

SUSTAINABLE INNOVATION – CONCEPTS, MECHANISMS, CONSEQUENCES

Florin-Răzvan Bălăşescu, Research Worker, Centre for Financial and Monetary Research "Victor Slăvescu", Romanian Academy

Abstract: In a narrow sense ,sustainable innovation is related to the novelty notion meaning new goods, services, values and mode of living taking into account the reality of market competition, consumer culture and political climate .

In a large sense, sustainable innovation is related to the sustainable development concept in the context of a complex relational environment between economy, society and nature, in so called dichotomy between specialisation and multidisciplinary approaches, (linear triple bottom line modes.).

Finally, all of these implies new forms of business, government consumption and culture values because sustainable innovation is in fact a continuous learning process both at a micro individual as well as social organisational level .

In this framework it is to mention the importance of a learning society that could stimulate the positive externalities of sustainable innovation procurement regulations in the process of human capital development, taking into account relationship between economic freedom, social norms and teleological reason of living, learning to learn" (Joseph Stiglitz), in a "scheme of possibility to create something new" (Constantin Noica) in so called triad oikos -habitus - paideia

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1. Eco innovation - concept and its interpretation.

As well known, the word "innovation" comes from the Latin noun innovatus, and appeared firstly as a concrete fact in the Renaissance period, but in the present days is related to the famous economists Joseph Schumpeter and Peter Drucker studies as "new combinations" of existing natural, financial technologic and knowledge entrepreneurship input factors within a managerial planning of discovering, evaluating, instrumentation and market successfully implementation on a way from a simple idea to new goods, services and industrial organisational system as a mature perspective of economy, society and environment network relationships, able to stimulate economic growth, employment creation and raising the life quality standards.

As mentioned some researchers like Gabriela Piciu (2013) or Nicholas S. Vonortas, Phoebe C. Rouge and Anwar Aridi (2015) sustainable innovation known also as green or eco innovation illustrates multiple characteristics depending the level of analysis¹.

From a general point of view, sustainable innovation illustrates new goods, services and market brands, within a step by step, radical transformative or resilient adaptive approaches,

¹ Gabriela Piciu coord. (2013)-"Environmental Financing Risk Management", Centre of Finance, Monetary and Financial Researches "Victor Slăvescu", Romanian Academy, Bucharest, 2013
Nicholas S. Vonortas, Phoebe C. Rouge and Anwar Aridi editors (2015)-"Innovation Policy -A Practical Introduction", Springer New York, 2015

characterized by marginal additivity, eco efficient improvements, a better organisational communication between economic, financial and political insiders and outsiders, taking into account the reality of consumers preferences as well as the possibility and necessity to raise the living quality standard through public investments in education and culture as a way to innovate the so called triad oikos -habitus -paideia.

From a specific point of view, inspired from the neoclassical, endogenous growth, institutional and state intervention models, sustainable innovation is related to positive and normative aspects of weak and strong sustainable development concepts (market competition reality, social historic evolution of human society and resilient dynamics of environmental complex adaptive systems) through reducing impacts on the environment or achieving a more efficient and responsible use of natural, financial, technological and human knowledge potential resources.

On one hand sustainable development relates economic, social and environmental issues in the so called triple bottom line strategy.

In this framework, time is considered as an aprioric reality space of marketplace interactions, that defines the portfolio structure essential characteristics management of rational utility maximizer agents- optimal Paretian profit seeking behavior, the capacity of efficient oriented substitution between production factors, the necessity of market failures and property rights public regulations as well as the demand pull pressures generated by consumer culture preferences.

On the other hand, sustainable economic development illustrates the very nature of social historical evolutionary processes in so called triple top line strategy.

This approach is based on the fact that time is an thermodynamic engine of evolutionary events characterized by a resilient social industrial metabolism of information, matter and energy exchanges between environment society and economy.

From the sustainable innovation concept, these two perspectives consider the necessity and possibility of a regenerative innovative development approach based on two possible alternatives:

- a linear regenerative Hicksian relative price model of innovation oriented to an optimal risk portfolio structure of natural, technological financial and knowledge-human factors;

- a non-linear circular economy model of innovation related to symbiosis biomimicry, entrepreneurship spontaneous creativity in the multidisciplinary research, to respect the rule of law spirit applied to public procurement principles of financial transaction transparency and political governance accountability.

The final goal of sustainable innovation conceptual models is to develop a continuous maturation of free will choices in the context of the relationships between liberty, responsibility and welfare in a “learning spillovers society” as well as to create the premises of an idealistic “triple Helix society” oriented to a continuous development of economic, social and environmental oriented to economic efficiency and social symbiosis, stimulated by an optimal mix of financial and institutional catalytic instruments- regulations, taxes and sustainable public procurement.

2. Mechanisms of sustainable innovation

Sustainable or eco innovation means new goods, services, cultural values and mode of living stimulated by technological push, market demand pull pressures and regulation drivers, a new space of a network interconnections between insiders and outsiders of socio economic agents, consumers and public authorities through so called R&D and L&D mechanisms (technical-economic and social learning).

These specific innovation mechanisms of R&D and L&D illustrate the relationships between positive, normative and complex resilient characteristics of the economy society and natural environment network.

In this framework it is to consider both the linear and non linear models of thinking at micro and macro level of economy within the respect of integrity, accountability and transparency public procurement principles applied to the relationship between producers, consumers, investors, educational system and public authorities.

Thus, on one hand the sustainable innovation is a linear research process starting with a simple idea problematisation in a way of analysis, evaluation and practical implementation and on the other hand is a non linear approach related to different multidisciplinary and multi responsibility levels to approach the same idea problem.

Briefly speaking, is about the importance of individual and social learning mechanisms oriented to economic efficiency seeking, promoting a friendly environment of human capital and production technologies development that is in the interest both of rational economic agents, consumers and public authorities.

As stated some researchers such as Susana Garrido Azevedo, Marcus Brandenburg and others (2014) or Ari-Veikko Anttiroiko, Stephen J. Bailey and Pekka Valkama (2011) sustainable innovation mechanisms act both at micro and macro level.

At microeconomic level the sustainable innovation mechanisms illustrate a learning process based on two well known models elaborated by K. Kalogerakis O. Gassmann in 2005 and M. Zeschky in 2008².

In the essence they suggested that sustainable innovation is a learning research process based on four phases: -

- definition of the search field (a detailed description of the essential problems along the supply and value chain with a review of the constraints and general conditions);
- search for analogies (the process of social learning of working team as well as investor angels);
- verification and evaluation of analogies;
- development of the solution via the transfer of analogies.

In this framework, the sustainable innovation mechanism based on abstraction, evaluation and practical implementation illustrates:

- the reason of innovation (reduce energy intensity, reduce dispersion of toxic substances, enhance recyclability, maximize the sustainable use of renewable resources and extend the product durability);

² Susana Garrido Azevedo, Marcus Brandenburg Helena Carvalho, Virgílio Cruz-Machado (eds.) (2014)-“Eco-Innovation and the Development of Business Models- Lessons from Experience and New Frontiers in Theory and Practice”, Greening of Industry Networks Studies volume 2, Springer International Publishing Switzerland 2014

Ari-Veikko Anttiroiko, Stephen J. Bailey, Pekka Valkama (2011)-“Innovations in Public Governance”, IOS Press, 2011

- searching the optimal specter of possibility actions taking into account the so called TRIZ method (Theory of Inventive Problem Solving- developed in the former Soviet Union by Genrich Altshuller).

Briefly speaking this is a method to find the common numitor of many similar problems, to diminish redundances, compromises and contradictions taking into account that path dependence successful solutions need an efficient use of resources;

-the TRIZ method parameters can be examined within round table workshops organized by the interested firms to create an environment of interactive and multidisciplinary learning debates between insider management team and outsiders possible specialized actors called knowledge brokers (consulting companies, suppliers, design agencies, universities or other interested partners who work across many industries) to engage and develop future profitable partnerships .

In this framework it is to mention the importance of individual and social learning mechanism in the so called Triple Helix Paradigm Development as a transition from linear to a non-linear model of interaction between producers, suppliers, public authorities, universities, banking system consumer culture and civil society involvement.

The final goal of this learning mechanisms is to engage workshop debates on positive and normative arguments of innovation aimed to develop in a sustainable manner the utility maximisation on profit, knowledge and marketable brands, human capital organisational culture and its positive knowledge spillovers across the whole economy.³

At the macroeconomic level the sustainable innovation mechanism is related to the impact of governance innovation – in the the so called economic and public institutional reforms.

In the essence, governance innovation is a set of principles adopted by an organization like a company or a state authority expressing how to rule and what kind of principles to apply in internal and external stakeholder relations as a transition process from old to new governnace, from classic bureaucratic and hierarchic state government to civil society public servants approaches, in the spirit of rule of law respect, to regulate the optimal equilibrium problem applied to specific issues (institutional interactive relationships in a society between politicians, labour unions and company stakeholders, to promote effective public policies in the field of procurement contracting-in and outsourcing practices).

Thus, sustainable public innovation is a new mechanism or a set of institutional arrangements which is successfully implemented to solve governance problems or to gain better governance outcomes, to analyze, evaluate, regulate the specific aspects of economic, social and environmental value chains, how public authorities provide or facilitate accountable relationships between the general public and public administration.

Briefly speaking, the proposed institutional and economic reforms oriented to the objective of economic growth, social welfare and environmental protection have a strong theoretical benchmark inspired by liberal or conservative economic perspectives. (for example the liberal New Deal reforms versus the Washington Consensus autharchic values)

In the same time, public innovation is a public choice and voluntary citizenship learning mechanism that takes into account a democratic and efficient oriented managerial process

³ Elias G. Carayannis, Elpida T. Samara, Yannis L. Bakouros (2015)-“Innovation and Entrepreneurship- Theory, Policy and Practice”, Springer International Publishing Switzerland 2015

related to analysis, evaluation and implementation of public regulations that affect financial procurement accountability principles and voluntary citizenship partnerships oriented to a society based on education and culture positive spillovers on the social relationships between public authorities, universities and economic agents.

Another type of learning mechanism is related to public procurement as an stimulus instrument for innovation.

At a first sight it is to consider the well known definition of public procurement as a contractual partnership in the acquisition process of goods and services offered by public agencies or private organisations taking into account the respect the rule of law regarding the principles of integrity accountability and transparence in the mutual benefit of consumers, suppliers and public authorities.

From this perspective public procurement for innovation (PPI) has a reason, specific features and mode of manifestation inspired by linear and non linear models of sustainable innovation learning mechanisms.

In this perspective, as mentioned in the studies of Johan Asphjell Bjørnaas and Harald Schmidt-Horix (2013) or Veiko Lember, Rainer Kattel, and others (2014) essential facts related to PPI illustrate the following aspects⁴:

- general theoretical background inspired by the theory of comparative and competitive advantage of nations' on one hand and the heterodox evolutionary economic tradition based on Schumpeterian innovation of new goods, services and production organisation;
- the good practices guidelines stated in the so called Oslo Manual, World Trade Organization (WTO) and Government Procurement Agreement (GPA) frameworks;
- specific concrete issues related to development of new tangible goods, intangible services, improvements of production organisation and human capital performance, as well as the classic auctional procurement process in the way from idea to market success (define specification, supplier selection, contract agreement, ordering, expending, evaluation).

Thus, the PPI occurs when a public agency places an order for a product or system which does not exist at the time, but which could (probably) be developed within a reasonable period that requires innovative work to fulfil the demands of the buyer.

From this perspective public procurement is a multi-objective policy, in which innovation is not principal related to supply side of creativity the principal objective is the consumer preference and financial integrity that makes a good reputation of the economic agent.;

- the reason for a PPI is related to improve services quality public services to the population (that act as an positive externality that spill over on the whole society), Address societal challenges (related to societal challenges such as global warming, energy supply or ageing societies), increase competitiveness (to increase the competitive advantages of the country)

⁴ Johan Asphjell Bjørnaas, Harald Schmidt-Horix- "Barriers to public procurement for innovation-" A case study of ICT projects in the specialised health services in Norway", PhD Dissertation June 2013 <https://www.nho.no/siteassets/nhos-filer-og-bilder/filer-og-dokumenter/offentlige-anskaffelser/masteroppgaver/barriers-to-public-procurement-for-innovation.pdf>
Veiko Lember, Rainer Kattel, and others (2014)- "Public Procurement, Innovation and Policy- International Perspectives", Springer-Verlag Berlin Heidelberg 2014

-the specific mechanisms of PPI are related to facilitate the customer-supplier interactive learning process (to reduce information asymmetry between suppliers and consumers, Increase Aggregate and individual demand preference culture, as well as to encourage a sustainable business in the field of public utilities) .

Sustainable innovation as a concept and learning mechanisms conduct to possibility to develop a society based on orthodox or heterodox economic theories related to linear neoclassical or endogenous growth models on one hand and on the other the non linear social “triple Helix” models.

a. Learning Society from the classical linear learning innovative model

In this framework the learning society could be illustrated as the triad of oikos habitus paideia meaning the relations between economics, sociology and philosophy sciences to create an innovative spirit of creativity, citizenship in a climate of individual and collective freedom & responsibility.

Thus it is to mention the recent study realized by Joseph Stiglitz and Bruce Grenwald (2014)⁵. The vision presented of the learning society reflects the importance of learning in the context of Ricardian theory of Comparative Advantage of Nations, suggesting that the structural elements of learning both at macroeconomic (public investment in education and ownership of intellectual property rights taking into account steady state capital stock improvements), microeconomic (stimulus of production factor productivity in a regulated competition environment).

The quality of labor factor is essential in a learning society.

The learning model is a linear deductive one starting with the problem interrogation of what is to be learned (meaning learning How to better meet consumer needs, development of optimal critical thinking in a way of learning to learn from positive or negative externalities generated by mistakes or to a future optimisation of personal specific qualities oriented to a better future, future development, learning from the others or in the context of transactional learning between consumers and producers, electors and elevated people)

In the linear perspective of learning society is very important to create a learning architecture that connects the major determinants of learning (capabilities; equal chances knowledge; ambition to create a mindset optimal for welfare and knowledge in the marketplace interactions with different people and authorities) very useful for future economic reforms to generate a new competitive space for infant industries .

b. Learning Society from the non linear learning innovative model

Learning Society from the nonlinear learning innovative model is related to the classical concept of Triple Helix socio economic development launched by Riccardo Viale and Henry Etzkowitz .

In the essence the triple helix concept is the result of the transition from weak to strong sustainable development, from isolated self interested agents to an integrative complementary social agents in a framework of social learning .

⁵ Joseph E. Stiglitz, Bruce C. Greenwald (2014) - “Creating A Learning Society-A New Approach to Growth, Development, and Social Progress”, Columbia University Press, New York, 2014

This classic concept have a pronounced social inductive learning characteristic :in the present the classic Triple Helix became a Qvintuple Helix to integrate, public authorities,economic agents,universities and other educational institutions,civil society media,consumer culture preferncies.⁶

3. Conclusion

A final remark is related to the fact that sustainable innovation in its triple quality of concept, mechanism and social ideal is more complex because implies not only intellectual skills or through a simple learning by doing .

In this framework,learning society is oriented to major human ideals taking into account the relationship between human character and its adaptive personality,the continuous improvement of ideas architecture(the formal,material, efficient, final causes as well as its inteligible characteristics oriented to supreme values of Good ,Beauty, Friendship) as well as the metaphisic aspects of innovation(ideas are not a simple intellectual exercise , because they contain a special content of non human energy that need an illumination process.)

As mentioned by some phisophers like Augustinus,Gregory Palamas, or the romanian writers Constantin Noica or the orthodox father proffessor Dumitru Staniloaie, sustainable innovation illustrates the relationship between human reason,sensibility and responsible free will in the context of the orthodox faith metanoia concept .

This make sense of a transition to another possible beautiful image of sutainable innovaton as a free wiil conscious new mindset of personal sacrifice for a higher fundamental set of values “ to love the others and the reward will come”⁷.

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