

European Union - Space of Regeneration, Learning and Innovation in the Context of Sustainable Multidisciplinary Research

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Abstract: Objective The Lisbon Strategy set a new goal for the EU economy: the transition to a knowledge based economy, competitive and sustainable at macro and regional levels, by creating the European Research Area – a geographic area without frontiers for researches, where scientific resources are better managed to create more jobs and improve Europe's competitiveness. That means an interaction between specific and multidisciplinary research network. **Approach** However, general research methodology sustains the importance of static and revolutionary specific criteria of Scientific Research Programs but also reveals the natural process of multidisciplinary researches. In this context, the European Union could be regarded as a specific and multidisciplinary research area, as a network of flows, connections, relationships, interdependencies, and interferences between natural - experimental and social-humanistic research spheres (economics, management, sociology and complex systems ecology). **Prior Work:** In this respect some researchers suggested that both natural and social systems could be considered as multidisciplinary complex adaptive systems consisting of specific cluster network connections (in the form of biotic and abiotic nodes, respectively, the competitive and regional poles) with the ability to continuous self-organizing, learning and regenerating process especially in crisis situations. **Implications and Value Paper Utility** The present paper might be useful to illustrate the contribution of technical-economic and socio-ecological researches to increasing the sustainability framework of European Research Area by considering the transition from the R&D approach (development through research process) to the L&D approach (development through learning process).

Keywords: European research area; industrial and regional clusters; complex adaptive systems; productive and social learning

JEL Classification: B4; F15; Q01

Considering the significant role played by research and development in generating economic growth, job creation and social cohesion The Lisbon Process states that the EU should engage in creating the European Research Area (ERA) -a geographic area without frontiers for research, where scientific resources are better exploited to create more jobs and improve Europe's competitiveness.

In essence, ERA reveals the importance of creating, restructuring and developing the scientific research market both at EU communitarian and national state levels, through the regulatory and financial instruments to activate the technical-economic and social innovations potential of the EU human resources.

Within this framework are measures that pursue the creation both of excellence centers and European organizations of scientific and technological cooperation-ESF(European Science Foundation), ESA (European Space Agency),COST (European Cooperation in the Field of Scientific and Technical Research), EUREKA (Extra-EU Research Program) - encouraging investments in venture capital research, in a European dynamic, open and attractive space for researchers and the investors, taking into account the environment protection and regional development principles applied to specific and multidisciplinary researches and innovations.

The European strategic goal of transition to knowledge based society is therefore closely related to creating a strong and dynamic European research network.

However, the European Research Area can be approached also from the perspective of sustainable research area concept – as a spatial and temporal established network of interactions in the fundamental research and practical application to the binomial specificity- multi disciplinarily.

The scientific research methodology point of view reveals the importance of scientific progress by considering the static and revolutionary specific criteria of Scientific Research Programs but also reveals the natural process of multidisciplinary research (e.g. Thomas Kuhn, Imre Lakatos, Brundtland Report);

Briefly speaking that means the specific field of study is not addressed in isolation but reveals exogenous inter related different research area suggested in the well known popular phrase: *disciplinary* versus *multi- disciplinary*, *inter- disciplinary*, *trans- disciplinary* .

Thus, while *pluri-disciplinary* concerns studying a research topic not in only one discipline but in several at the same time, *inter-disciplinary* means the transfer of

method from one discipline to another (in a factual, methodological or creative way) and *trans-disciplinary* concerns - as indicated by the prefix "trans" - which is also between disciplines and within different disciplines and beyond disciplines.

These two possible features of endogenous and exogenous scientific progress spirit changed the history of human society. So as is a keyword which expresses the evolution in time of the principles and institutions that generally define a certain type of human society (from ideal, real, possible society to the state of modern democracy transition) so the notion of knowledge society expresses the process of continuous adaptation and optimization of the specific arrangements for policy management and recovery the potential of sustainable productive resources of human society, manifested through the concrete transition from traditional economic research to entropic sustainable approach in which is considered the transition from agrarian, industrial, society to the to tertiary service - industrial, knowledge based – information society .

From the real world perspective is important to observe the interaction between human beings and their environment in a process of locating and adapting to the changes occurring in bi-univocal entropic exchanges between the natural environment on one hand and the artificially socio economic human environment, on the other.

In this context, we mentioned some theoretical and practical considerations that might be useful to approach the European research topics:

- the concept of network as a matrix of structured elements to highlight not only the actors involved but mainly the very nature of specific links between them (economic, financial, technologic, socio institutional);
- transition from classic sustainable development approach to regenerative development paradigm (triple bottom line versus triple top line);
- considering the impact of environmental features of complex social systems nonlinearity, unpredictability, decentralization, self organization, continuous learning and adaptability to the face of crisis risk;
- considering the binomial innovation & learning as interaction between elements both of project management and learning management by considering the path from idea to its market successfully application through individual and social learning with the possibility of application in different contexts (technical-economic and socio-ecologic);

Firstly, we are talking about the network concept as an matrix of natural and socio institutional structured elements *-nodes-* and the nature of specific multiple links between them *-synapses-* is proposed the emphasis not only on socio-economic agents involved, but especially on the very nature of interconnection between these processes i.e. the biunivocally connections, flows and interferences of scientific information established between different spheres and fields of research (real experimental techno-economic areas - economics, management, mathematics, ecology, physics - and social humanistic spheres - such as sociology, politics, history).

Secondly, are taking into account the strategic variables of regeneration and research space development opportunities- culture, education, work experience - which maintain a state of permanent and continuous interconnectivity between the natural environment, social organization and economic process, adapted to both survival biological, endo - somatic requirements and exo-somatic spiritual and cultural aspirations of human beings.

This implies an organic integration in the research network space of so-called concepts of project management, transition management and adaptive management.

In this framework, on one hand it is considered the subjective, comparative, analytic and parametric research of the interconnections shown between the components of project management (early details of general and specific business needs, relations between project beneficiaries and the stakeholders directly or indirectly involved, issues arising the multiphase cycle stage, the project cost-benefit analysis by considering an matrix of risks and responsibilities in respect of organization, management, technical contractual, financial and environmental issues).

On the other hand, are emphasized the issues related to the continuous transformation of the economic and technical socio institutional processes and because some researchers sustain that both natural and social systems are in fact multidisciplinary complex adaptive systems (*panarchies*) - able to be resilient and regenerated especially from external unpredictable shocks and crisis by the way of adapting, self organizing, and learning.

Thus, the literature of social economic networking space researches illustrates the importance of the relationship between learning and innovation (innovation as a process of learning) that could be approached from multiple angles, such as:

- traditional view of knowledge as product of research working, with the opportunities to become a success story and market profit winner, or as a lifelong learning process in terms of individualistic (the characteristics of persons involved in the process), structuralist (and social organization of production characteristics) and interactive (the process multidisciplinary collaboration) features of learning process;
- network perspective of complex systems, of interactions between agents (individuals, teams, organizations) and the as so called learning process of single, double and triple loop, so that innovation, learning organization and culture is in continuous interaction.

This requires reconsideration of endo-somatic and exo-somatic socio economic metabolism in a the dynamic vision, which creates a turbulent tension for a continuous permanent change, to encourage multidisciplinary research communication flexibility in different contexts (technical-productive and socio-communitarian), through a process individual and social learning (professional expertise and “table round” multidisciplinary communication),structured on three levels (*single-loop*-correcting errors diagrams through conceptual models- *double-loop*- error correction by examining the principles and policies, and *triple loop levels*-the development of standards and protocols of governance and government).

The evolving historical process of Toffler agrarian, industrial and information waves illustrates the spiritual transfiguration of human society and its specific nature of economic process from traditional economic approach, to the entropic one.

Advancement of knowledge process and its impact on the resilience of natural and socio-economic environment are closely linked to Michael Porter concept of cluster-industrial competitive and regional integrative poles. In essence, it is a process of managing the interaction between the concept, objectives and learning outcomes on one hand and natural environmental regeneration on the other, aimed towards innovation in the field of technical- industrial and socio communitarian fields of human activity (spin off, spin out, sustainable economic communities).

The economic and technical context, it illustrates not only the multiphase financing support requirement on the road from invention to innovation well known in the framework of EASD projects -Early Stage Technology Development- but also is needed the presence of a spiritual mentor named “angel”, that brings together a

large portfolio of physical, intellectual and financial assets in the absence of him appears the waste of money, time and energy.

Due to market failures, risk and uncertainty of invention to innovation way but also of non-synchronizing of actors behavior involved in innovative research networking process (coordinator, researcher, strategist, accountant, seller, public authority) it became clearly the necessary transition from R&D approach (development through research) to the L&D (development through learning process), in the concrete forms of productive type of learning by doing and interdisciplinary round table dialogue of social learning to ensure resonance between team members to attain the ultimate final goal- a successful winning story on market and recognition of professionalism.

The space research approach is also evident in the context of social organization by considering the sociological concept of community network that reveals both the common shared general issues (territory, language, culture) as well as the processual aspects of social interaction between society and individuals through the economic, social, political or educational-cultural functions of nation state.

In this framework it is considered the so-called sustainable communities notion which derive from the general concept of community and principles of sustainable economic development, as a form of manifestation of human social communities that support human potential and give the opportunity to all its members to participate in the social, economic and institutional governance and government in a such a way as to protect the natural environment, to promote moderation and to allocate resources as needed.

Sustainable communities concerns not only concerns the city or region, is not related to a fixed parameter but rather illustrate a network process like a social learning containing community multidisciplinary “round table debates” connections and relationships of between individuals or groups of stakeholder interests involved, such as individual and legal persons, central public and local authorities financial banking players, different specialists such as engineers, architects, other specific NGOs.

Research space approach driven by the nature of network processes in various contexts reveals the importance of taking into account the beneficial and negative impact effects in terms of recovery incentives including financial but also the risk vulnerability exposure applied on the triad regeneration - innovation - learning.

On one hand, it noted the positive aspects induced by positive butterfly effect and self organization of complex networks, but on the other is about the very nature of interest conflicts revealed by socio institutional actors' behavior that increase or decrease the capacity of adapting and learning.

In conclusion, the nature and context of technical - economic and socio- ecological of research area approach transfigures continuously the regeneration - innovation - learning triad, showing how human being is related to working productive process or acts in the space of social networks in the context of the entropic flows between natural and socio economic environments.

These aspects concerning the regeneration, productive and social learning-innovative features of research space network could be illustrated through two possible examples in the EU space.

The first one illustrates the techno industrial context - for example the Belgian experience of national funds and European funds (FEDER, FSE) utilization.

In this framework we can mention the following aspects:

a) *stimulating the creation of industrial competitive clusters* - i.e. network regenerative researches market (products, services operators in the field of biotechnology, chemical and pharmaceutical and information technology, agro food industry, space, construction materials, etc.) through a project management to reveal the relationship between the main coordinator of the project (Minister of Small and Medium Enterprises), Executive Coordinator (direction or relevant specialized agency), and beneficiaries (e.g. S.M.E-s).

Thus, the main objective of research network area reveals regenerative markets both in terms of efficiency (value-added new products) in view of the emergence of new agents in this market as well as terms of their contribution to a more balanced regional development. In this respect, there are important the economic eligibility criteria (classification structure of possible new regenerative products and research areas e.g. biotechnology) as well as the financial eligibility criteria (inclusion of businesses in the European Community definition of Small and Medium Enterprises described in the Recommendation of 6 May/2003 (not to be a "lazy" business in sensitive sectors or with other financial problems).

Thus, we are taking into account some catalytic measures aimed to creating new businesses and jobs, through a financial and technological mix (angel investors, corporate firms economic, financial, banking and public budget), and some other

incentives for training, strengthening and development of innovative entrepreneurship (e.g. by developing so-called multidisciplinary economy of scientific incubators).

b) promotion, development and enhancement of human capital potential in terms of technological innovation, the concepts of integration of Research University centers with real economy through spin off and start ups that means stimulation measures of aimed to revealing the essential role of the school environment, academic education and training specialists, or obtaining patents in the process of recovery productive. It is of note in this regard the granting of "moral subsidies" that encourages firms employing highly skilled professionals PhD respectively acquiring companies reputation by providing the name of "**First Doctor**".

Briefly speaking the technical economic context of research space network is valued through some performance indexes like creative competitive cluster poles, patent and brectes and training of high skilled researchers.

The second example reveals among other perspectives the so called The Natural Step (**TNS**), New Urbanism (**NU**) and Melbourne Principles (**MP**) approaches.

The general framework of classic TNS approach takes into account basic conditions of social and industrial metabolism that affects the society-economy-environment interaction processes both in products (by highlighting discrepancies between the consumption of raw materials extracted and slow regeneration capacity of their land), those between of industrial noxious and natural recycled products requiring the integration of production processes with environmental cycles) and the recreational services degrading (services that keep life degradation in general).

Taking into account the entropy law the TNS authors appealed to so-called funnel metaphor that reveals a limited metabolic margin for maneuver between two limits social and economic environment regarding the ecosystem capacity to provide products and services reflecting the need for better strategic management thinking (designing a mental model of awareness axiomatization, instrumentation, deployment) oriented to practical possibilities of implementation. In this framework, TNS approach illustrates the importance of social innovation and creativity of all stakeholders implied in the sociological communitarian process (individual and legal persons, public and local authorities, economic and financial banking actors) through the strategic planning of education and cultures sustaining through school-church- economic agent-public authorities partnership.

Secondly, the NU perspective is a urban regenerative design form emerged in the '80s as a reaction to human habitat and environmental conditions degradation, of increasing urbanization and metropolitan congestion. Based on the round table principle the NU approach reveals aspects of human habitat issues (car traffic fluidity, extension of pedestrian streets, built in profile design of houses, business and economic opportunities of stakeholders (economic agents, population), i.e. essentially turning green space in the sense of quantity, quality and intensity to benefit members community.

That means a multidisciplinary social learning process between different stakeholders (well trained specialists, investors and public authorities) to be aware of the interaction between nature and social environment.

As concerning the MP, this approach is based on the 2002 United Nation Conference „Melbourne Principles for Sustainable Communities” (Melbourne, Australia, 2002) and points out the strong position of public authorities as the main decision stakeholder through effective promotion of sustainable consumption as well as transparency of social, political and financial accountability.

All these illustrate that analysis of space research network focused on innovation - learning binomial both at environmentally, socially, and productive levels, open new strategic opportunities within the production processes (a new market of products and services incorporating more added value through innovation and human capital development, productive conservation engineering technology, methods of using non-conventional and interactive information systems, organic farming and organic trade, development of natural biological disciplines, art and philosophy) but also in the sphere of social organization processes (a new organic architecture human habitat - the regenerative landscape architecture and urban regeneration process of relations between the EU social actors involved - politicians, specialists and society at large).

In fact, finally the research space network development implies the transition from R&D (development through research process) to L&D (development through learning process) approach. And that means a continuous battle for a better and better fulfillment of professional and social duties as is said by Elena Antonacopoulou: what does mean *learning in practice* versus *learning in practice*?

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