IS ENVIRONMENTAL DEMATERIALIZATION AN ACTIVE FACTOR OF THE SUSTAINABLE DEVELOPMENT?

Florin Răzvan BĂLĂŞESCU[*]

Rezumat

După cum este cunoscut, dezvoltarea durabilă relevă aspecte economice, sociale şi ecologice circumscrise sustenabilității stocului capitalului natural şi fluxului entropic material energetic ce afectează relația omului cu mediul din perspectiva externalităților şi a „metabolismului" socio-industrial. Astfel, ținând seama de principiile raționalității autonom economice şi ale complexității integrativ socio-ecologice, dematerializarea relevă importanța diminuării consumurilor materiale în sens absolut (cantitativ) şi relativ (intensitatea utilizării resurselor), fiind în egală măsură un concept, un instrument şi un vector purtător de valori socio-economice privind impactul ştiințelor naturale şi sociale asupra relației economie-societate- mediu. În acest cadru ne punem întrebarea dacă am putea vorbi şi despre o altfel de dematerializare circumscrisă unui altfel de determinism al existenței umane?

Abstract

As it is known, sustainable development reveals economic, social and ecologic aspects circumscribed to the sustainability of the stock of natural capital and to the energy matter entropic flows which affects the relation environment-economy-society in terms of externalities and of the socio-industrial metabolism. Thus, taking into account the principles of the

[*] *Scientific researcher III, Centre of Financial and Monetary Research "Victor Slăvescu", Romanian Academy.*

technical-economic rationality and integrative socio-ecologic complexity, dematerialization is a concept, an instrument and a vector carrying socio-economic values based on the natural and social sciences. In this framework environmental dematerialization reveals the issue of socio- economic energetic centres - a result of relationship between nature and human rational sensible free will determinism.

Keywords: sustainable development, ecologic economy, dematerialization

JEL Classification: Q56, Q57, Z1

Strictly, etymologically speaking, the term of dematerialization (*fr*. *dématérialiser*) refers to the probability and possibility of separating the matter, of losing the material characteristics and even of the matter itself; this may be understood by the triad dematerialization - teleporting - materialization, a process of transformation and passing of a structure or entity from the area of the visible to the area of the invisible and reciprocally, as shown by the Philadelphia experiment.

From the economic perspective, in general, dematerialization refers to the efficiency of the production and consumption processes and it may be seen as a deep accelerated integration process of services and goods within the meta-industrial economy with the following features:

- diffusion of the sectorial borders meaning that the production of industrial goods claims more and more the use of services
- specialization versus multidisciplinary aspects of economic meaning the importance of supply chain network process to improve the relationship between suppliers and consumers but also taking into account the fact that production of industrial goods claims more and more the use of productive services;
- increased spatial and technological complexity in the context of market globalisation;
- in the transition to knowledge based economy the human capital is an important asset in the accounting structure of firm in the form of psycho economic and social-ecologic abilities (autonomous economic rationality and integrative adaptive-resilient intelligence).

In this framework dematerialization could be approached in the context of the decentralized managerial process aimed to profit maximization objective taking into account both the competition based reality of cost reduction and quality reputation as well as the efficient contribution of productive services.

In this framework is interesting to notice the conception of Henk Kox L.M. and Luis Rubalcaba Bermejo (2007), who showed that dematerialization may also be seen as a process of managerial, productive and financial flexibilization aiming to ease business efficiency through the tertiary sector of economy - that implies an interactive process of transforming the goods into services and of the services into goods.

Goods that transform into services	Services that transform into goods
Production services used for the production and distribution of goods. The physical good include a higher value, joining the services incorporated into the production processes.	**Production goods**: they are of use before the actual production (for instance, professional training)
Operational services: services generated by goods, independently of their use and contracting; appearing here is a function of the goods through services.	**Operational goods**: used in co-production through the flow of the added value, including accounting or communication services.
Functional services: provides utility to the goods. All goods have functional, practical value, which is a quality intrinsic to the services.	**Functional goods**: material or not, they presume the delivery of a service for a used which is concomitantly supplier too.
Accompanying services: they accompany the maintenance of goods.	**Accompanying goods**: ex-post equipment of the services.
Differentiated services: the peculiarities of the goods differ, from case to case, depending on the quality of the incorporated services.	**Differentiated goods**: based on the perception of singleness, of the consumer or seller, about the services provided through goods.

Source: Kox H.L.M., Rubalcaba L. (2007)

Thus, it is to consider the analysis balanced, „anorexic" or hedonist consumption pattern which determines the change of the economic agents from consumers of physical goods into consumers of information, culture and knowledge. This is done through productive services.

The productive services cover a wide range of activities, from complex ones such as management, financial consulting or technological services, to simple ones such as cleaning, traditional trades (lawyers, accounting) and to new specializations - telematics engineering. Characterized by immateriality, trans-territoriality and unpredictability, they shape the condition of people and goods.

Starting from the acceptation of the apparent opposition 'goods-services', the productive services picture a specific duality, meaning that some goods behave rather as services, while there are services behaving rather as goods. This led to the idea of integrating the goods and services: all the goods involve services and all services involve a physical materialization or materialized goods.

From this perspective, the dematerialization means not only the recycling and economizing of material resources but also the increasing of immaterial component of human capital that reconfigures in a pecuniary, technologic and adaptive resilient way the network flows between economy, society and environment.

Thus, in a narrow point of view, dematerialization illustrates the integrative transformation process of goods into services and of services into products.

In a broad meaning, dematerialization illustrates the multidisciplinary, complex interdependences between natural and anthropic environment, under the form of a concept, instrument and vector generating free market and socio-economic values of economic development, environmental protection and social welfare, based on the optimization and precautionary analysis of the externalities impact on the evaluation of the natural, technologic and natural capital, as well as the entropic complexity of socio-industrial metabolism.

This makes it necessary to take into consideration the institutional mechanisms of the human society: the market and the society.

As mentioned by Emil Scarlat (2005), a possible starting point for the article is the concept of social economic agent and its connection with surrounding environment both natural and anthropic.

Thus, the agent is defined as those who, or through, is exerted the power to generate an effect or impact, endowed by rationality, autonomy and flexibility within the context of maximizing the function of economic (efficiency), financial (profit) and social (utility) excellence, but also characterized with the complex systems abilities to the environment through a continuous improvement of the capacity of resilience, innovation and learning from the previous experience.

In turn, the notion of environment represents, essentially, the conditions in which this agent exists and functions. In other words, the environment defines the properties of the world in which the agents are, it comprehends the principles, laws and processes in which the agents exist and interact.

The principles are the laws of nature that express the basic truths existing in the surrounding world, characterised by accessibility (how much is the environment known by the agent), determinism (how much can the agent predict environmental events,),controllability (how much can the agent change its environment), volatility (how much can the environment change while the agent decides on the following action), temporality (if the actions of agent take place continuously or not), localization (the space of interaction between the agents).

The processes are the second essential characteristic of the environment which illustrates the manner of expression of the principles stated through specific parameters that can be measured in terms of quantity and quality.

In other words, the environment is an integrated assembly of the principles and processes where the state represents a lot of multitudes and values that define completely the environment, while the process is an action carried out autonomously and which changes the state of the environment.

From the perspective of this paper, the relation between the economic agents and the environment illustrates different perspectives of dematerialization taking into account the principles, instruments and values promoted by environmental economy and economy of the natural (ecologic) resources.

Thus, the principles and processes governing nature, economy and human society, reveal the importance given to the positive or normative character of perceiving reality as it is given or of perceiving it as an social

ideal or construct of imagination by the way of optimization, socialization and individualization of an efficient and equitable allocation of resources management.

This is then projected on the way in which the self-interest of the economic agents from the integrated free markets is maximized and on the institutional mechanisms of the norms of community cohesion by making an evaluation of the costs incurred by the optimization, socialization and individualization of an efficient and equitable allocation of resources.

The reality exhibits in equal measure a marginal propensity of individual preferences for profit, efficiency and utility, as well as an entropic somatic behaviour, the economic and social agents put constantly an increasing pressure on natural and artificial human environment, in which the allocation of resources is generated by real needs and passing wishes, never completely met by technological and social innovation.

On this background, dematerialization can be analysed by comparing the aspects circumscribed to the environmental economy with those of the economy of the natural (ecologic) resources as concept, instrument and vector for the promotion of the individual and social values, of the economic efficiency and social equity.

In this framework, firstly, it is to mention, some of the main features of rational economic sustainability:

- the formal, structural efficient and final principles of capital stock elements subjective evaluation (water, air, fire, earth) integrated to the other forms of the economic capital (accounting, technological, human, financial and social) to meditate on freely life sustained services offered by nature environment and human behaviour;

- the characteristics of specialization and rationality of economic agents whose endowments, and preferences, necessities and desires are the result of decision-making processes with the purpose to ensure an economic and social, productive and consumerist, pecuniary and technological optimum, at the regional or global level;

- the importance of evaluating the characteristics of the capital elements by greening environmental accounts inspired from the national capital accounting, and of the fiscal regulatory instrument of the Pigouvian taxes,

and of the environmental tax for an efficient resource allocation, reduction of pollution and achieving the social equilibrium through Pareto's primary and secondary economic optimum, as well as in order to show the hypothesis of the so-called double dividend – control pollution, reconfigure the structure of the fiscal revenues (alleviation of the impact of the distorted taxes on capital and income) and stimulate the market forces;

Secondly, inspired by the principles of the bio economic, thermodynamic, and matter substance monism, the approach of ecologic issues reveals rather socio economic characteristics such as:

- the principle of multidisciplinary objective - experimental research in the complex systemic organization approach of nature and society, to illustrate the specific features of adaptation, innovation and learning capacity of social and natural interdependent entities;

- systemic integration of the constitutive aspects of the socio-economic sustainability (limited scarce resources, degradation of the ecologic, economic and cultural patrimony, of the flora and fauna, problems related to environmental pollution, economic gaps and social inequities generated by the change in the life style of increasing population whose number is relentlessly) within the precautionary principle of zero growth, neo-Malthusianism and of the complexity science innovative clusters integrated into the concepts with socio-economic impact – the IPAT equation Degrowth – as mentioned in the official documents of the Club of Rome and of the World Rio Summit (Meadows Donella H.; Meadows Dennis L et al. (1972); United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 3-14 June 1992);

- Importance of the systemic integration of the socially acceptable norms of using the ecological space concept with the aspects circumscribed to the industrial ecology concerning the absolute and relative intensity of material units aimed to improving productive eco-efficiency eco-sufficiency, through the fiscal ban on consumption intensity of materials stimulating the factor X (to consume X-times less in order to obtain X-times more) taking into account the indicators generated by the of the material flow accounting such as the ecological footprint and ecologic rucksack, the life cycle of the products and

the importance of disseminating the information on the voluntary-ideological cooperation to shape the sustainable consumption.

Within this framework, dematerialization reveals a nice picture of miniaturization and the socio-ecological ethics.

However, dematerialization also reveals some problems and challenges such as:

Firstly, there are problems generated by the characteristics of complex systems and their impact on the productive and social behaviour. Based on resilience-learning-innovation triad, dematerialization presumes the dominance of the ideal social over the economic reality through an adaptive management of learning from experience, both at the individual and social levels. Even in this case, however, dematerialization is not a genuine anti-entropic metabolic process, because the "learning in practice" terms are not enough.

For instance, learning from the past as an only routine is often useless; it is much more important that the person gets involved in the day-by-day work, thinking of one's current and future responsibility-the transition process from "learning in practice", oriented towards the goal of continuous professionalization by strengthening the free will motivations for taking responsibility.

That could mean that the agent is not historically predetermined rather he is freely the one who shapes the space time coordinates of action - time for working, time for socialization or so called time oasis (the time for meditation when thoughts are cleared and ordered).

Secondly, there are problems generated by the perspective of the economic Degrowth: dematerialization has to solve the problem of entropic material consumption, which presumes the expansion of the immaterial sphere of the productive services but also sociological issues.

This is easy to say but difficult to play, particularly since the services might consume even more matter and energy reconfiguring the structure production and consumption to generate very noxious "information" wastes, of heavy metals, within the context of the energy rebound effect and of the implications of the entropic socio-cultural metabolism when people forget the

traditions and the modernity shape the lifestyle as in the case of so-called risk society concept.

From the perspective of achieving an equitable ratio between natural environment and the anthropic one, which is the relation of causality and which is the meaning of this relation?

It is difficult to answer these questions.

However, the ecological dematerialization illustrates empiric precaution in the relation between man and his/her environment. Hence, the quantitative analysis shows the need to identify a point of support by comparing the elements of the environmental economy with those of the ecologic economy.

This point of support may be called demateriality – a subjective, structural concept specific to the neoclassical economy of free market agents, which define the finality of the reason for existence of natural capital in the context of its productive and consumist, pecuniary and technological, regional and global externalities that shapes the human action responsibility management.

Demateriality might be the invisible environment which supports the visible environment of dematerialization, just like the idea of currency is the one supporting the visible bank notes money.

It manifests through the evaluation of the rational optimum efficiency of using the natural capital, as well as by the intelligent, adaptive-resilient of the socio-industrial and ecologic metabolism within the framework of the *"triple bottom line"* or *"triple top line"*, strategy, taking into account the concrete particularities of the existing economic reality and of the community sociologic ideal.

In this case, it is required a deepening the analysis of the distinction between the actual needs and temporary desires, as well as an analysis of the difference between the state of misery and GDP depended poverty.

The relation between individual economic and social man and nature could reveal also other aspects more special than apparently shown by the demateriality-dematerialization binomial.

The Romanian researcher Constantin Rădulescu-Motru made a significant contribution to this matter in his paper "Power of the Christian soul" (1930).

According to this paper, within the relationship between human being and natural environment, the psychological determinism of soul and conscience is primordial to the determinism of the natural sciences, both historically, and logically.

Thus, the fact that nature has its own rules is obvious, but they become important only within the context of the act of free will, rationality and feeling from the human being, of so called the determinism of soul laws, both of them originating in the acts of will of the God.

Historically speaking, mankind practiced the truths of modern sciences even before the scientific theory and practice. Soul determinism was and is still primordial because the "primitive man" who didn't have access to science, trusted in God – the ex nihilo creator of life laws - and followed first the natural course of the inventions utility and only after that followed the psychological impulse of adaptation and precaution. The first inventions, such as the wheel, appeared this way.

Even when, once modernity started, the scientific determinism managed by experiments could prove to convince only the fact that the exterior social and economic environment is the one which should be conquered by the adaptation and precaution - *savoir c'est prévoir* (to know means to predict).

Referring to the human being – natural environment relationship, for Constantin Rădulescu-Motru, the research of the objective world laws is no less important than the subjective psychological laws of conscious in which the human being gets involved in the real nature through its personality and character.

From this point of view, nature bears the he concrete exterior footprints of personality visible actions as well as the motivations built on abstract and intuitional logic grounds.

Within this framework, by developing the concept of the energy centres, the author highlights the need to construct centres of soul energy – place of the metaphysical institutions, motivations, thought, intentions on the basis of which the external economic and social centres of energy are built.

Constantin Rădulescu-Motru said that science turned the human being fearful, but the Christian religion made him brave; the true science was the result of a soul needs, not so much to conquer the natural external ever-

changing environment but to seek the real meaning of the useful, visible things, to conquer mainly the his selfish environment by conscience, character and personality, because only on the basis of a well-prepared, logically conscious and sensitive soul, a personality can be exteriorized by good acts.

The conviction that the external nature is led by stable laws, among which the human is always in a safely solid ground, was the most needed one for the man who dared to make his life at his own risk.

Instead of the ancient people ground, based on soul unity of blood, race and religion relationships, for the modern man, nature is no longer just a possibility thought in the rational, analytic manner; rather, it had to become a certain experimental reality, otherwise its entire activity would be worthless – knowing means predicting, and predicting means that one can.

However, the Divine Creator, knowing this inclination of the human to selfish autonomy, introduced from the very beginning the Christian heteronomous principle of reason and sensibility in the relationships between people and between them and the natural environment.

Synthesizing the above paper, we may say that environmental dematerialization is an active factor of sustainable development within an awareness process of economic, social and ecologic problems, illustrating the following aspects:

- initial starting point – the hypothesis of the given reality and that of imagination construction by considering the positive principle of the economic sustainability versus the normative principle of the sociologic sustainability;

- defining particularities of the social economic agents and of the natural environment entities (autonomous economic rationality and natural production integrated capital versus resilient-innovative intelligence and holist systemic approach the environment);

- characteristics of natural capital analysis and strategic instruments (network of the relative prices, capital accountancy and fiscal instruments for the economic evaluation of primary and secondary Pareto optimum versus the network of the adaptive complex systems, accountancy of the monetary-material flows and the anti-entropic fiscal instrument of dematerialization,

factor X, voluntary conformation to control the hedonism of using the ecological space);

- quality of generating and carrying values vector – the individual self-interest versus the social collective values;

- aspects circumscribed to the relation between the natural determinism and the human determinism, illustrating the free will of the agents in their action to conquer not so much the external natural environment, but mainly the inner environment of liberty and responsibility, of reasoning and action. This illustrates the psychological component of the character – the space where the intuition acts to elaborate the motivations, intentions, thoughts, aspirations, attitudes and personality, meaning the reflection towards the exterior through facts;

- metaphysical aspects – the dictum "*savoir c'est prévoir*" versus savoir c'est la foi en Dieu Chrétienne – on the basic role of the Christian credo of stating the importance of constructing the centres of soul energy as premises for the construction of the centres of socio-economic energy – faith, patriotism and responsibility are those "cleaning non-pollution fuels" that stimulate human character and personality as well as the actual way in which one might optimize, socialize and individualize the relationship between the natural and the anthropic, economic, social, cultural and educational environment.

References

1. Adam Barbara; Beck Urlich;Loon Joostvan (2005) - *The Risk Society and Beyond-Critical Issues for Social Theory,*S age Publications, London

2. Antonacopoulou E. (2006) - *Learning-in-Practise: The Social Complexity of Learning in Working Life*, WP nr. 033, February, Advanced Institute of Management Research, London

3. Boyer R. (2011) - *Are there laws of motion of capitalism?*, Socio-Economic Review nr. 9/2011, pp. 59-81, Oxford University Press and The Society of the Advancement of Socio-Economics

4. Beck, Ulrich (1992). - *Risk Society, Towards a New Modernity*. London: Sage Publications

5. Behrens A. (2004) - *Environmental Policy Instruments for Dematerialisation of the European Union*, SERI BackGround Papers nr. 7, May 2004, Sustainable Europe Research Institute (SERI), Viena

6. Bermejo, Rubalcaba, Luis (1999) - *Business Service in European Industry-Growth, Employment and Competitiveness* ,European Communities, Brussels, Luxembourg, Chapter 3-"Explanatory factors of business services", pp. 103-186

7. Cucuzzella Carmela and De Coninck, Pierre (2008) – "The Precautionary Principle as a Framework for Sustainable Design: Attempts to Counter the Rebound Effects of Production and Consumption", First International Conference on Economic De-Growth for Ecological Sustainability and Social Equity, Paris, April 18-19th 2008

8. Dovers S., Hutchinson M. et al. (2008) - *Uncertainty, Complexity and the Environment* pp. 245-261, "Uncertainty and Risk Multidisciplinary Perspectives", Kammer G. and M. Smithson (editors), EarthScan Publishing, London

9. Kox H.L.M., Rubalcaba L. (2007) - *Business services and the changing structure of European economic growth*, CPB Memorandum, Vol. 183, 4 July, CPB Netherlands Bureau for Economic Policy Analysis, The Hague

10. Meadows D.H., Meadows D.L et al. (1972) - *Limits to Growth*, New York: New American Library

11. Piciu G. C., Manolescu Ghe. (coord.) (2010) – *Internalization of the financing costs and of the negative externalities for the environmental protection*, (in Romanian) research project, CCFM „Victor Slăvescu", Bucharest

12. Piciu G. C., Manolescu Ghe. Et al (2011) - *Economy and Environment - Strategic, Integrative and Convergent Approach of the Financial Flows for a Regenerative (Industrial) Economy*, Financial Studies, CCFM „Victor Săvescu", vol. 15(1), pp. 210-241

13. Rădulescu-Motru C. (1930) – *Power of the soul*, (in Romanian) Casa Şcoalelor, Bucharest

14. Sorrel S. (2010) - *Mapping Rebound Effects From Sustainable Behaviours – Key Concepts and Literature Review*, SPRU, August 2010

15. Shmelev S. E. (2012) - *Ecological Economics-Sustainability in Practice*, Springer Publishing, London

16. Sava N.I. (2005) – *Risk society – Security under conditions of risk*, (in Romanian), http://www.unibuc.ro/prof/sava_i/docs/res/2012febI._N._Sava_-_Societatea_Riscului.pdf

17. Scarlat E. (2005) – *Agents and agents-based modelling in economy*, (in Romanian) ASE, Bucharest

18. Van den Bergh J.C.J.M (2011) - *Environment versus Growth - A criticism of "degrowth" and a plea for "a-growth"*, Ecological Economics, 70, pag. 881-890, http://degrowth.org/wp-content/uploads/2011/05/van-den-bergh_degrowth-and-a-growth.pdf

19. United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 3-14 June 1992, http://www.unesco.org/education/information/nfsunesco/pdf/RIO_E.PDF