the award. Thus, IIB Sant Pau, together with its researchers and the European Commission, commit not only to implementing the approved action plan but also to comprehensively monitoring its development in 2019 and to create a new strategy to ensure that this recognition is maintained going forward. Therefore, this strategy must take the new Strategic Plan into account.

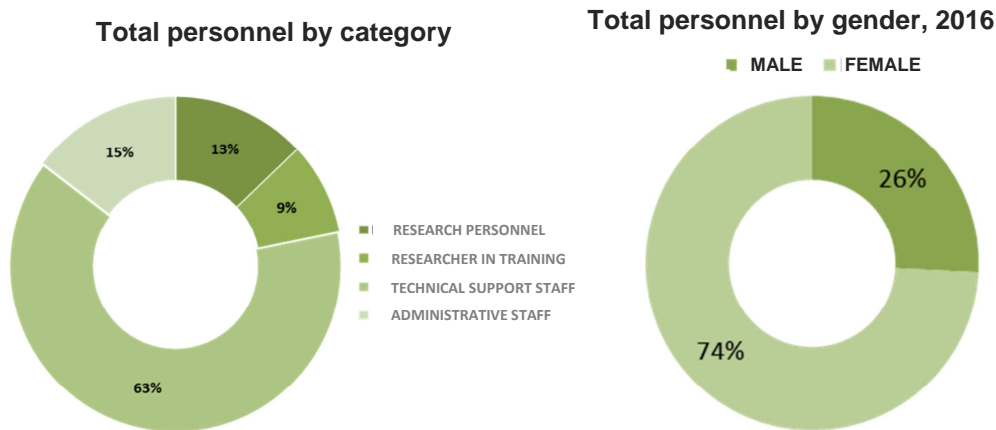
The number of professionals and technical support staff for the research groups has increased substantially at the Institute. Based on data reported to the ITEMAS Platform since 2014, the number of researchers has been steadily rising in recent years, which is consistent with the increase in scientific production:



RESEARCH PERSONNEL

The number of researchers refers to the personnel involved in the 76 research groups in the various organisations within IIB Sant Pau.

The workforce of the Research Institute Foundation, the managing body of IIB Sant Pau, consists of researchers, technical support staff, employees in training, and administrative staff. At the end of 2016, the team consisted of a total of 337 professionals under contract, some working part-time. The distribution of staff by category and gender are shown here:



The largest group is comprised of technical support staff, accounting for 63 % of all personnel. The technical support staff is mainly recruited by the different groups within the IIB Sant Pau to participate in the research groups. These figures are attributable to the nature of the Institute, in which most researchers are clinicians recruited by the health care units.

4.3. STRUCTURE OF PHYSICAL RESOURCES

The new research building concentrates all of the cross-disciplinary resources dedicated to scientific research, innovation, and transfer. This includes both management and scientific and technical services. At the same time, it provides the research groups with their own defined spaces as well common shared workspaces, thus strengthening the connections between these groups.

Importantly, due to the physical proximity of the building to the hospital, the professionals and users of the new research centre will have easy access to the hospital, thus bringing research work that much closer to routine health care activity. This will promote a close, ongoing relationship between the Institute’s researchers, clinical care, and with clinical research professionals at the hospital, which will boost translational research projects. In short, this proximity will help to encourage the application of research discoveries aimed at treating patients.

This new structure also aims to be a pole of attraction for companies, universities, and groups from other organisations, to strengthen relations between these entities, thus further promoting the value added by IIB Sant Pau researchers. The centre contains all of the necessary scientific and technical services for research, as well as common areas:

- ✓ Genomics and Transcriptomics Platform
- ✓ Bioinformatics Platform
- ✓ Cytomics Platform
- ✓ Microscopy Platform
- ✓ Biobank
- ✓ Clean room
- ✓ Cell culture unit
- ✓ Radioactivity Unit

It is important to highlight the Institute’s Centre for Drug Research (CIM), which carries out phase I studies to evaluate the tolerability, safety, pharmacokinetics and, where possible, the pharmacodynamics of new drugs, which are then compared with pre-clinical data. Data from 2018 on CIM activities include the following:

Clinical Trial Activity, CIM Sant Pau			
Clinical Trials		Number of Patients	
Active private clinical trials	515	Active private patients	3516
Phase I clinical trials, healthy volunteers	11	Healthy volunteers, phase 1	366
Independent researcher clinical trials	12	Patients (Independent researchers + others)	1824
Other independent studies	62		

4.4. AUDIT RESULTS

As part of the internal analysis, we also assessed data obtained from reaccreditation as a CERCA centre (November 2016) and as an ISCIII Research Institute (March 2016).

The following table shows the strengths and areas for improvement that were detected. These points are crucial to the SWOT analysis, which will mark the strategy to be followed in the coming years:

STRENGTHS	AREAS FOR IMPROVEMENT
<ul style="list-style-type: none"> ▶ High scientific production ▶ Efficiency (cost-effectiveness) 	<ul style="list-style-type: none"> ▶ Promote greater internationalisation ▶ Increase EEC fund-raising

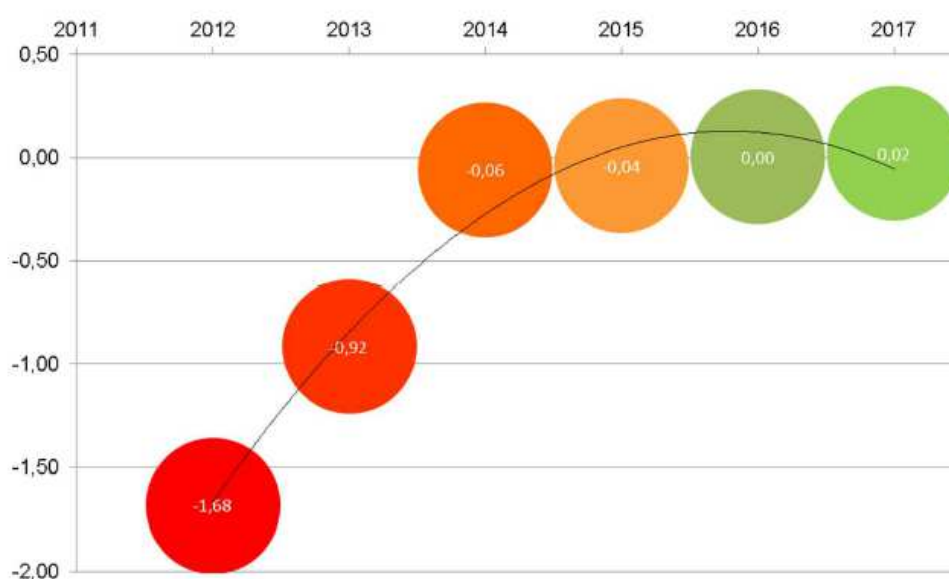
<ul style="list-style-type: none"> ▶ Significant involvement of clinical researchers ▶ High capacity to raise funds through competitive bids at a national level ▶ Large number of clinical trials ▶ Double the number of researchers in training ▶ New building, opportunity for integration ▶ Highly committed management ▶ Promotion of emerging groups 	<ul style="list-style-type: none"> ▶ Keep internal regulation documents up-to-date ▶ Improve management processes ▶ Implement a monitoring system for objectives and indicators ▶ Increase participation of External Committee ▶ Improve innovation and transfer results
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4.5. ECONOMIC RESULTS

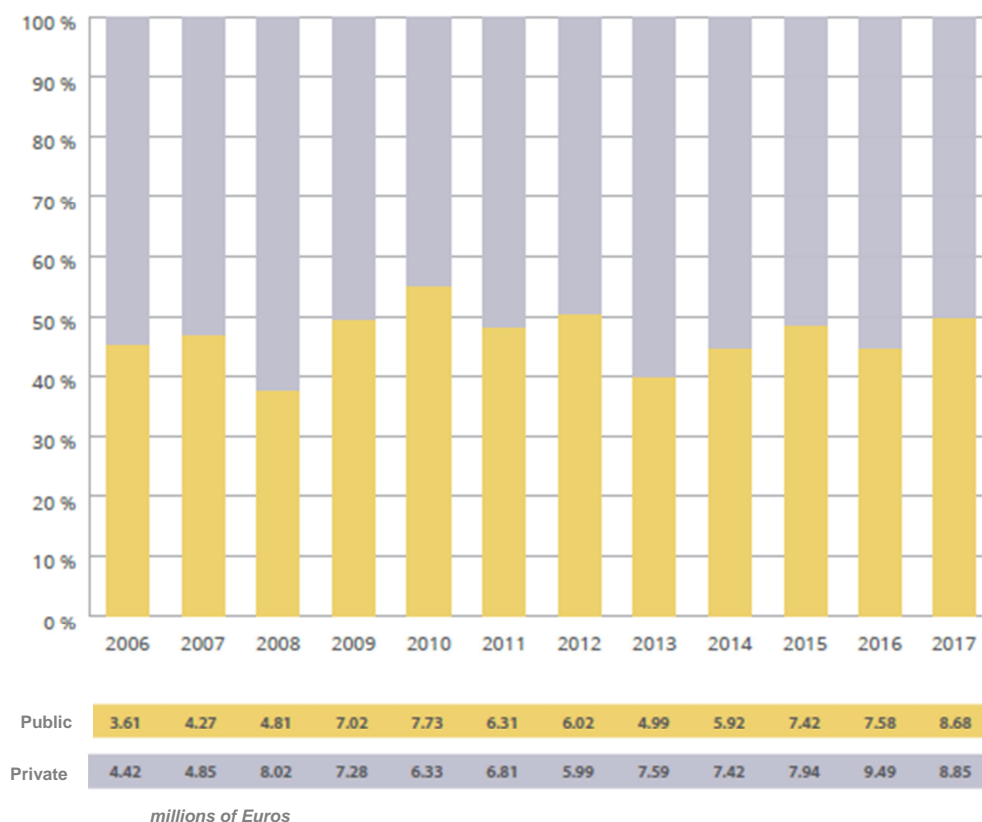
The following graphs, which coincide with years of economic crisis and a decrease in structural contributions, show a clear upward trend in income and results. Due to financial contributions from PlaVE 2014-2015 and grants from the Private and Health Management Foundations of the Hospital de la Santa Creu i Sant Pau, both income and net results showed a positive evolution through 2017.

Evolution of Results 2012-2017

YEAR	2012	2013	2014	2015	2016	2017
INCOME	-1.683.577	-915.947	-58.953	-39.182	3.678	22.178



Evolution of Public/Private Income 2006-2017



As the graph shows, income from public and private funds was reasonably well-balanced over time. Public funds include those received from the government of Catalonia and all competitive grants. Private funds include those received from the Private Foundation and the Health Management Foundation of the Hospital de la Santa Creu i Sant Pau, donations and all income derived from activities with private companies.

In 2018, the integration of the Catalan Institute of Cardiovascular Sciences (ICCC) into the Institute had an important economic impact, as the funds for the ICCC from the Catalan government’s Department of Business and Knowledge were incorporated into a consolidated balance sheet; however, these additional funds were offset by increased expenses, which include both salaries for the ICCC personnel and services for the scientific work of the institute. As a result, the integration of the ICCC did not increase net income, but actually led to a small deficit.

It is important to underscore the chronic, ongoing structural deficit in the Institute’s budget compared to similar institutes in terms of structural income, which is used as the basis to compare results. The following table shows the financial results for health care institutions and research centres in Catalonia (Institutes and Centres Data 2014-2015). Results are given through the year 2015, although the results in both 2016 and 2017 are similar.

Resources obtained in 2014 and 2015 over provision of funds: grants from government of Catalonia, competitive and non-competitive funds

	Aportació Generalitat €		Variació 2014	Fons competitiu aconseguit €		Variació 2014	Fons no competitiu aconseguit €		Variació 2014	
	2014	2015		2014	2015		2014	2015		
CENTRES DE RECERCA	CMRB	1.804.340	2.826.986	↑57%	526.712	656.235	↑25%	600.000	192.320	↓68%
	CREAL	1.569.600	1.562.616	→	1.816.059	2.220.064	↑22%	337.858	86.464	↓74%
	CRG	13.883.400	14.718.400	↑6%	19.504.277	29.334.665	↑50%	3.114.043	2.112.305	↓32%
	IBEC	3.224.288	2.725.000	↓15%	5.172.384	12.874.348	↑149%	1.168.230	397.035	↓66%
	ICCC	945.875	946.000	→	230.484	63.984	↓72%	1.134.290	765.124	↓33%
	IJC	600.000	600.000	→	640.315	2.365.201	↑269%	470.900	967.072	↑105%
	IMPPC	2.220.699	2.221.000	→	261.500	-	-	1.000	-	-
	IRB	12.447.820	12.533.000	↑1%	10.242.026	14.231.384	↑39%	2.428.037	1.361.384	↓44%
	ISGLOBAL/CRESIB	1.107.000	1.482.000	↑34%	8.341.644	1.152.174	↓86%	918.977	3.866.983	↑321%
INSTITUTS D'INVESTIGACIÓ SANITÀRIA	IDIAP Jordi Gol	735.000	735.000	→	657.648	756.302	↑15%	1.097.745	480.357	↓56%
	IDIBAPS	5.605.548	5.866.000	↑5%	24.394.576	25.212.106	↑3%	9.523.051	14.508.224	↑52%
	IDIBELL	5.070.000	4.800.000	↓5%	10.049.502	15.797.689	↑57%	7.086.364	4.396.091	↓38%
	IDIBGI	450.000	500.000	↑11%	708.643	2.055.014	↑190%	806.846	1.055.902	↑31%
	IGTP	500.000	600.000	↑20%	3.686.599	4.768.294	↑29%	4.656.054	4.326.359	↓7%
	IISPV	520.000	520.000	→	1.126.454	2.098.108	↑86%	1.051.425	758.673	↓28%
	IMIM	3.100.000	3.100.000	→	7.319.820	9.540.310	↑30%	7.541.618	8.342.129	↑11%
	IRBLeida	500.000	500.000	→	2.579.836	2.302.787	↓11%	2.079.050	1.829.003	↓12%
	IRHSCSP	700.000	700.000	→	5.830.856	6.758.741	↑16%	8.350.552	9.885.582	↑18%
	VHIO	1.210.000	1.210.000	→	4.987.010	5.018.998	↑1%	5.581.633	21.679.515	↑288%
	VHIR	2.000.000	2.100.000	↑5%	10.633.842	12.722.724	↑20%	24.685.971	13.757.336	↓44%
TOTAL	58.193.570	60.246.002	↑4%	118.710.186	149.929.126	↑26%	82.633.642	90.767.858	↑10%	

↓ Disminució respecte al 2014; ↑ Augment respecte al 2014 → Sense variació respecte al 2014

Font: SIRECS-UNEIX i pressupostos de la Generalitat

Source: SIRECS-UNEIX and Catalan government budget

Translation: Catalan government contribution/Variation/Competitive funding obtained/Non-competitive funding obtained

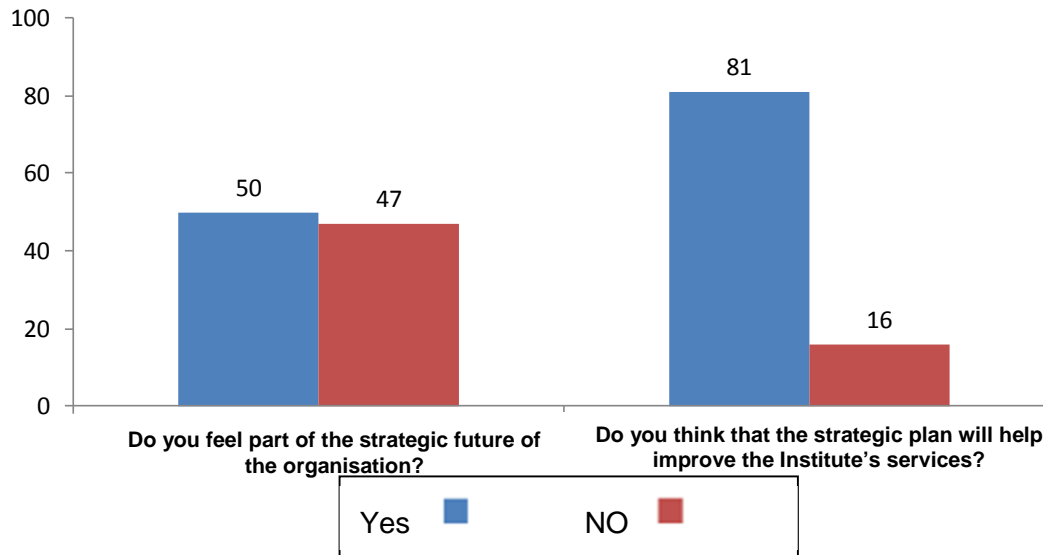
The new research building was inaugurated in 2019 and became fully operational that same year. The building created new expenses, particularly with regards to maintenance, leading to an overall increase in expenses.

Given these data, with regard to the structural financing of the Institute, we can conclude that relative operational financing from the Catalan government has been insufficient since joining CERCA. As a result, the Institute is highly dependent on funds from our two foundations to balance the budget.

4.6. SURVEY OF PROFESSIONALS: RESULTS

In October 2018, an online survey of the Institute's professionals was conducted to determine their views with regard to improvements at the Institute. A total of **97 responses** were received. The main findings are presented below.

The first section of the survey contained several questions about strategy, with the following result:



Although only 51% of those surveyed reported feeling involved in the organisation's strategic future, over 80% believed that the strategic plan would help to improve the Institute's services.

In the second section, participants were asked to assess 23 different aspects of the Institute according to whether they considered a given aspect to be a strength or weakness of the Institute. Responses were given on a scale ranging from 1 to 5 for each item, with higher scores indicating greater agreement with the statement.

The survey results are shown in the following table, with the percentage responses received for each item. The last column shows the sum of the percentage of responses received for scores of 4 or 5, indicating a positive assessment.

On average, only **26% of the professionals** surveyed gave a **high rating** (score of 4 or 5). For most items, the most common score was 3, suggesting a need for improvement. For some items, a score of 2 was common.

The results in the last column are colour-coded to facilitate interpretation. Green indicates that the combined percentage of high scores (4 or 5) is > 26%, orange indicates that the percentage is around 26 %, while red indicates that the combined percentage is below 26%.

RESEARCH AND INNOVATION

Research and Innovation	1	2	3	4	5	4+5	NS/NC
1. We are well positioned in Catalonia	2%	23%	36%	33%	6%	39%	0%
2. We are well positioned at a national level	7%	26%	34%	29%	4%	33%	0%
3. We are competitive nationally	10%	26%	31%	26%	7%	33%	0%
4. We have the capacity to attract talent	10%	28%	27%	31%	4%	35%	0%
5. There is a good evaluation system for groups	12%	27%	38%	22%	1%	23%	0%
6. Innovation and technology transfer are encouraged	15%	32%	36%	16%	0%	16%	0%

Six different aspects in the area of research and innovation were assessed. The two items that received the highest scores were research position in Catalonia (item 1) and capacity to attract talent (item 4). By contrast, the two lowest-rated items were the group assessment system (item 5) and promotion of innovation and technology transfer (item 6).

RESEARCH SUPPORT SERVICES

Research Support Services	1	2	3	4	5	4+5	NS/NC
7. Intranet	5%	22%	31%	33%	4%	37%	5%
8. Internal communication	10%	18%	33%	33%	3%	36%	3%
9. External communication	13%	16%	31%	24%	3%	27%	12%
10. Projects Unit	5%	12%	21%	30%	14%	44%	18%
11. Travel management	11%	13%	23%	23%	2%	25%	28%
12. Support for patent applications	5%	8%	11%	8%	3%	11%	64%
13. Support for preparing agreements/contracts	1%	18%	22%	30%	11%	41%	18%
14. Continuous training	6%	22%	30%	27%	5%	32%	10%
15. Scientific dissemination meetings	7%	20%	29%	29%	5%	34%	10%

This block of questions assessed nine different aspects. As the table shows, in some cases, a significant proportion of participants did not assess certain items (“don’t know/no opinion”). For example, 28% and 64%, respectively, of the professionals surveyed did not give a score for the items “travel management” and “support for patent applications”.

In this section, the most highly rated aspects were the Projects Unit, with 44% of responses either a 4 or 5, and support for preparing agreements and contracts (41%). The lowest rated aspects were external communication, travel management, and support for patent applications.

SCIENTIFIC-TECHNICAL SERVICES PLATFORMS

The final section of the survey evaluated the scientific-technical services platforms. In most cases, only half of those surveyed gave a score for all of the platforms, with more than 50% of answers being “don’t know/no opinion”, based on whether the respondent had used a given platform.

In general, the scores were low, with less than 20% of respondents giving a score of 4 or 5, except for the Animal Experimentation Service, which was the most highly rated aspect in this section.

Open-ended questions were included to allow participants to indicate their perception of the Institute’s strengths and weakness, and also to suggest measures for improvement. All responses were analysed and grouped together for inclusion in the SWOT analysis.

It is important to emphasize that, at the time the survey was conducted, the physical facilities for these services/units were less than ideal. After the move to the new building, these services will be evaluated again according to the needs of the groups and technology changes.

5. DIAGNOSIS. KEY TRENDS IN OUR REGION

To implement the scientific strategy, it is important to assess the environment (scientific, political, economic) in which we find ourselves, which is a complex one. This analysis was performed at three levels: European, national, and regional.

Using this analysis, we had to decide how to orient and align our strategy with policies for biomedical research and innovation, but also with national and international trends. To this end, we assessed the strategic policies and regulations published by the following organisations:



5.1. INTERNATIONAL PRIORITIES

Through the Europe 2020 programme, the European Commission established its current priorities, which emphasises knowledge and innovation, sustainability, competitiveness, and social and territorial cohesion. The **Horizon 2020** programme aims to fund research and innovation effort that focus on several different strategic pillars, with health care being a key priority as one of the main challenges facing society.



Challenges Established by the EC



Facing the current problems:

- ✓ Population ageing
- ✓ Increased burden of diseases
- ✓ Lack of sustainability and inequalities in health care
- ✓ Pressure to reform health care

The European Commission has issued this challenge:

Social Challenge 1: Health, Demographic Change and Well-being

Objectives:

- ✓ Improve our understanding of the causes and mechanisms related to health, such as healthy ageing and disease
- ✓ Improve our ability to monitor health and to prevent, detect, manage and treat diseases
- ✓ Support the elderly so that they stay healthy and active
- ✓ Test and demonstrate new models and tools to promote health and treatments

However, we need to look beyond this, as we cannot rely on a strategy designed for the year 2020, which is quickly coming to an end. Rather we must consider **Horizon Europe**, which will establish the measures to be taken from 2021 to 2027, prioritising support for knowledge dissemination (open communication), the impact of research and innovation, and the presence of the user in the innovation value chain. Therefore, this programme will focus on:

- ✓ Promoting and supporting innovations that present significant potential to disrupt the market.
- ✓ Mission-oriented R&D: to match EU research and innovation to the needs of society and citizens, with strong visibility and a high impact.
- ✓ International cooperation to resolve global problems.
- ✓ Open science: better dissemination and exploitation of the results of R&D&I and support of these efforts.
- ✓ Strengthen international collaboration.

It is important to stress the importance of responsible research and innovation, an approach that supports more inclusive, more sustainable innovation. For this reason, the participation of those involved is important; there is increasing talk in the sector of encouraging the participation of patients and health care users.

Therefore, responsible research and innovation must be one of the Institute's core values, and we must also define an objective to develop a Corporate Responsibility Plan.

5.2. NATIONAL PRIORITIES

As an ISCIII-accredited institute, we must take into account the ISCIII's strategic plan, which forms part of the Spanish Strategy on Science, Technology and Innovation 2013-

2020 and the Spanish National Plan for Scientific and Technical Research and Innovation 2017-2020. The basic objectives are:

- ✓ Generation of knowledge in health sciences.
- ✓ Production of a positive impact in the health of the population.
- ✓ Generation of wealth through innovation and the creation of various business initiatives.
- ✓ Support for the international leadership of the Spanish Science and Technology System.

The Spanish National Plan for Scientific and Technical Research and Innovation 2017-2020 establishes the following objectives:

- ✓ Spanish National Plan for Scientific and Technical Research and Innovation 2017-2020
- ✓ Incorporation and training of Human Resources in R&D&I (O1)
- ✓ Strength and leadership in the generation of scientific and technological knowledge (O2)
- ✓ Accelerate private investment in R&D&I and the competitiveness of innovative companies (O3)
- ✓ Develop and consolidate the impact of strengths in R&D&I to benefit the main challenges facing society (O4)
- ✓ R&D&I synergies and policies: Spanish Central Administration-Regional Administration-EU (O5)
- ✓ Open R&D&I and responsible participation of society (O6)

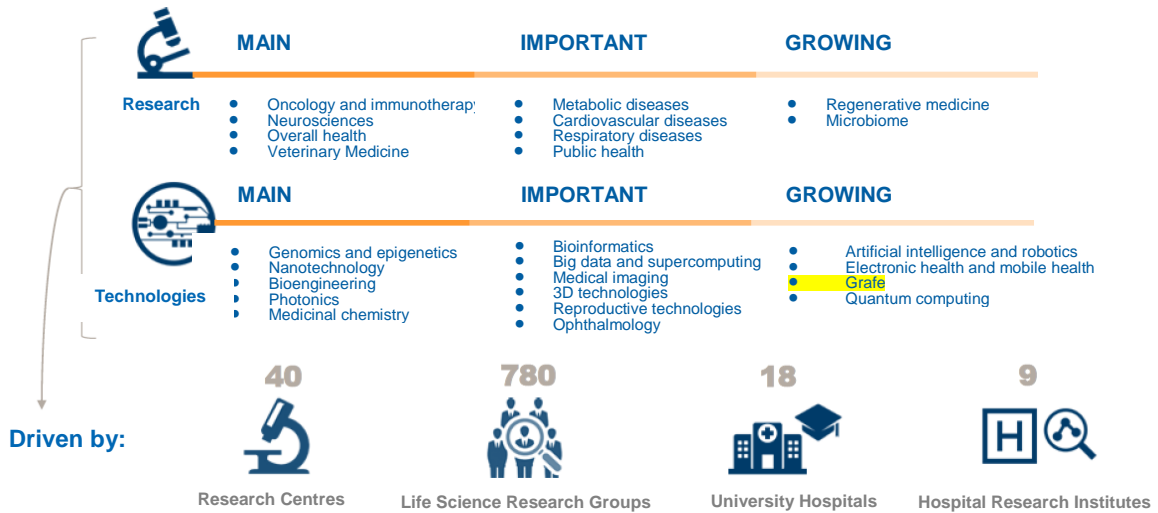
These strategic lines are closely aligned with the European strategy. Therefore, we must adapt in order to identify new formulas to measure our scientific activity and adjust our policies to those defined by the various organisations.

5.3. REGIONAL PRIORITIES IN CATALONIA

In the case of Catalonia, it is important to underscore the favourable environment and the numerous initiatives in the field of research and innovation in the life sciences sector. The sector report published by ACCIÓ (Agency for the Competitiveness of Business) in April 2018 shows the evolution of the health care sector in recent years, which demonstrates the potential of our ecosystem consisting of university hospitals and their research centres, technology centres, universities, businesses and start-ups, accelerators, and related trade fairs. This report presents the main assets of the Catalan bioregion, an environment highly conducive to research.

Main Assets of the Catalan Bioregion

Biocat, strategic organisation and catalyst for the construction of the Catalan ecosystem for life and health, has identified the main assets of the Catalan bioregion in research and technology:



Source: Biocat, 2017

Note that this report includes trends in new, emerging technologies expected to make their way into the health care sector in the next few years, prompting important changes:

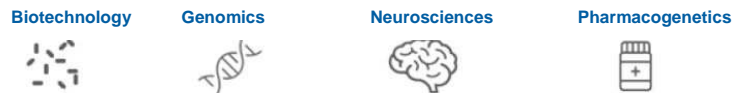
Technological Opportunities

ACCIÓ has identified 12 innovative technologies as the main drivers of evolution and disruption in Catalonia in the coming years. It is in the health sector where these technologies are most expected to lead to important changes:

Artificial Intelligence VR and AR Internet of Things Blockchain Robotics 3D Printing Nanotechnology Quantum Science



4 of these 12 technologies are specific to life sciences:



The Catalan ecosystem of life sciences and biology is made up of the **most important and innovative companies and research institutes**. With the **densest pharmaceutical ecosystem in Europe, the largest biotechnology industry in Spain and a highly technological medical device sector and a fast and continuous growth**, Catalonia offers the most complete business ecosystem for life sciences in southern Europe. Similarly, Catalonia has more than **40 leading scientific, technical and research centres, which are strategic for the development of life sciences industries**. Innovation is also one of the main characteristics of the Catalan life sciences sector: it has more than 95 active spin-offs and 352 start-ups. Furthermore, over the **past 5 years more than 200 related companies** have been created. In addition, neuroscience, genomics and epigenetics are classified as the main capacities of the Catalan bioregion by Biocat, the strategic organisation and catalyst for the Catalan life sciences sector.

Source: Map of Technology Trends,

The Catalan Health Plan 2016-2020 is the current strategic plan guiding policy at the Catalan Department of Health. This plan includes a specific line aimed at promoting research and innovation throughout the Catalan health care system to align the research strategy with other strategic lines of the Health Plan.

PERIS 2016-2020 (Strategic Plan for Research and Innovation in Health) is aligned with the contents of the Catalan Health Plan 2016-2020. PERIS is the development vector for the research and innovation line, which essentially represents the research and innovation strategy of the Catalan Department of Health. The objectives established in the Strategic Plan (PERIS), which we will align our strategy with, are as follows:

- ✓ Objective 1: Promote the **participation of patients** and, in general, the Catalan people, in the research and innovation policies of the Catalan health system.
- ✓ Objective 2: Increase the quality of research in the health care field to ensure the **excellence** of our health care system.
- ✓ Objective 3: Strengthen capabilities to translate knowledge generated by researchers and technologists to clinical health care in the areas of prevention, diagnosis, and treatment of pathological processes, and to promote better health more generally.
- ✓ Objective 5: Promote training and employment opportunities for scientists and technologists in the Catalan health care system and **strengthen the scientific capacities** of health care professionals.
- ✓ Objective 6: Integrate health **research and innovation policies** with other existing policies in Catalonia.
- ✓ Objective 7: Strengthen the role of the Catalan health system as an agent to support innovation by creating mechanisms to **accelerate the transfer of knowledge** to the productive sector.
- ✓ Objective 8: Promote **dissemination** of scientific advances in the health care field.

5.4. COLLABORATIONS AND NETWORKS

It is important to emphasize that all our work would be worthless without the collaboration of the important players in our ecosystem, both nationally and internationally.

As shown in the internal diagnosis, specific collaboration agreements have been signed with other centres, universities, and industry. However, we are also working on generating a map of strategic alliances to conduct our work without needing to expand the infrastructure and to ensure that we take advantage of expert knowledge for each case. This will be an important strategic line to develop.

5.5. CONCLUSIONS OF THE EXTERNAL DIAGNOSIS

- ✓ Research and innovation in the health sector is a priority and a strategic objective underlying the policies of government, both national and international.
- ✓ There is a clear trend towards developing closer relations between public and private sectors, especially in the area of innovation.
- ✓ There is also an increasingly strong trend to critically evaluate the impact of research and innovation projects.
- ✓ Patients are being increasingly involved in research and innovation projects, giving them an important, proactive role.
- ✓ Fundraising has become even more competitive.
- ✓ Internationalisation is a key component of all strategies.
- ✓ The current environment is highly conducive to carrying out innovation projects
- ✓ The policies for CERCA centres and ISCIII-accredited institutes have changed with regard to assessing results and evaluating research groups.

6. SWOT Analysis

To perform the diagnosis of the current situation, the following groups were asked to participate in strategic sessions to reflect on and review the current situation with:

- ✓ Management teams from the Institute (16 April 2018)
- ✓ Permanent Commission (23 April 2018)
- ✓ Internal Scientific Committee (11 May 2018)
- ✓ Governing Council (22 October 2018)
- ✓ Board of Trustees (3 December 2018)

In addition, on 14 June 2018, a strategic review session involving 40 professionals from the Research Institute was held. Subsequently, 95 professionals from IIB Sant Pau were surveyed.

This process was used to identify weaknesses and threats as well as strengths and opportunities facing IIB Sant Pau. This information was then used to perform the SWOT analysis presented below:

STRENGTHS	OPPORTUNITIES
<ol style="list-style-type: none"> 1. The brand, history and story of the Foundation of the Hospital de la Santa Creu i Sant Pau 2. High scientific production 3. Very efficient in research 4. Good cross-disciplinary services 5. Increasing number of clinical trials 6. Increase in FIS (Spanish Fund for Health Research) 	<ol style="list-style-type: none"> 1. The Sant Pau brand 2. Improve talent recruitment 3. New building and new facilities 4. Contribution of ICCC integration for fundraising 5. New CIM facilities, opportunity to offer quality external services 6. Relationship with industry

<p>projects</p> <ol style="list-style-type: none"> 7. Centre for Drug Research (CIM) 8. Good relationship between clinical and basic research 9. Good translational clinical research 10. Multidisciplinarity 11. Significant activity in collaboration agreements with the industry, nationally and internationally 12. Comprehensive service by scientific platforms 13. Increasing trend in the last two years in transfer activities 14. Good communication and collaboration with the University 15. Accreditation as a CERCA centre and ISCIII Institute 16. Complementary structure of IIB Sant Pau, organisations with different activities 	<ol style="list-style-type: none"> 7. Sharing equipment and techniques 8. An important innovation ecosystem is being created around health 9. Increasing public and private investment in innovation in our area. 10. Positive involvement of society in biomedical research 11. Changes in R&D policies, with an emphasis on impact 12. Grants to promote internationalisation 13. H2020 fundraising 14. Restructuring of platforms in the new building. External utilization. 15. Room for improvement in the review of processes 16. Increase institutional relations, enhance strategic alliances 17. New facilities 18. Integration with ICCC, structures and staff
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WEAKNESSES

THREATS

<ol style="list-style-type: none"> 1. Insufficient critical mass 2. Improve the interaction between basic and clinical research 3. Dispersion of research groups (little interaction) 4. Minimal interaction with patients 5. Lack of diversification of funding sources 6. Lack of a good economic returns from the private sector 7. Weak structure for attracting resources (patronage) 8. Sense of belonging missing 9. Absence of policies to support research at the hospital (hiring of personnel, incentives, professional career) 10. Lack of a talent recruitment programme 11. Lack of technical-administrative personnel 12. No European projects office 13. Qualitative resources need developing (collaboration, dissemination) 14. Lack of a system for monitoring objectives and indicators 15. Lack of meritocratic/scientific criteria to assess researchers 16. Low levels of international fundraising 17. Insufficient resources for the platforms 18. Work is not process-based 19. Little flexibility when adapting to new requirements 20. There are no self-support structures. Significant dependence on external management 21. Economic deficit in the 2018 financial year. Need for a viability and sustainability plan 	<ol style="list-style-type: none"> 1. Lack of funding 2. Reduction in non-competitive funds 3. Very competitive environment (difficulty recruiting good students) 4. Excessive focus on patient care (research work not considered) 5. Decrease in public resources 6. Excessive bureaucratisation of administrative procedures 7. New laws, regulations, public procurement law, data protection law, transparency law, intellectual property laws... 8. Difficulty attracting talent 9. Lack of investment and technological renewal 10. Changes in the evaluation systems for Research and Innovation. Definition of new indicators 11. Excessive external entities that require indicators, which have often not been systematically gathered. This is becoming more onerous.
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7. BASES FOR CHANGE

During the strategic review sessions, professionals from the IIB discussed, in their respective working groups, proposals for actions to be performed in the next four years to address the opportunities and threats identified in the SWOT analysis.

This debate and reflection process identified five main bases for change.



8. STRATEGIC PRIORITIES AND OBJECTIVES

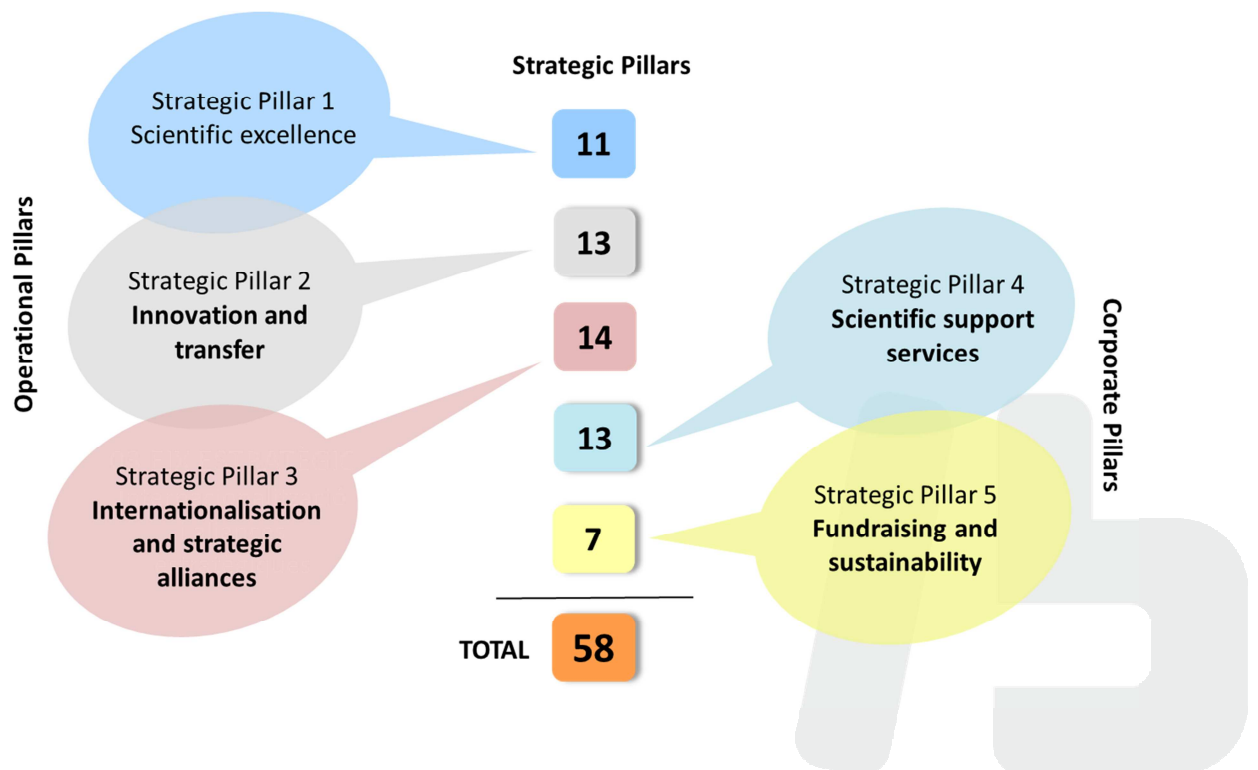
The Strategic Plan is intended as a management, incentive, and motivational tool, which establishes a shared roadmap for the professionals of the IIB Sant Pau.

In line with the bases for change, the Strategic Plan for Research and Innovation 2019-2023 has been structured around 5 pillars and 58 specific objectives.



These 5 strategic pillars must act as a lever for change in the evolution of IIB Sant Pau.

They are grouped into two blocks. The first block contains the three operational pillars most relevant to the Institute's research and innovation activity, while the second block contains the two corporate pillars designed to support and contribute to the success of the first block.



8.1. STRATEGIC PILLAR 1: Scientific Excellence

Challenge to which it responds: **Develop a model research system**

In recent years, the IIB Sant Pau has established all the mechanisms needed to ensure a model research system, as evidenced by the indicators shown in the diagnostic part of the present review. Consequently, we are currently in the consolidation and continuity phase, which will ensure good results in the coming years.

One of the keys to maintaining scientific excellence will be closer collaboration among the research groups of IIB Sant Pau, particularly to provide good translational clinical research. The creation of common spaces will facilitate closer integration of the various research groups.

Several lines of action will be prioritised over the next four years, starting with efforts to provide more visibility and to strengthen the brand of the IIB Sant Pau. In addition, more resources will be allocated to attract high level junior and senior researchers. Talent recruitment and retention are one of the greatest challenges facing us in the coming years, as described in the European Commission's HR Strategy for Researchers (HRS4R). It will be necessary to demonstrate implementation of an open, transparent, and merit-based recruitment (OTM-R) process, as called for in the HRS4R strategy. Such as process (OTM-R) will help to promote a more attractive research career, ensuring equality of opportunity, which will allow for the best person for a given position to be hired. This process benefits everyone—researchers, institutions, and the research system in general—by creating opportunities for all candidates and facilitating mobility.

The policy of excellence in prioritising resources will continue. We will also continue working with the research groups to reach a consensus on a good strategy to improve the evaluation system based on external evaluations performed according to internally-defined criteria. All actions defined with the research groups will be included in the Institute's Scientific Plan. Another “diagnostic process” will be needed to define the strategy for prioritising research areas of interest and to evaluate the possibility of redefining the Institute's specialisation.

We also aim to continue measuring the impact of our research. For this reason, apart from periodic external evaluations, we will continuously evaluate the scientific activity of the research groups, sharing the results through the Institute's scorecard. All these indicators must be aligned with the policies set by the regulations and standards established as part of our accreditation as a CERCA centre and as an ISCIII accredited institute.

One important commitment for the future is to promote greater interaction between science and society. The incorporation of “social responsibility” aimed at creating a

responsible research and innovation model will be promoted to motivate and involve key players and to evaluate the impact of our research on patients.

Strategic lines of action will be performed through the following strategic objectives:

STRATEGIC LINES OF ACTION	STRATEGIC OBJECTIVES
Design strategies to attract and retain national and international talent	SO1.1: Promote and improve recognition of the IIB Sant Pau brand
	SO1.2: Develop active policies to attract talent (junior and senior profiles)
	SO1.3: Open, Transparent and Merit-Based Recruitment Process (OTM-R)
Integrate IIB Sant Pau research groups and work methodologies	SO1.4: Strengthen a culture of collaboration among IIB Sant Pau research groups
	SO1.5: Streamline support services for groups
Improve the group evaluation system	SO1.6: Guarantee scientific competitiveness based on continuous evaluation of the groups' research activity
	SO1.7: Transparently consolidate access to information through the scorecard
Specialisation: research areas	SO1.8: Update and monitor the Scientific Plan
	SO1.9: Give continuity to the policy of excellence in prioritising resources
Responsible Research and Innovation	SO1.10: Corporate Social Responsibility Plan
	SO1.11: Define criteria to measure the impact of research

8.2. STRATEGIC PILLAR 2: Innovation and Transfer of Impact

Challenge to which it responds: **Transform research activity into advances that are applicable to clinical practice**

One notable trend in our region (Catalonia/Spain) is the increasingly active role played by patients. Another trend is greater investment in innovation, from both the public and private sphere. Furthermore, in Catalonia, the ecosystem for innovation in health is becoming increasingly dynamic.

To seize the opportunities offered by this new environment and to transform research into advances applicable to clinical practice, we will continue to promote a culture of innovation at IIB Sant Pau in the coming years by promoting the work of the Innovation and Transfer Unit and creating mechanisms to strengthen the relationship between the Research Institute and other entities within IIB Sant Pau. Along these lines, the Innovation Unit has been defined as a “mixed” unit of both the Institute and the Health Management Foundation.

To optimise research, we will define mechanisms to assess the feasibility of proposed innovation projects and to prioritise the most promising ones. In addition, initiatives for innovative ideas and opportunities will be launched, transfer activities will be increased, and we will seek to identify ways to create an environment of innovation between researchers and other agents.

The success of this strategic pillar involves knowing how to establish collaborations with other agents in the innovation ecosystem and in developing a plan to recognise and disseminate information about innovative projects, which would act as a motivating factor for potential agents of innovation at IBB-Sant Pau.

STRATEGIC LINES OF ACTION	STRATEGIC OBJECTIVES
Promote innovation	SO2.1: Implement a plan to actively promote a culture of innovation at IIB Sant Pau SO2.2: Promote the work of the Innovation and Transfer Unit throughout IIB Sant Pau
Prioritise innovative projects/ideas	SO2.3: Consolidate mechanisms to identify and channel innovative projects SO2.4: Create feasibility and prioritisation analysis mechanisms for innovative projects
Strengthen the innovation model	SO2.5: Strengthen valuation and transfer activities through the unit and with transfer consultants SO2.6: Promote entrepreneurship SO2.7: Create a space for open innovation for researchers and external agents SO2.8: Generate and implement procedures to manage innovation
Interact with the innovation	SO2.9: Participate in institutional programmes that

ecosystem	promote innovation
	SO2.10: Identify and collaborate with companies with innovative components
Develop a model of incentives for innovation	SO2.11: Create a network of strategic alliances to accelerate innovative projects
	SO2.12: Develop a plan for the recognition and dissemination of innovative projects
	SO2.13: Ensure recognition of incentives for innovators

8.3. STRATEGIC PILLAR 3: Internationalisation and Strategic Alliances

Challenge to which it responds: **Increase the level of internationalisation of the IIB Sant Pau**

To achieving recognition as a prestigious research centre, it is essential to be active in the international arena. This strategic pillar includes a set of objectives aimed at promoting the international aspects of IIB Sant Pau. These objectives include providing the resources needed to raise funds through international groups, promoting H2020 and other calls for proposals, strengthening strategic alliances, and promoting professional exchanges at an international level.

These objectives imply the need to focus on three main lines of action: a) identifying and successfully obtaining international research projects, b) promoting a culture of internationalisation and c) defining a work methodology based on the structure and processes of the Institute.

Proper internal communication is particularly important; for this reason, one of the strategic objectives of this pillar is to disseminate the international work of the Institute’s research groups and to identify synergies.

STRATEGIC LINES OF ACTION	STRATEGIC OBJECTIVES
Increase fundraising from international programmes	SO3.1: Identification of initiatives with the potential to access international resources
	SO3.2: Equip the Research Institute with a stable and integrated structure that can provide cross-disciplinary support
	SO3.3: Facilitate research into international

	resources to strengthen the research groups based on external evaluation and indicators
	SO3.4: Promote plans and incentives for internationalisation
	SO3.5: Detect and design specific training to access calls for proposals
Strengthen strategic alliances in international settings	SO3.6: Promote participation and leadership in European consortiums
	SO3.7: Encourage participation in International Research Committees
	SO3.8: Establish agreements with international academic and research centres
	SO3.9: Explore synergies with other national research centres
Promote professional exchanges in the international arena	SO3.10: Support activities that promote international networking
	SO3.11: Encourage participation in recruitment programmes for international professionals
	SO3.12: Encourage participation in enrichment programmes for clinicians
Give visibility to international activities	SO3.13: Promote a culture of internationalisation
	SO3.14: Promote actions to disseminate the work of the research groups in this area and identify synergies

8.4. STRATEGIC PILLAR 4: Scientific Support Services

Challenge to which it responds: **Provide the IIB Sant Pau with the organisational and technological resources necessary to perform its scientific activity**

Strategic pillar 4 is the first of the two corporate pillars designed to support the operational pillars. This pillar includes actions that the Research Institute intends to take in the next four years in the following areas: human resources, the use of platforms, improved internal processes, and better information technologies. In this regard, we must continue to adhere to the European Human Resources Strategy for research (HRS4H), continuous training, and implementation of the equality plan.

In the human resources area, consistent with our desire to construct a project that the professionals can feel a part of and proud of, we will seek to improve human resources policies. These measures will include the development of a professional recognition plan, the promotion of continuous training, and improvements in internal communication and transparency.

The inauguration of the new building has opened up a window of opportunities for the scientific-technical services that the Institute provides to its research groups. However, some of these services must be redefined and some of the shared laboratories still need to be made operational. All services must be performed efficiently according to quality standards. Of the various services offered, three in particular should be highlighted as strategic services—the Biobank, the Clean Room, and the Animal Experimentation Service.

Within the framework of the Strategic Plan 2019-2023, the intention is to improve internal processes and, with this aim in mind, define the quality plan and begin to implement a process-based management model. In this regard, we will need to develop a comprehensive Quality Plan, which will be progressively implemented throughout the entire Institute, including the organisational structure and the specialised units, including:

- ✓ Quality Program at CIM Sant Pau, which must include the new structure for phase I trials in oncology and haematology.
- ✓ ISO 9001 quality system for the certification of platforms.
- ✓ Implementation of Good Clinical Practice in the clinical research platform AGDAC, which will be subject to audits by pharmaceutical laboratories and inspection by the FDA.

Finally, these organisational changes will require substantial changes in our IT systems, which will also help to make our processes more efficient. For this reason, an IT systems plan will be designed and we will also begin to take steps towards becoming a “paperless” research institute.

Quality and IT systems are key aspects of the strategy to gain efficiency in the near future, which is why we need a specialised IT unit to implement the activities and goals defined here.

Consequently, structural and organisational changes are needed to define the scorecard and develop a plan for improvement actions.

STRATEGIC LINES OF ACTION	STRATEGIC OBJECTIVES
Create a project that professionals feel part of and proud of	SO4.1: Improve HR policies to retain talent
	SO4.2: Ensure the stability of a continuous training strategy adapted to the needs of professionals
	SO4.3: Promote a culture of corporate social responsibility based on values

	SO4.4: Maintain HRS4R accreditation
	SO4.5: Improve internal communication and transparency
Optimise the use of platforms	SO4.6: Update the provision of scientific-technical services
	SO4.7: Implement a continuous evaluation plan for the quality of the platforms
	SO4.8: Obtain ISO accreditation for the platforms
Work with efficient processes	SO4.9: Define the Comprehensive Quality Plan for the Research Institute and the progressive implementation of the plan
	SO4.10: Elaborate a comprehensive process-based management model
	OE4.11: Define a scorecard
Make ICTs available to support professionals	OE4.12: Provide the Institute with basic IT systems for managing processes
	SO4.13: Provide the Institute with a document management system

8.5. STRATEGIC PILLAR 5: Fundraising and Sustainability

Challenge to which it responds: **Diversify sources of funding**

The fifth and final strategic pillar includes a series of actions aimed at increasing our capacity to raise the funds needed to finance the Institute's activity and to ensure its sustainability.

Actions in this area will be aimed at finding sources of private and international funding, as well as patronage. One of the main sources of private financing comes from the clinical trial services offered by the Institute (CIM). Therefore, this unit must be strengthened as a source of financing.

To improve fundraising efforts, a good external communication strategy is essential, with quality materials and a range of professional services. Efforts in this line should focus on establishing a business-centric model.

STRATEGIC LINES OF ACTION	STRATEGIC OBJECTIVES
Diversify sources of funding	SO5.1: Increase private fundraising
	SO5.2: Implement a strategy to seek patronage funds
	SO5.3: Create a unit specialised in obtaining international resources
	SO5.4: Develop an external communication strategy

	to improve fundraising
Ensure the sustainability of the structure	SO5.5: Review structural revenues and operating grants
	SO5.6: Strengthen the infrastructure for clinical trials as a source of funding
	SO5.7: Increase competitiveness to obtain resources from phase 1 and 2 trials (CIM)



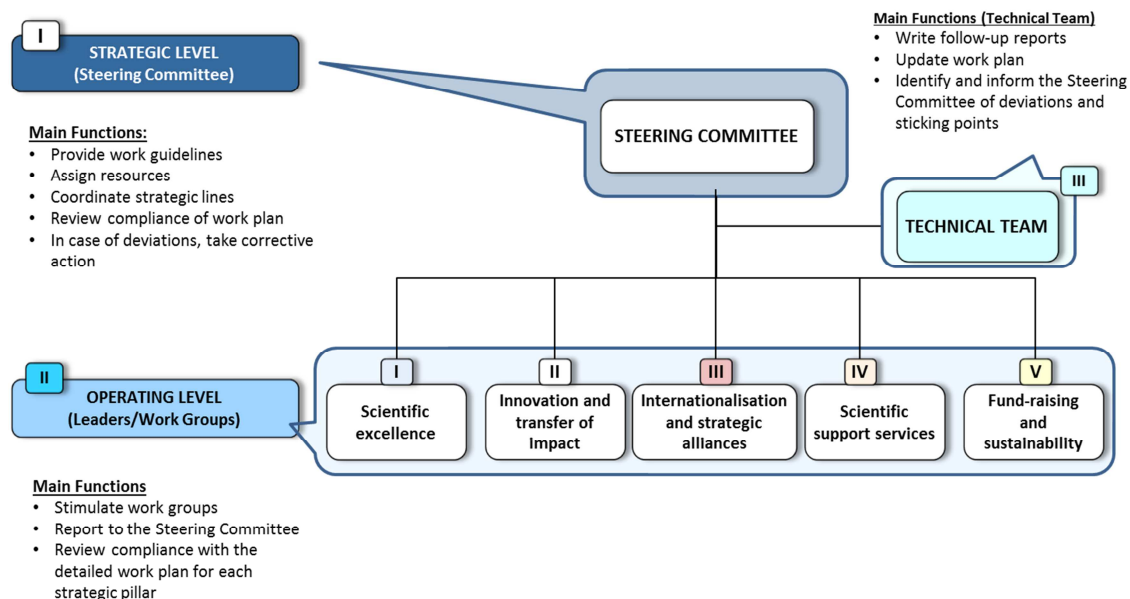
9. IMPLEMENTATION PHASE

One of the key aspects of any strategic plan is to monitor the execution of the objectives during the plan's period of validity. Consequently, the implementation phase requires the development of a monitoring methodology.

Implementation of the Strategic Plan for Research and Innovation 2019-2023 will be divided into two main areas: 1) strategy: definition of strategies, allocation of resources, and monitoring of the main lines of activity and 2) operations: a leader is assigned to each strategic pillar and tasked with guiding and motivating the members of the working group. The working groups execute the agreed tasks and monitor daily operations.

The leaders are the individuals responsible for overall management of the strategic pillar, with the support of a working group. In this regard, a technical team or individual person will be responsible for monitoring the work, creating reports, and for informing management of any deviations from the plan.

The main tasks in the implementation phase are as follows:



Monitoring will be based on an annual plan using a scorecard to monitor and evaluate deviations from the results and costs of the activity in question.

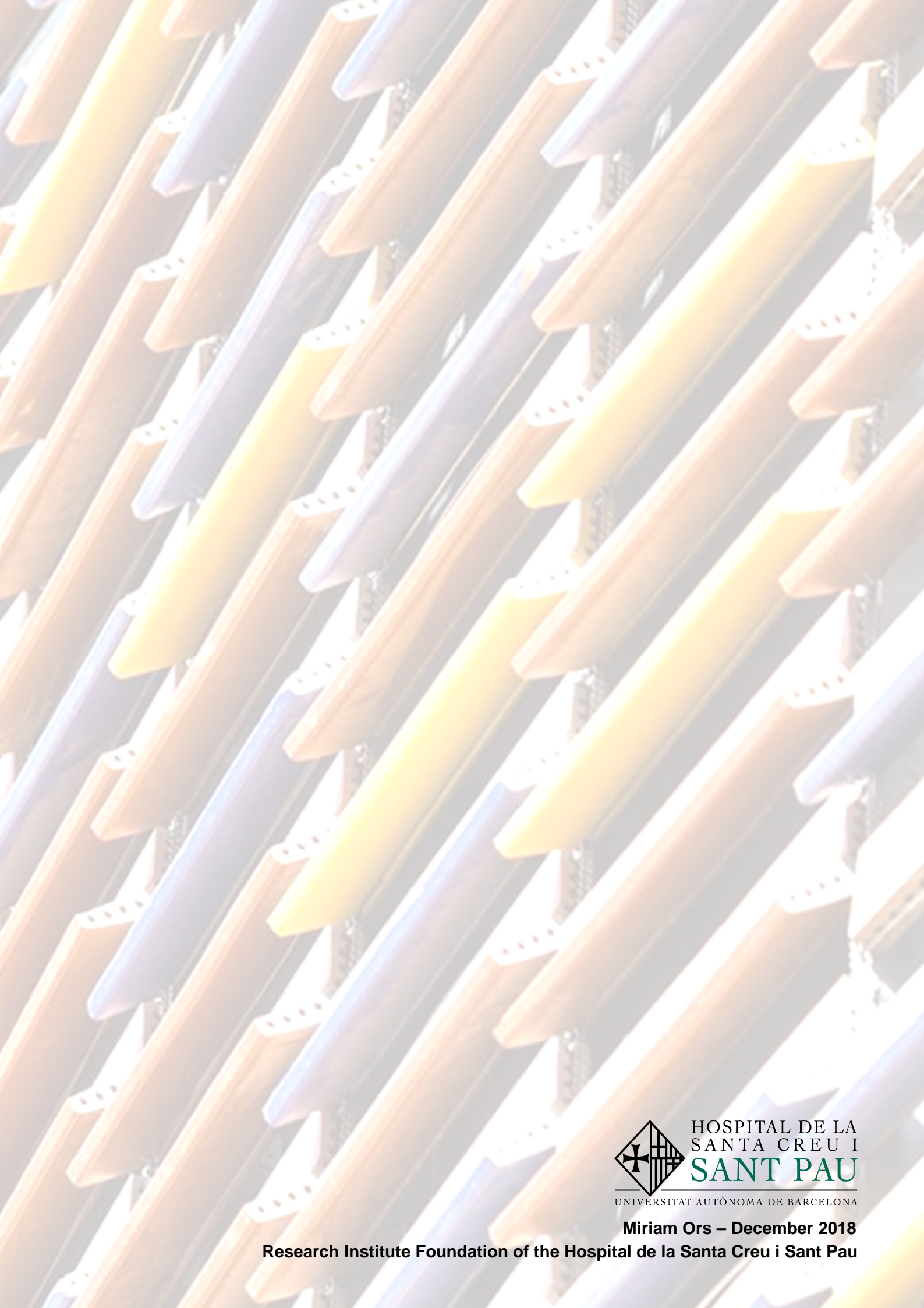
ACKNOWLEDGEMENTS

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HOSPITAL DE LA
SANTA CREU I
SANT PAU

UNIVERSITAT AUTÒNOMA DE BARCELONA

Miriam Ors – December 2018

Research Institute Foundation of the Hospital de la Santa Creu i Sant Pau