The need for designing an adequate and modern infrastructure in systems ecology and biology research fields in Romania appeared in the context of increasing of economic competitiveness and economic development based on knowledge, in general, and development of modern ecology and biology, in particular.

As international and national premises and requests which justify the design of research platform (PCBE) can be mentioned:

- Promoting in developing strategies and politics of sustainable development model, as the only viable solution for solving the ecological crisis (ex. WSSD/Johannesburg/2002; Major objectives for development/UNO/2001; Conclusions of the first global study regarding ecosystems' valuation /Millennium Ecosystem Assessment/2005; EU strategy for sustainable development /2001 & 2006; National Strategy for sustainable development (SNDD)/2000 & 2008; UNO conventions regarding: Climate changes – CCC; Biological Diversity – CBD; United Nations Convention to Combat Desertification – CCD; Wetlands Protection – Ramsar; Convention for Migratory species protection – CMS/Bon; EU Directives: Water Framework Directive /Eu-WFD/2000/60/EC; Habitats Directive /EU – 92/43/CEE; Birds Directive/EU – 79/409/CEE; Natura 2000 Network; Regional Conventions: Convention regarding Black Sea protection against pollution/Bucharest/1992; Convention regarding cooperation for protection and sustainable use of Danube /Sofia/1994; Environmental Operational Program /2007-2013/Romanian Government etc.);
- Decreasing and control of greenhouse gases emissions, liquid pollutants and reutilization and recycle solid wastes, neutralization and safe deposition of dangerous chemicals.
- Conservation/protection, sustainable use and restoration of bio and ecodiversity as key measures for climate changes adaption and assuring ecological sustainability for any socio-economic systems development.
- Promotion in global, EU, national, regional and local strategies and politics of transition from sectoral approach to ecosystems one, and from conventional management to the ecosystems and adaptive management.
- Necessity for complementing the training and disciplinary research programs and projects (level 1) with inter and transdisciplinary programs and projects (level 2)

- Development, adapting and making efficient the educational system, communication and public information, of decision makers and managers regarding the complexity of interdependencies relationships between nature/environmental components and human society

that is a condition for sustainable development.

- The need for training the human resource capable to use and/or develop inter and transdisciplinary knowledge, for integrate and adaptive management of natural capital and socio-ecological complexes.

The XXIth century key- strategic objectives for development are represented by the transition from sustainable development model and society (economy) edification based on knowledge, and are imposing the promotion and consolidation of transdisciplinary research in the field of ecology, systems biology and sustainable development. The multi and transdisciplinary approach, in ecology and biology, has affirm in the last century as a necessary intercession for opening a new perspective for knowledge' development regarding the complexity and diversity of life's phenomena and forms, direct and indirect relationships between them inside the biological systems and nature and human society hierarchical organization and complexity. Thus, had been differentiating two multi and transdisciplinary scientific domains that are intensively promoted in the strategies and research programs recently launched by European Union, USA (NSF – USA, FP6 and FP7 – EU, ESF) or others developed or developing countries. These domains are already known under the name of:

a) systems biology or bio-complexity, that proposes to integrate the experimental genomics, proteomics, cell biology, morphology and physiology (neurophysiology) research activities using bio-informatics, math and numerical modelling techniques;

b) systems biology or eco-complexity, that permits the identification and description at variable space and time scale of natural capital's and socio-natural ecological complexes' (socio ecological complexes) structural and functional components (bio and ecodiversity).

Until now, the research activity of different Romanian institutes/research centers and of University of Bucharest was oriented especially on disciplinary research, which drove to the development of knowledge in specific domains. In the same direction was developed the material basis, with expensive research equipments, utilized by small teams, for very strict research studies. Despite the high research capacity in the field of basic sciences in general and biological and ecological sciences, in particular, the results are poorly turned into account because of resources' dispersion and because of using an inadequate system for knowledge transfer towards users. The elaboration of new economic development strategies and politics,

ecological and social security (sustainable development) has to reckon on systems ecology and biology knowledge integration and the production of transdisciplinary knowledge. Because of this, it is needed the creation of an unitary RDI structure, as a research platform oriented towards sustainability and globalization problems, biodiversity conservation, sustainable use of resources and ecosystems and adaptive development management (holist), in the conditions of climate changes.

The contribution of this infrastructure for increasing the performances in research and for the intensification of international cooperation is obvious. The development and institutional consolidation in the direction initiated by this project, as part of the newest and seriously challenge at European and global level, is, in the same time, a priority and an opportunity for University of Bucharest. It could be developed the potential and the infrastructure from University, and in this way, it could be a response to a great opportunity to direct participate into a high-perspective European institutional construction. Moreover, such a platform could play a catalyze role for long term socio-ecological research network development, similar as the European one (
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We are stressing that, through this project it is aimed the development of national network for transdisciplinary research of local and regional socio-ecological complexes and thus, the University of Bucharest would become the node through which the national network integrates with the European network.

The integral realization of project's objectives has a major and multiple impact that could be concretized in:

- **Coagulation and organization of human resources and equipments** that are dispersed in universities and research institutes that approached isolated aspects regarding structure, functioning or only the dynamics of biological and ecological systems or components of socio-ecological complexes;

- **The significant increasing of potential and efficiency in using the equipments and research infrastructure** and creation of the critical mass needed for transdisciplinary research activities
- **Creation of the competitively potential on national and European market** of research in a high priority domain, from which it depends the design, the acceptance from the social point of view and the applying of conservation politics and sustainable use of natural capital, respectively the sustainable development at local, regional and national level.

- **Constitution of national long term socio-ecological pilot complexes for integrated monitoring and research** and its integration in the similar networks at European and global level
- **Evaluation of the existent data and information** and the guarantee of their transfer to educational, decision-makers, adaptive management sectors.

- Promotion and orientation of transdisciplinary research and integrated monitoring activities (problems packet and complementary research and monitoring methods)
- **Development and consolidation of managerial capacity** in research-development activity
- **Creation of the interface for cognitive transfer and consultancy for decisional process**
- Creation of the institutional infrastructure and management system that guarantee the platform's long term efficiency and viability
- **Extension of scientific services given to enterprises and the transfere of scientific products towards different economic sectors:** medicine, engineering,

biotechnologies, management of socio-ecological complexes, including the field of measurements, tests, trials and certifications.

- Satisfying the needs and competitiveness of Romanian jobs.

The infrastructure is design in such a manner in order to permit the assessment of **transdisciplinary research directions**
identified and promoted at national, European and global level. Starting from the request of integrating and harmonize the “economic development with social and environmental security” (Johannesburg, 2002), frequently formulated in development strategies and politics, it is an evidence that solving the development problems needs the manifestation of the taking and applying decisions capacity that consider, in the same time, social, economic and natural structures and processes at different space and time scales. Thus,
the strategic
research directions which will be promoted via this platform’s research programs are following:

- Investigation/characterization of socio-ecological complexes
- Investigation of biological diversity
- The response of biological systems to the drivers factors, including climate changes
- Development of biotechnologies and renewable resources

These strategic directions are in agreement with research priorities of the Framework Program 7 (FP7) launched at the European level, the specific program for cooperation, thematic areas "Environment-including climate changes (ex:" Climate changes, pollution and risks ", "Human resource development", "Environmental technologies for observation, simulation, prevention and mitigation of natural and anthropogenic factors of order", "Earth's observation and valuation tools").

Stated strategic research directions involve addressing specific research directions, which ensure the development of knowledge on the structure, functions and dynamics of biological/ecological systems at all levels of organization (supra-individual, individual and molecular) and their response to different factors of command / environment. They are summarized in Table 1, in which are stated also the departments which, with specific modules for laboratories provide research directions mentioned approach.

Platform's organization by **departments** ensure first interdisciplinary and transdisciplinary approach of research directions from the extremely broad field of environmental sciences (by specializing each department), and on the other hand guarantees the functionality of the platform, through a structure that allows the integration of knowledge and data collected (through the Department of systemic ecology and sustainability-DESS and Department of molecular informatics-DIM).

Departments tackles, especially, a certain degree of organization of biological systems (such as DESS and DBIM) or a particular issue at all levels of organization (like DIM which provides data analysis and mathematical modeling of biological / ecological systems). We must emphasize that, with designed laboratory modules, fitted with specific equipment / methodologies / techniques, departments provide the approach of all research directions and ongoing of research activities by using highly efficient human and material resources. The entire infrastructure has been built on the long experience and performance of the team which is to achieve the project implementation in spirit of innovative and integrated approaches to biological systems and for providing added scientific value, educational and economic.

Such a platform is **NEW** and **UNIQUE** to Romania through the structure, organization and functionality, which ensure:

i) orientation of research directions / services for integrated and complex approach of biological systems at all levels of organization (molecular level, individual, population and ecosystems) in their interaction with the environment in the context of sustainable development of knowledge-based society;

ii) unified organizational and functional integration of research and monitoring structures of ecological and biological systems (hierarchically organized); spatial distribution (by Research Station in Braila and Sinaia) ensure the development of the national network of areas of long-term ecological research and its integration in similar networks at European level (ELTSER) and global (ILTSER);

iii) achievement of a unified information system that integrates both existing data and those that will be generated in the areas of long-term ecological research; information system will be extremely useful in developing scenarios for designing management plans for regional and

national development ;

iv) the technical solutions used for construction / endowment of the central building and fitting out / endowment of regional research resorts are the last generation: 1. **Green house**, 2. **The installations are**
; 3)
Research equipment
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