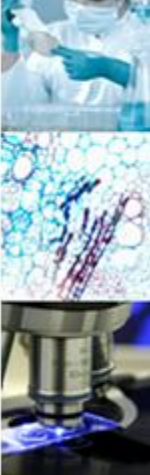




Development Plan, 2012-2015





National Research & Development Institute for Biological Sciences

Ministry of Education, Research, Youth and Sport

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Context

Romanian accession to the EU brought in 2007 great expectations for the entire scientific community. Given the commitment for RDI at European level, there were high hopes that Romania will align itself with reinforced funding and more ambitious goals. The first two years after accession partially confirmed such hopes. The Government adopted the National RDI Strategy & Plan 2007-2013 and increased the budget allocation for RDI. There was a good breath of oxygen for the local research actors which managed, through a competitive system of national and European calls for projects, to improve their management capacity and research infrastructure, increase their number of staff by hiring more young students and even attracted young Romanian researchers from abroad.

Unfortunately, due to the global crisis, the beginning of 2009 was marked by a dramatic cut of the national research budget, which translated into massive budget cuts of on-going research projects (up to 60%), into cancelation of new calls, delays in payments, institutional redesign of the National RDI Plan (NPRI) etc.

The lack of predictability in terms of public funding in 2009-2010 strongly affected the management of the research entities and reduced the RDI activity to the survival level.

The year 2011 came with positive changes in research policy and legislation as a reaction of research authorities to overcome the existing faults and improve the suffering research system (Gov. Emergency Ordinance 6/26.01.2011 referring to the scientific research and technological development, Gov. Decision 133/16.02.2011 referring to the changes of some regulation regarding the National Plan for Research, Development & Innovation, Gov. Decision 1062/October 2011 referring to the evaluation and classification of research entities for getting access to public institutional funding). Moreover, in 2011, some of the NPRI financing instruments were re-activated of the NPRI and new calls were opened.

INSB, the National Institute of Research & Development for Biological Sciences, adapted rapidly to these constantly changing conditions. The Institute understands that at times of distress, the prevalent logic can be "the fittest will survive". However, RDI policy and investment needs to be strategic, based on a broader development vision.

It is with great hope that INSB participates to the evaluation and classification of Romanian R&D actors aiming their national certification, according to the recently approved regulation (GD¹ 1062/14.11.2011).

As required by the above-mentioned regulation, this Report presents the INSB Institutional Development Plan for 2012 – 2015. The structure follows format suggested by GD1062, while adding a few other (sub)chapters found relevant for our strategic view for the research activity of the Institute in the 4 years to come.

The approach in drafting the Development Plan was highly opened and participatory. An important part of the staff was consulted and feedback was received thereafter. The document is an expression of the determination of INSB to overcome future challenges and fulfil its ambitious vision in the near future.

Mandate

INSB was established in 1996² as a National Research & Development Institute having as core activity fundamental and applied scientific research, innovation and technological development in the life sciences field aiming to fathom the knowledge of life based processes, organisms development in particular environment terms, biodiversity and national genofond preservation.

According to its role as National Institute, INSB is **one of the main partners of the Romanian Government in the field of biological/life sciences** and actively contributes to the achievements of the scientific and technological goals set by the S&T national research programs. INSB is a reliable partner in European programs (FP6, FP7) and other international RDI programs.

INSB is a Romanian legal person coordinated by the National Authority for Scientific Research within the Ministry of Education, Research, Youth and Sport, The headquarter is established in Bucharest and has 2 branches: Biological Research Institutes Cluj Napoca and Iași and 1 subsidiary: Biological Research Center „Stejarul” Piatra Neamț.

The INSB Organizational Chart is included in the Appendix 1 (version approved by the MedCTs Order no. 3750/17.04.2008).

¹ Government Decision

² INSB was established by G.D. 1317/ 11.12.1996, by reorganisation of Development Biology Institute, Bucharest and its merger with Biological Research Institute, Cluj Napoca, Biological research Institute Iasi and "Stejarul" Biological Research Centre , Piatra Neamț. In 2002, INSB absorbed the National research Institute for Biotechnology (G.D. 1272/13 Nov. 2002). INSB last accreditation occurred in 2008, by Decision 9688 / 30.06.2008.

Vision

INSB will consolidate by 2015 its position as the **most prominent Romanian applied research organization in field of life sciences** with internationally recognized achievements in **biomedicine, agri-food and environment & biodiversity.**

INSB will enhance its unique combination of skills and competences at national level in several critical areas for the future, such as **bioinformatics, biotechnologies, bioanalysis and biomaterials** which will contribute both to the prosperous and healthy development of the Romanian society and to the general progress of European research in the field of life-sciences.

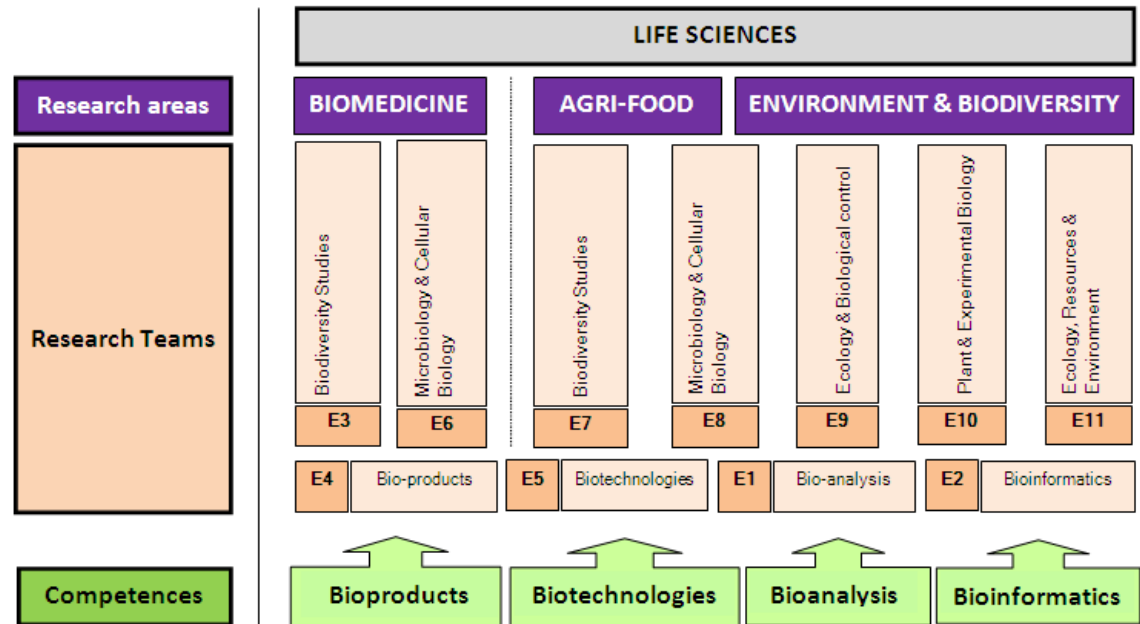
Mission statement

Our mission is **excellence in life sciences research undertaken through the process of integrating research in the biological sciences and cooperating with local & international partners** to understand the processes of life and solve issues of health, food, society and environment.

INSB aims to:

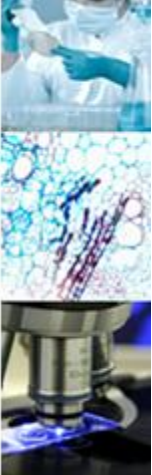
- Keep up-to-date with the scientific achievements and trends at international level
- Foster research oriented to private sector and be ready to promptly respond to private research demand. Traditionally, the local research played its role into an almost closed environment, promoting mostly the supply side of research which proved to be too little connected to the industry sector needs or, even at larger scale, societal needs. We are aware of this shortage of our research and commit to be more proactive to overcome it and successfully serve to this aim.
- Proactively search of/connect to new international partners and maintenance of current collaborative research network
- Increase management efficiency and improve research environment quality
- Foster high level of competences of our scientists, through continuous training and connection to international research community
- Encourage communication in between research teams and foster an open door culture to stimulate ideas and knowledge sharing
- Concentrate on ensuring research continuity to get best achievements viable at international level
- Embrace European and international best practices

Figure 1. INSB Scientific areas of research and teams



Source: INSB 2011

INSB is aware that success depends on building top research teams in our main research areas that not only undertake forefront science but also apply advanced mechanisms and instruments to identify innovative solutions, link and measure processes across scales, understand biological mechanisms. Furthermore, as opportunities arise, we are ready to develop new research teams to address research latest topics and new societal challenges.



INSB will tackle the best-tailored research national and international grants and funds, which will be of optimum return for our Institute. The Institute will provide training and will use the most appropriate training opportunities offered by the local and international research communities to develop the competences and support our researcher's career.

Our success depends on full commitment and flexibility at the individual, research team and top management level and on efficient investment in cutting edge research infrastructure.

Values

Excellence. INSB undertakes research of high professionalism and excellence, competitive at international level, based on 2 crucial assets: senior PhD researchers and up-to-date equipments and research infrastructure.

Collaboration and partnerships. We are aware we cannot get the best research results and respond to our societal needs only through our own research efforts, isolated aside in an ivory tower. That is why we are open and promote research collaboration with most reputed and active entities at all levels: internationally and locally, public and private.

Liability. We are accountable for our actions and decisions to the public, research community and funders, and we submit ourselves to most appropriate scrutiny.

Ethics. Ethics standards in life sciences are crucial and strongly debated by the entire society, from top level of the authorities to every individual. Therefore, INSB strategic research goals will be fulfilled by embracing the ethic standards promote by the scientific community worldwide.

Proactivity. We are active in a developing EU country with less resources and poorer research capacity. So, it is naturally to be permanently connected to the research ideas and trends, which spring in the top, developed nations worldwide. However, as presented by this report, as well as by our Institute Self-evaluation Report 2007-2011, we have achieved unique research outputs at national and international level and we will keep to our proactive scientific attitude, as our resources will improve.

Scientific SWOT analysis

INSB elaborated a Self-Evaluation Report 2007-2011 aiming to have a strong analysis of the past and present before thinking about the future. Some of the conclusions of that document are further expanded here with the help of a SWOT analysis, done from a scientific/research perspective.

The Scientific SWOT analysis should be regarded in the framework of the local context of the research system in the last years, as presented in the 1st Chapter, as it may be wrung our internal environment achievements and fruited the external one.

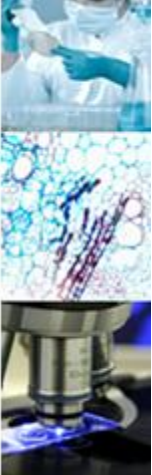
Internal Environment:	STRENGTHS
	<p>Complete alignment with the most updated trends and scientific developments in the wider field of life sciences research</p> <p>Strong qualified research teams with high degree of flexibility in approaching new life sciences research sub-domains. Good rate of staff (senior and young researchers) trained in international courses and summer schools or participants in high ranked conferences which exposed them to state of the art science and latest technology.</p> <p>High class scientists with top qualifications in a wide range of scientific domains open for continuing training. Young researchers with high potential for professional development (The institute staff average age is 42 years old). 25 PhDs out of 98, 65 FTE researchers. The multiple specializations of our staff allow the Institute to tackle multiple life sciences sub-domains.</p> <p>Wide and updated research infrastructure both in terms of equipments and laboratories, which provides INSB a competitive position at international level. Several new modern equipments were acquired in the last 4 years. Headquarters recently refurbished and appropriate for research activities.</p> <p>Competences to approach interdisciplinary activities. New applicative research domains.</p> <p>Good portfolio of new technologies and methods to produce biomaterials and bio-products with high selling potential</p> <p>Our institute research domains are harmonised and integrated into the EU research policy</p> <p>Laboratory of Cellular culture certified by RENAR (Romanian Accreditation Association, National Accreditation Body) (2008)</p> <p>Own Technological and Business Incubator (ITA Binnotech)</p> <p>Good rate of return of researchers trained abroad (60%, 2007-2011)</p> <p>Important research results which drive to an increased international visibility of the Institute</p> <p>Good permanent collaboration with research community Diaspora</p> <p>Wide range of personnel affiliations and memberships (international and national) organizations, universities, networks and platforms active in life sciences research</p> <p>The Institute is Affiliated Centre of ICGEB (member of an international research network, which</p>

provides more international visibility and access to high-level research potential partners. This is unique for Romania, as ICGEB offers this role to one single entity per EU Member State. INSB is eligible to access the financing tool Collaborative Research Programme (CRP) of ICGEB, and can benefit from scholarships, scientific workshops and international conferences)
 ISO9001:2008 certification (quality management system implemented since 2008).
 Good national coverage (Bucharest, 3 local cities) in 3 development regions (3-South Muntenia, 6-North West and 1-North East)

Internal Environment:	WEAKNESSES
	<p>Rather low number of patents compared to the Institute important and numerous research results: only 8 international & 13 national (OSIM) patents</p> <p>Suboptimal scientific publishing as regards the score of influence of our researchers articles; more homogenous publishing among the research teams required</p> <p>Insufficient technological transfer know-how, including more effective marketing of research results</p> <p>Still reduced number of bi-lateral research cooperation agreements compared to existing potential</p> <p>Suboptimal inter-departmental (inter-team) collaboration, compared to existing interdisciplinary potential in terms of designing, implementing and transferring to market research processes.</p> <p>Lack of financial resources for medium term investment in HR. Lack of a performance-based motivation strategy. Lack of budgetary resources to sustain an adequate financial motivation package for young researchers.</p> <p>Suboptimal marketing & promotion activity at national and, mostly, international. Still weak dissemination of research results through mass-media, as well as identification of TT opportunities and market research needs.</p> <p>Suboptimal quality of research support services. Insufficient staff for ensuring the horizontal research activity logistics and backing-up the research teams in implementing their projects.</p> <p>Absence of a team involved in project administration which may create pressure on researchers to deal with administrative and financial tasks, which affects the efficiency of the research process.</p>

External Environment:	OPPORTUNITIES
	<p>Top interest at European and international level for the field of life sciences, both in the public and private sector.</p> <p>High-level EU agenda in terms of policies, regulations and good practices in life sciences</p> <p>Availability and accessibility of national and international strategic programs and networks.</p> <p>Existing wide networking and collaboration with researchers from reputed labs and universities based in the EU, USA and worldwide.</p> <p>Strengthening the existing ties with the academic environment (corroborated with attracting the industry into forming larger and stable consortia focused on applied research). Wide and realistic educational offer for the entire range of professional levels</p> <p>Increased development potential for creating an European level infrastructure based on INSB involvement in coordination of the Life Sciences research pillar of the International Centre for Advanced Studies Danube River-Danube Delta-Black Sea</p> <p>Attracting more financial resources at EU level (Framework Programmes, Structural Funds, Cross-Border funds)</p> <p>Increased national funding opportunities within the National Plan for RDI 2007-2013 (Human Resources, Ideas, Partnerships)</p> <p>Obtaining medium-term performance-based national funding as a result of a successful certification process</p> <p>Enlarging the range of research services and clients portfolio in the field of analysis of active biological substances (enzymes, vitamins, hormones, etc) or regenerative medicine (see EU regulations requiring systematic evaluations of the population health).</p> <p>Developing and offering consulting services targeted mainly at industry, for generating independent revenues. Availability for biocompatibility testing of biomedical devices</p>

External Environment:	THREATS
	<p>Possible second wave of international crisis. Presence of hard budgetary constraints. The published national budget for the coordinating Ministry (Ministry for Education, Research, Youth and Sport) increased with 3.5% in 2012 vs. 2011, to 8.7bn lei (approx 2bn euro). However, the research system is still under-financed.</p> <p>Inconsistency of the RDI National Strategy and lack of correlation with sectoral research strategies.</p>



Inconsistence, unpredictability, or even missing, of the national research programs and competitions. Competitions published on very short notice, which allows insufficient time for preparing competitive project proposals

Budget-cutting of on-going projects (as it happened during 2008-2009)

Weak public support (investments) for development of knowledge and increase of education quality (which rendered research career very little attractive for youngsters. As a consequence, INSB is hardly able to find good promising young researchers)

International mobility reverse side: increasing rate of researchers trained abroad who decide not to return within INSB. On the other hand, the institute is permanently under threat about the professional choices of its actual young researchers who are very likely to choose to leave the Institute for PhD's international programs. Moreover, at national level, a motivation policy for orienting the best students towards research career in Romania is still missing

National public policies and regulations regarding the researcher promotion are constantly changing, highly inflexible and hinder the researcher career projection and development

On-going decrease of local researchers number.

Lack of financial instruments which allow Diaspora researchers to collaborate with INSB without being bound to work on full-time contract at the Institute premises

Insufficient private-public partnerships

Risk of the Institute management change on the occasion of 2012 general elections

Lack of the Institute base funding

A possible missing link between the envisaged certification of the National Institutes and their budgeting (Institutional financing through Program 6 of the National Plan for RDI 2007-2013 - Support of Institutional Performances. It will be of utmost importance to explicitly link the two exercises, which will be both a matter of content as well as of timing.

Lack of trust of the private, national and international, business environment actors in the current research systems. Therefore, still little financing from private sector will be available in the near future. On the other hand, reduced capacity of industry to absorb the research results.

A still poor correlation of research with the market needs (research demand should come from market to research actors and not vice versa)

Lack of financial support for the AICB Collection

Lack of comfortable finding for patenting our Institute research results (limited access to market and promote the research achievements)

Research units with similar concerns from other countries (Strong collaboration and development of world class complementary competences are a must)

Competition launched in 2011 on the National Plan for RDI imposed too drastic eligibility criteria, and partially even not appropriate with the worldwide scientific trends, which limited into a great extend the access to public funding

Risk about the limited capacity to make all necessary acquisition of equipments as they depreciate by wear and tear.

Strategic scientific objectives and directions

A. Taxonomy and ecology

- a. Studies of molecular taxonomy, sintaxonomy, palynology, and taxonomic diversity among species and geographic areas of Romania.
- b. Evaluating the risk factors inside natural ecosystems that threaten the existence of rare and vulnerable plant species included in "Natura2000" sites for Romania.
- c. Expanding and analyzing the only live algae collection existing in Romania in order to identify new strains with potential biotechnological applications as well as clarifying some aspects of taxonomy, phylogeny and ecophysiology.
- d. Phytogeographic studies on rare and endemic plant species from the Romanian Carpathians for identifying their genetic centers and elaborating in situ conservation strategies.
- e. Chemotaxonomy of pharmaceutically important plant species that could prove important in producing secondary metabolites.
- f. Studies on the structure, functionality and productivity of natural vs. anthropic ecosystems, corroborated with aware monitoring and elaboration of strategies for preserving biodiversity as well as rehabilitation measures.

B. Molecular genetics and cytogenetics.

- a. Genetic manipulation of crop plants in order to confer them resistance to pests.
- b. Evaluating the impact of GMOs on natural populations.
- c. Cloning and functional characterization of important genes in maize, for a better understanding of endosperm development and improving grain quality.

- d. Using modern techniques such as “next gen” sequencing to get insights into the transcriptome of maize hybrids, corroborated with analyzing the genetic diversity of traditional cultivars, for defining heterotic groups for Romania.
- e. Analysis of genetic stability of tomato cultivars following cryopreservation.
- C. Biotechnologies**
- a. Inducing genetic variability in aromatic and medicinal plants through tissue cultures.
- b. Identification and extraction of new active compounds from medicinal and aromatic plants, grown in conventional cultures.
- c. Using the in vitro cultures for ex situ conservation and in repopulating actions.
- d. Conversion of solar energy into hydrogen using photosynthetic microorganisms.
- D. Bioinformatics and statistical analysis**
- a. Enlarging the existing databases on the national flora, corroborated with using GIS (Geographic Information System) in modeling the species potential distributions. This in turn will serve to developing conservation strategies nationwide.
- b. Quantifying the impact of climatic changes on endangered, rare or endemic plant taxa.
- c. Assembling and interpreting the huge data sets generated by “next generation” sequencers that will be implemented in the near future.

Human Resource strategy

Along with the Institute research Infrastructure, our human capital is a crucial source of competitive advantages. In November 2011 we openly endorse³ the *European Charter for Researchers* and the *Code of Conduct for the Recruitment of Researchers* which we commit to put into practice making full use of the Human Resources Strategy for Researchers tool starting with 2012.

Our final goal is building on our ‘HR Excellence in Research’ accreditation, underpinned by the HR Strategy and so to better promote our Institute to potential young researchers and senior practitioners as providers of a favourable, qualitative and motivational work environment and show our commitment to fair and transparent recruitment and individual evaluation tools.

Ethical and professional aspects

Ethics standards in life sciences are crucial and strongly debated by the entire society, from top level of the authorities to every individual. Therefore, INSB strategic research goals will be fulfilled by embracing the ethics standards promote by the scientific community worldwide. One of our references is the *European textbook on Ethics in Research* published by Directorate-General for Research Science, Economy and Society and the *European Research Ethics (ERE) platform*.

Recruitment

The Institute strongly collaborates with high level local Universities which provide access to best students, post graduates (master) and PhD candidates. The Institute has among its staff 3 permanent professors which facilitate the identification and recruitment of new staff out of our Universities partners. The recruitment process uses evaluation tools of candidate knowledge and skills, and usually includes a trial period of at least 6 months.

Figure 2. Structure of the research staff

Number	Facts					Forecast			
	2007	2008	2009	2010	2011	2012	2013	2014	2015
PhDs	65	78	78	74	69	69	71	71	73
PhD c.	23	29	33	29	25	25	23	23	20
Master	8	15	10	11	11	11	16	16	16
Students	7	8	8	1	5	1	1	2	2

Source: INSB, Research Dep. Managers, Survey

Our recruitment policy objectives are:

- Increasing the ratio of PhDs and PhD students among the total number of researchers.
- Recruiting experienced researchers and postdoc’s;
- Increasing the engagement share of the Romanian Diaspora into the Institute research projects.
- Maintaining strong ties with the local universities as the best way of recruiting students that could turn into potential employees.
- Active participations to workshops and summer schools as well as training courses abroad, targeted especially on young researchers.
- Encouraging highly qualified senior researchers in getting certified as PhD advisors.

³ Our support letter may be seen on <http://ec.europa.eu/euraxess/index.cfm/rights/charterAndCode#R>

- Adopting non-financial stimulants for our performing personnel: promotion of individual research outcomes, participation at highly profile international conferences and workshops and/or in training courses, mainly those opened by ICGEB.

Working conditions & social security

INSB commits to ensure an efficient and friendly working environment and improve social security by:

Figure 3. Working conditions safe & security

<p><i>Equipment, signs and loads</i></p> <ul style="list-style-type: none"> • Use of work equipment according to the original Technical Instructions • Use of personal protective equipment • Work with display screen equipment • Provision of health and safety signs at work 	<p><i>Protection of specific groups of personnel</i></p> <ul style="list-style-type: none"> • Protection of permanent staff • Protection of temporary staff • Protection of pregnant women, women who have recently given birth and women who are breastfeeding • Protection of visitors • Protection of staff and visitors with disabilities
<p><i>The workplace</i></p> <ul style="list-style-type: none"> • Minimum safety and health requirements for the workplace • Security access to the work sites & labs • Temporary and mobile work sites • Equipment and protective systems intended for use in high risk atmospheres 	<p><i>Chemical, physical and biological agents</i></p> <ul style="list-style-type: none"> • Exposure to electromagnetic fields • Exposure to noise • Exposure to mechanical vibration • Risk of explosive atmospheres • Exposure to chemical agents • Dangers arising from ionising radiation • Exposure to artificial optical radiation • Exposure to carcinogens and mutagens • Exposure to biological agents

Training

More focus will be put on researchers training of 2 categories: specialized research courses and training on horizontal disciplines, such as project management, technological transfer and entrepreneurship).

Career management policy will focus on our young researcher's development. They will benefit of permanent mentoring from our senior researchers, counselling and periodical training up to getting their PhD.

The *brain drain*, one key issue we faced during the last years, will be carefully scrutinise and efforts will be made to decelerate this negative phenomenon by making use of necessary tools: staff involvement into decision making, transparent management, training, mentoring and career advice.

Mechanisms for stimulating the appearance of new research directions

Mechanisms

The approach for stimulating new research directions is demand oriented, depending on the challenges of the potential clients. Therefore, the research directions for the next years will follow three main types of challenges: Grand Challenges, Technological challenges and Social&societal challenges

Grand Challenges. The European Group on Life Sciences (EGLS) had among its goals the identification of a number of grand challenges, visionary topics demanding breakthroughs in research and engineering in many key technologies focusing the 10-20 years in the future. Grand challenges should drive more clear "pictures of the future", particular highly potential applications and lie at the edge of what "just might be possible", so as to inspire scientists beyond the boundaries of ordinary thinking. Grand challenges might identify clusters of underlying technological issues that must be addressed. Consequently, the grand challenges provide a method to define technological roadmaps from where future basic research directions can be drawn.

Technological Challenges. Another way to spring up novel ideas and research themes is identification of key technological issues of major importance for society and/or economic growth. For, example "simulation" has been identified as a key technology for future growth. To enable progress on simulation there is a need to address issues related to visualisation, modelling, software engineering, etc. Consequently, the identification of such a key technological issue can be an efficient mechanism for the definition of future research directions.

Social and Societal Challenges. Nowadays major social and societal challenges might be reliable drivers for identifying major research issues to be addressed. During the last decade, there have been expressed various needs for improving the general quality of life: needs for ensuring a longer active working life, a nice aging of people while keeping them in good physical and mental health or providing enhanced security. These category of challenges will be defined based on the future development of the Romanian society and population, both from a structural and a conjunctural perspective (e.g. food crisis or climate change)

Finally, any research theme selected would have to clearly address the following four inter-relating important issues: what is the need to be addressed, how can it be best addressed, for whom is it addressed and by whom.

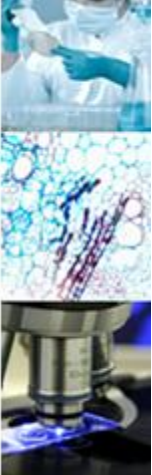
Instruments

- Internal scientific meetings, set-up on quarterly basis or ad-hoc, upon any Scientific Council member or researcher notice to debate on the latest news and research concepts sprang worldwide and the Institute capacity to efficiently tackle them
- Internal meetings of the research teams on 2 weeks basis. The young researchers (including research assistants and technical staff) are strongly recommended to attend and share their ideas and thoughts.
- Permanent on-line screening of national and international events of any kind (conferences, scientific communication sessions, workshops, exhibitions, saloons, fairs, etc)
- (related to the above) Attendance to most relevant scientific event, mostly international ones. Following the event, the participant will prepare and submit to the Scientific Council members a Report presenting the followings: title, organizer, country, scientific thematic and its detailed description, list of speakers/trainers, papers and any material handed, list of relevant web-pages of the event and scientific thematic approached.
- Extend the access on on-line public scientific libraries and data-basis in life sciences domains
- Improvement of the Institute scientific collection of books, magazines and papers currently stored in its libraries
- Creation of an electronic data base with entire collection accessible by the Institute employee's
- Strengthening the inter-departmental collaboration. We will permanently stimulate the collaboration in between our research teams seeking to reduce to zero the so-called „silo functioning” of our Institute processes. All processes are analysed and adjusted in order to eliminate any inadequate and inappropriate one which is likely to create „silos”. Any departmental process affects the activity of the entire Institute and is treated as a global process. That is why we are encouraging extraversion and internal exchange of research ideas and results for boosting our efficiency.
- Staff mobility. We encourage the interchanges of scientists for exchange ideas and enable know-how transfer.
- Strengthening interaction with private sector will get us closer to the market and further to individual needs.

SWOT Financial Analysis

Strengths	Weaknesses
Financial stability despite the national budget cuts between 2009-2010	More than 50% of total overhead was previously supported from National Nucleus Program which is to be closed by the end of 2011
Relative diversification of clients as compared to a few years ago	Small turnover from ITA Binnotech incubator
Wages payroll payment is made in time	Small royalty revenues from the Institutes patents
Institute is liable with respect to financial taxes toward state budget	Small level of activity/income vis-à-vis the private sector
Opportunities	Threats
Certification of RD entities in place (will lead to a more transparent and performance based institutional funding on long term which our Institute will benefit from. The institutional funding Contract will be concluded on the duration of the Institute certification period which will support our management to better forecast the multiannual cash-flow, despite the only annual base budgeting engagements)	Lack of transparency and traditional instability of national public funding (the Institute is ready to tackle other sources of funding in order to counter-balance this threat: accessing European programs, Structural funds, increase the private partners portfolio, etc)
Access to more stable funding programs: Horizon 2020 - the Framework Programme for Research and Innovation (/FP8); Collaborative Research Program (CRP) of ICGEB ⁴ , EU Structural Funds for research; Programs of Local Ministries (Structural funds and others) in domains where our Institute is active (e.g.	Inappropriate eligibility criteria on public funding (National Plan 2007-2013) which limits our access to new funds: no/law score for participation in some famous international conferences which offers great visibility to our Institute in the international scientific community
	National grants eligible expenditures don't include promotion expenditures (Our Institute have to finance

⁴ the annual expenditure of ICGEB for collaborative research programmes amounts to over US\$1 million



<p>environment, etc)</p> <p>Europe 2020 Strategy future launch of 'European Innovation Partnerships' between the EU and national levels to speed up the development and deployment of the technologies needed to meet the challenges identified. The first will include: 'building the bio-economy by 2020', 'the key enabling technologies to shape Europe's industrial future' and 'technologies to allow older people to live independently and be active in society'⁵</p> <p>Increasing worldwide number of open-minded and future-oriented venture capital companies⁶ and blue angels who invest in life sciences entities and lead the new concept or technology to its commercial potential.</p>	<p>its marketing & promotion strategy from its own pocket or other types of grants)</p> <p>Presence on the local market of other units active in life sciences domain</p>
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Among main strategic steps to overcome our financial weaknesses and avoid the financial threats are:

- **Increase the private sector balance:** As the public funds remains low, that is why we are open and develop strategies to strengthen the collaboration with private actors and add new ones to our portfolio. In the last years, the Institute had fruitful partnerships with local private companies, such as *Hofigal Export Import S.A.* (Romania), *Dacia Plant* (Bucharest, Romania), *The Commercial Society for Medicinal Plant Research and Processing PLANTAVOREL* (Piatra Neamt, Romania)
- **Increase the international collaboration:** We have traditional collaboration with important research entities outside the country, mostly in international projects funded by the European FP, INFRATECH, the South East Europe Transnational Cooperation Programme, Ecochange, Gloria Europe or Intrabiodiv, etc. Strengthening the international collaboration is crucial for increasing the institute revenues and for the know-how transfer.
- **Insurance of financial resources for investment objectives:** Traditionally, the national public funding sustained the major part of our Institute research activity. However, the critical experience of the last 2 years (project budget cuts, lack of calls for proposals, etc) determined us to change our financing policy and adapt it to the new context: we will increase collaboration with international partners in projects funded from international programs. We will increase our revenues from collaboration with private companies, as mentioned above, and facilitate the technological transfer and penetration to the private market. Increased focus will be oriented to development of our Technological and Business Incubator (ITA Binnotech)
- **Increase research results capitalization:** The institute has 8 International patents registered in the last 4 years who will be promoted and capitalized. Another strategic step, be analysed in-depth, is the creation of a spin-off company.

Infrastructure: investment plan and strategy

INSB is fully aware that the road ahead for RDI in Romania will not be smooth and easy, given the international circumstances. However, hoping that the Romanian Government approach to RDI funding has shifted from dissipating resources into small projects to concentrating investment in important large infrastructure which can provide a national/European impact, INSB has planned two critical investments for the medium term: an International Centre for Advanced Studies Danube Delta – Black Sea and a Platform for Tisular Engineering and Biomedical Biotechnologies.

International Centre for Advanced Studies Danube River – Danube Delta – Black Sea (ICAS-DDDDBS)

The Centre is a Romanian initiative to establish an international point of excellence for fundamental and applied, integrated and multi-disciplinary research of the river – delta – sea systems and for foster sustainable management of wetlands and river-delta-coastal areas & sea macro-systems. The Centre can be financed through ESFRI (the European Strategy Forum on Research Infrastructures) and will be built based on the existing networks and research infrastructure in the Danube-Black Sea region. INSB is coordinating the Life

⁵ Europe 2020, A European strategy for smart, sustainable and inclusive growth, European Commission

⁶ <http://www.mddionline.com/links/venture>, <http://www.findventure.com/biotechnology-venture-capital/>

sciences research pillar of the International Centre for Advanced Studies Danube River – Danube Delta – Black Sea.

The mission of ICAS-DDDDBS is to support the implementation of the Danube Strategy and the development of the research activities, collection and processing of information and support in the decision-making process; ICAS-DDDDBS shall become a European leader in frontier research in the field of delta macro-systems; ICAS-DDDDBS shall become a platform for research, education and innovation, contributing fundamentally to the sustainable development of the Danube-Danube Delta-Black Sea area.

More information on: <http://www.danube-delta-blacksea.eu/index.html>

Platform for Tissular Engineering and Biomedical Biotechnologies (TEBB Platform)

Motivation:

- Research expertise and outcomes achieved in these research domain during 2002-2011 with a collaborative effort of 4 departments of the Institute: Cellular and Molecular Biology (Team 3), Cellular Dynamics and Flow Cytometry (Team 6), Bioproducts and biomaterials (Team 4) and Bioinformatics (Team 2)
- The Institute is currently (2010-2013) establishing a new research facility, the *Centre for Biotechnologies for cell therapy and regenerative medicine based on stem cells and modulation in apoptosis* (BIOREGMED). The project value is 1.4 mil euro and is financed through the European Regional Development Fund (ERDF), Sectoral Operational Program Increase of Economic Competitiveness (SOP IEC). The maintenance of this Centre after the closure of the project (July 2013) permits the further development of the Platform (so much the more the Institute is bind to keep the BIOREGMED Centre operational for at least 5 years following the project termination)

Most of the BIOREGMED Centre objectives prepare the path for establishing the TEBB Platform:

- Creation of a Training and Know-how transfer Centre - pole of excellence and nucleus of scientific competences around the international experts invited in the project team
- Achievement of original, patentable biotechnologies and biomaterials for cartilage cell therapy which will be transferred and, later, produced by a biomedical biotechnologies private Lab (similar to other development countries cases)
- Following the BIOREGMED project closure, the Centre will be maintained (and developed into our TEBB Platform) for further research in regenerative medicine domain (based on stem cells and modulation of apoptosis targeting to achieve dermic tissue, nerves regenerations, cornea, diabetes treatment)
- Stimulation of TT onto the industry by generation of applicable research results, increase of innovative services products (biomaterials and cell biotherapies) and foster of private sector innovation demand (biotechnologies enterprises, products for regenerative medicine of osteoarthicular diseases)
- Attraction and training of young researchers in this top domain of biotechnology research, and creation of new jobs for graduates, doctorands and post-docs.
- TEBB Platform will enable obtaining blood substitutes (in particular, platelets substitutes), a research theme of major importance in the actually crisis of blood for transfusion, especially taking into account that the platelets are now preserved only for 5 days).
- TEBB Platform will enable the research and production of new intelligent biomaterials based on erythrocyte membrane camouflaged nanoparticles which will ensure a good bio safety and a long circulation. This expected results could be the basis for the efficiently methods in the personalized medicine from diagnostic, such as imaging probes, to novel therapeutic modalities including controlled drug delivery systems.

Benefits for INSB:

- ✓ Improved interdepartmental collaboration
- ✓ Stronger involvement of other research institutes and universities scientists
- ✓ Full and efficient exploitation of the Institute research infrastructure
- ✓ Effective usage of the experiments and research achieved by the Institute until now
- ✓ Usage of the Institute intellectual property patrimony in this research domain
- ✓ Educational benefits: trained specialists in tissulare engineering and biomedical biotechnologies by setting graduation, master, PhD and Post-PhD research internships
- ✓ TEBB Platform will facilitated more technological transfer to local private companies, traditional partners of our Institute (Hofigal Import Export, Plantavorel, etc) as well as to new SMEs which will have the opportunity to use technologies already developed by INSB or new ones.
- ✓ The Institute will organize microproduction of biomaterials and products developed within the TEBB platform

New research equipments which will be acquired:

- Electron microscope
- Microimager
- Ultracentrifuge
- Lyophilizator / speed vacuum freeze dryer
- Cryogenic installation

Acquisition of research equipments and instruments

In order to increase our competitiveness internationally and be able to implement our research ideas, other major pieces of equipment are planned to be purchased: state of the art bioreactors ,Flow Cytometer, "Next Generation" DNA sequencer coupled with adjacent bioinformatics tools, GC-MS-MS (Gas chromatography – mass spectrometry) instrument, Ultrahigh pressure liquid chromatography instruments. Approximated investment values, from which main part is thought to be ensured by project is about 2.5 mil Euro.

Technology transfer and the attraction of non-public funds

ITA Binnotech

In 2006 opened ITA Binnotech, a business and technological incubator, within its premises in Bucharest aiming to enhance the technological transfer to the incubated companies and to market. Binnotech's mission is to encourage the private sector development through innovation and technological transfer of our Institute research results (rapid TT of our research into economy by stimulation of private companies to apply our research results and technologies, support for our promotional activities, etc). The incubator services include: business consultancy, including grants accessing, technological, financial and infrastructural support addressed to new SMEs aiming to support them to successfully spin off by the end of the incubation period. During 2008-2011, the number of incubated firms doubled, to its full capacity (550mp), from 3 to 6.

The incubated firms operates in various fields, such as: environment consulting services (including waste water, air, soil, noise and microclimate testing), non-pathogen microorganisms microbiology used in various biotechnological processes, as cultures nucleus of national public utility, research advertising and promotion, Innovation and TT Consulting services, etc

Plans for the following 4 years:

- Establish of our own spin-off company and its incubation by ITA Binnotech having as mission tehnological transfer to the market and micropoduction. We envisage: independent manager, external audit, independent accounting, own patents as inkind contribution of the Institute
- On-going and annual appraisal of the incubated companies
- Increase of revenues by: better selection of incubated firms, identification of other potential fims to be incubated (by replacement of the existing ones), incubator promotion of all means used by teh Institute.

Office of Techonological Transfer

INSB commits to organize an Office of Technological Transfer (OTT) with the core role of identifying, in collaboration with our 11 research teams, research outputs with potential commercial interest and developing particular strategies for how to exploit them. The natural path from research idea to marketable product or technology may, from some certain milestone be supported by the OTT. Our objective is to increase the number and commercial value of international patents issued for practical processes and here the OTT together with the inventor may have a crucial input.

We acknowledge the following TT instruments:

- Setting up joint ventures or partnerships
- Licensing agreements
- Establishment of a research spin-off company, a popular vehicle of commercialisation in developed nations, while the Institute preserves an equity stake in the business

We are heavily considering implementing the above tools by rising of venture capital for properly funding the development process of bringing new technologies to market.

Strategic partnerships and visibility: events, communications, collaborations.

Strategic partnerships

Scientific communication tools

Events: conferences, scientific communication sessions, workshops, scientific exhibitions, research salons. INSB is a reputed organizer of scientific events

Attendance at worldwide events organized by international bodies

Collaboration:

- In light of greater European research connectivity our institute is committed to strengthening the existing ties with similar organizations at national and international level. This will benefit from the existing networks created around the FP5 and FP6 projects where INSB was involved in.
- The newly recruited researchers coming from abroad already agreed upon new collaborations with their former colleagues located in Europe, USA and China. The collaborations will take the form of exchange students, seminars/events, and joint experimental goals, leading to co-authoring scientific papers.
 - Collaboration with similar / complementary research institutes and centres (Research Institutes of the Romanian Academy: Institute for Biology, Research Institute for Life Quality and Institute of Biochemistry)

Communication to public

INSB will use the following path to improve the quality of the scientific information offered to the public:

- Aiming to increase awareness of our research and outcomes and their potential for the market transfer technology and improvement of societal quality of life, we will enable interaction of our research teams with public and media people with our work experience by continuation in organising INSB Open days (open the research laboratories for short periods to journalists to work in, accompanied by appropriate funding)
 - Enhance the collaboration to one of our incubated company, Economix News and jointly develop a communication to public strategy
- INSB will better support the proactive engagement of its researchers in the public debate. The scientists themselves have the best understanding of the benefits of their own work and their implications on the public in general. INSB will encourage its researchers to spare some of their busy time to produce articles of common, public accessible language and to take part of communication events on key life sciences. In particular, we need to anticipate issues likely to foster public concern and help to restore the image of scientists.
- Our future research projects will improve the PR & Dissemination Task by more focus on the communication to society at large issue.
 - INSB plans to identify the science media centres running in EU and worldwide and contact them to present our scientific results (this centres gather relevant and high quality information from the scientific community and structure it primarily for the media)
 - On-going up-page of our web page and approach of the most active social media platforms

Sustainability

INSB aims to acquire and manage resources to finance life sciences research to the highest international standards both today and in the future.

In order to ensure our financial sustainability, INSB will maintain a rolling four-year financial plan and monitor the level of our free reserves in comparison to a target level, which is calculated on the basis of financial risk. Current reserves will allow us to invest further in our research in the short term, but on the medium term, the certification-based funding from the Romanian Government is critical.

To sustain INSB financial position, and provide for a sustainable expansion in order to achieve the ambitious research objectives, INSB will increase, diversify and maximise its income and continue to monitor and reduce its cost base.

INSB aims to better exploit its intellectual property, promoting interactions with the business community which ensure that our laboratory results are developed for the benefit of the economy and can generate a significant income for reinvestment in the INSB research.

While long term plans and commercialisation targets are ambitious; the income budgets, on which INSB bases the expenditure plans, are more prudent, as required in times of great uncertainty and volatility.

INSB aims to continue to invest in infrastructure in order to maintain the facilities necessary for the conduct of world leading research and to develop new facilities, as funding allows, for the implementation of the two critical infrastructures mentioned in the current Development Plan

Performance Indicators

Scientific activity	2007-2011	2012-2015
Number of articles published/accepted for publishing in international scientific flow (ISI)	51	60
Number of articles published/accepted for publishing in mainstream international scientific flow (other than ISI)	45	50
Cumulative impact factor		
Number of citations (ISI)	7	15
Number of citations (other than ISI)	15	30
Relative increase of the FTE researcher's number (%)	-	
Number of national patents applications		
Number of international patents applications		
Number of national patents granted	27	35
Number of international patents granted	8	15

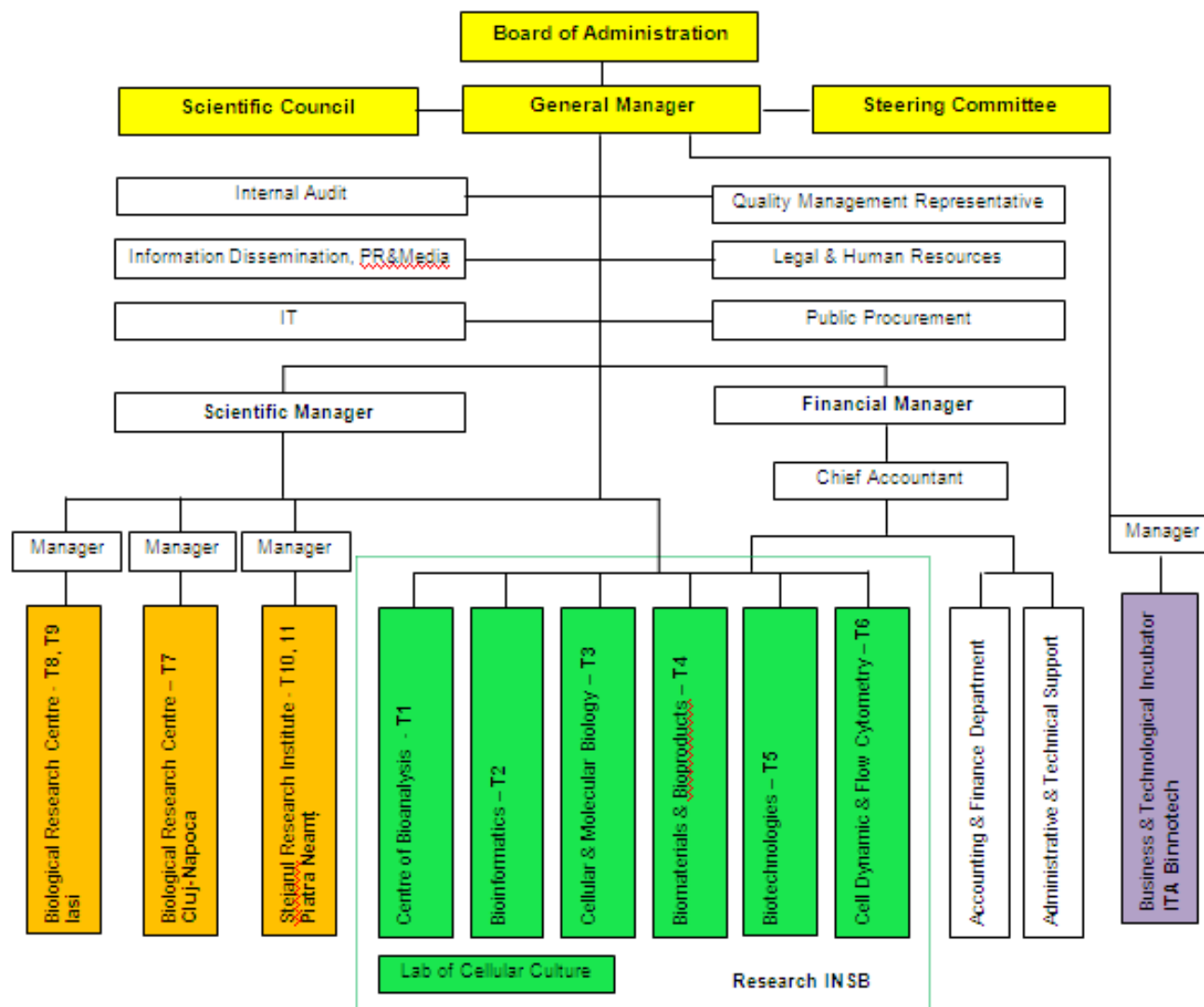
Human resources	2007-2011	2012-2015
Number of staff*	173	180
Number of researchers (head-counting)	113	113
Number of PhD	69	73
Number of PhDs financed through research projects	30	35
International Training internships (man-month)	-	19
Number of financed International conferences attendance	-	3
Number of staff trained in research and/or innovation management	-	2

*end of 2011, as per 2011 Balance Sheet estimate

Research infrastructure	2007-2011	2012-2015
Average usage of the research equipments (%)	32,3%	37%
Number of scientific events & conferences organized	2	4
Investment in research infrastructure (%)	18%	20%
Increase in major research equipments (>15keuro) (%)	78%	20%

Financial indicators	2010	Target 2015
Revenues from international sources (%)	9	15
Revenues from national sources (%)	70	60
Revenues from international private sources (%)	4	4
Revenues from national private sources (%)	5	10
Revenues from patents exploitation (%)	0	0
Non-research revenues (%)	12	11

Appendix 1. Organizational chart



Appendix 2. Definitions of indicators

Number of articles published/accepted for publishing in international scientific flow (ISI) = Number of scientific articles published or accepted to be published in ISI publications during 2007-2011

Cumulative impact factor = the cumulative impact factor has the meaning of author's total number of citations per author in the first two years after publication, with its unit cites/author at this paper age. This unit is equivalent to a single-authored (a = 1) article, published in a journal with impact factor unity

Number of citations (ISI) = number of citations of INSB researchers scientific articles in ISI articles or papers

Number of citations (other than ISI) = number of citations of INSB researchers scientific articles or papers published in other mainstream scientific magazines

Relative increase of the FTE researcher's number (%) = FTE research staff 2015 (planned)/ FTE research staff (estimated by the end of 2011)

Number of national patents applications = Number of patents files submitted to national patents and inventions registration organisms (OSIM)

Number of international patents applications = Number of patents files submitted to international patents and inventions registration organisms (EPO, USPTO, JPO, triadic)

Number of national patents granted = Number of active patents granted by national patents and inventions registration organisms (OSIM)

Number of international patents granted = Number of active patents granted by international patents and inventions registration organisms (EPO, USPTO, JPO, triadic)

Number of staff = total number of employees registered by the annual balance sheet

Number of researchers (head-counting) = the employed scientific researchers (grades) CS I, CS II, CS II, CS and ACS.

Number of FTE researchers = Full-time equivalents number of researchers employed in INSB by the end of the period of review

Number of FTE research support staff = Full-time number of staff backstopping the research activity (technicians, IDT) employed in INSB by the end of the period of review

Number of FTE administrative staff = Full-time number of staff backstopping the overall activity employed in INSB by the end of the period of review (others than researchers and research technicians)

Number of Dr. = Number of individuals having the title of Doctor of Sciences and employed by INSB

Number of PhDs financed through research projects = Number of individuals working on doctoral theses at INSB in the period under review, i.e. supervised by INSB staff regardless of grants and including INSB staff working on theses

Number of Post-PhDs financed through research projects = selfexplanatory

National Training internships (man-month) = Number of training months, excluding attendance at conferences and seminars per employee (full-time equivalent), in training internships organized by national bodies (national mobility)

International Training internships (man-month) = Number of training months, excluding attendance at conferences and seminars per employee (full-time equivalent), in training internships organized by international bodies (international mobility)

Number of financed International conferences attendance = number of international conferences where INSB researchers attended during the period under review.

Number of staff trained in (general) horizontal courses = number of employees trained in courses other than on own scientific research domain, such as: research and/or innovation management, project management, technological transfer management, IPR management)

Average usage of the research equipments (%) = measure of exploitation of current research tools, equipments, installations owned by INSB

Number of scientific events & conferences organized = number of scientific events organized by the Institute during the period of review, such as: conferences, seminars, scientific communication seminars, workshops, research salons.

Investment in research infrastructure (% or klei) = selfexplanatory

Increase in major research equipments (>15keuro) (%) = selfexplanatory

Revenues from international sources (% or klei) = selfexplanatory

Revenues from national sources (% or klei) = selfexplanatory

Revenues from international private sources (% or klei) = selfexplanatory

Revenues from national private sources (% or klei) = selfexplanatory

Revenues from patents exploitation (% or klei) = selfexplanatory

Non-research revenues (% or klei) = selfexplanatory