Research on the Economic Organization Environmental Impact

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Any economic activity carried out by an organization, can generate a wide range of environmental implications. Particularly important, must be considered the activities that have a significant negative effect on the environment, meaning those which pollute. Being known the harmful effects of pollution on the human health, the paper presents two models of utmost importance, one of the material environment-economy interactions balance and the other of the material flows between environmental factors and socio-economic activities. The study of these models enable specific conditions that must be satisfied for the economic processes friendly coexist to the environment for long term, meaning to have a minimal impact in that the residues resulting from the economic activity of the organization to be as less harmful to the environment.

Keywords: harmful effects of pollution, environmental factors, socio-economic activities

All the people live in an environment in which they work, being bound more or less by schools, universities, town, shops, theaters, cinemas, restaurants, agencies, foundations, churches, sports clubs, and so on. All this is nothing else but organizations that allow to create a broad portfolio of activities and specializations to produce goods, services and information, that contribute to create a life more comfortable, more interesting for each individual in society.

The organization is therefore a group of people working together, to achieve common goals in order to obtain a product for a customer.

Some organizations pursue common goals in terms to achieve the profit as we can exemplify in this group the companies which offer products and services and non-profit providers of social services, such as for example churches. Organisations such as schools, universities, churches, foundations, associations, government continue to provide the means to achieve an organizational framework conductive to the development of culture, education and knowledge as the foundation of the society.

The generalized organizational system is illustrated in figure1.

In general, the organization can be considered as a system where we distinguish sizes inputs, output and state elements.

Inputs elements are subject to an transformation process specific to each organization (organizations know-how) based on mechanisms and laws controlling the process. In different stages we can identify state elements that reflect changes in the system.

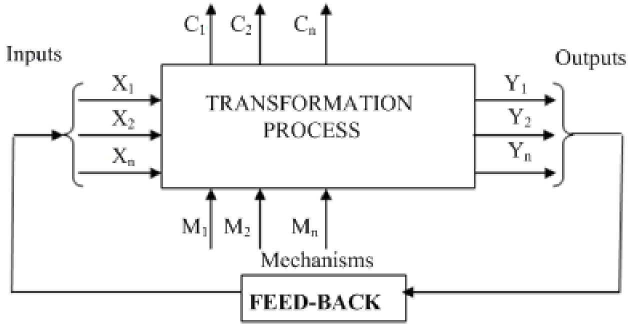

Fig. 1. The organization's Generalised System

The outputs represent in general the embedded added value in the product, which may be material or immaterial.

Organizations are open systems. In an organization, conceived as a system, entries consist of resources and outputs are products, services, and so on, and the environment influence the system through *feedback*.

The external environment is any element outside the organization, over which the organization has a certain influence, through residues discharged into the environment by production processes and services.

Pollutants are emitted from natural and anthropic sources of pollution (artificial, man-made) [1-3].

Anthropic pollution comes from various human activities conducted through economic organizations in industry, transport, agriculture, housework.

They were conducted and carried out numerous studies on pollutants emitted by industries, the immediate and long-term effects of pollution until the effects of emissions mitigating measures [4-6]. Studies are conducted at national level, and through international cooperation, in order to preserve an environment as clean as possible. This desideratum can be achieved, always elaborating models of the material balance and models of the material flows between environmental factors and social economic activities for the economic organization, whose impact on the environment, we want to study it.

Experimental part

The use of the resources and environmental impacts, have been studied both from the economic analysis (classical and neoclassical economics) as well as the natural sciences, which had significant influence on the economic environment development.

Material balance principle, refers to the equality that must be maintained between the physical flows in any closed system, according to the laws of thermodynamics.

Based on material balance principle can be identified the conditions which may be satisfied for that economic processes coexist with the environment in the long term.

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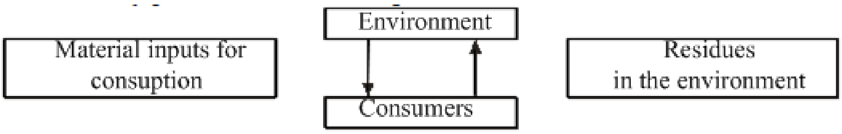

Fig. 2. Material balance principle

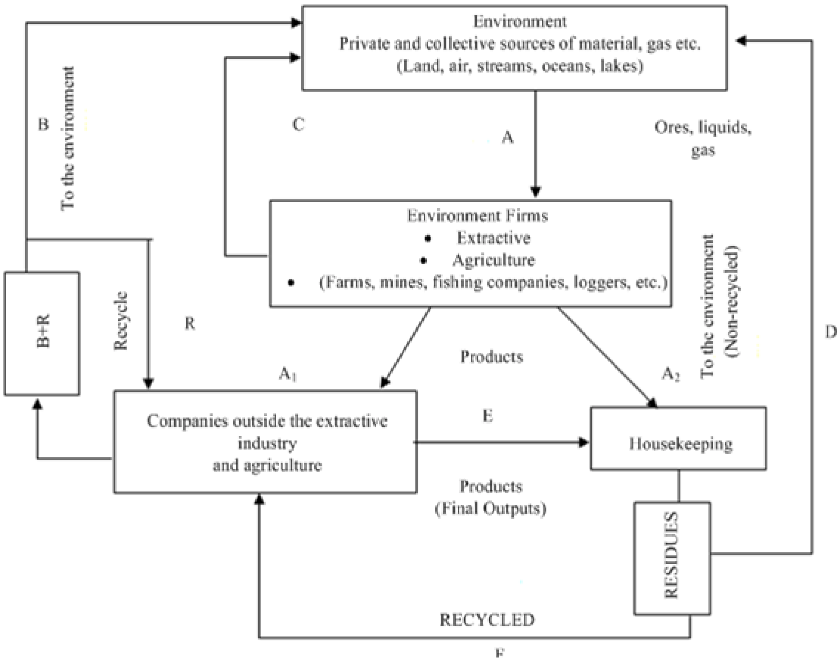

Fig. 3 The material balance model from the environmental-economy interactions

The essence is, that the waste mass flows of human activities directed towards the medium is equal to the mass of the flow of the resources from the environment.

In its simplest form, these interactions are conducted without any intermediate between medium to the final consumer, as shown in figure 2.

According to the material balance principle, if in the consumer sector does not occur storage of goods, the mass of the material inputs from the environment to consumption, must be equal to the average mass of the waste received in the environment from the end users.

A more complete description of the impact of organizations (companies) on the environment, taking into account intermediate production and recycling processes is presented through an explicit model of the material balance, as shown in figure 3.

Respecting the notations from figure 3, become evident some mathematical relationships for those four tapes, first, the base:

- For the environment

$$A = B + C + D \quad (1)$$

where: A is the mass flow of materials from the environment and B + C + D = mass of waste discharged into the environment.

- For mining and agricultural companies:

$$A = A_1 + A_2 + C \quad (2)$$

- For companies that are not related to mining and farming:

$$E + B + R + = A_1 + R + F, \quad (3)$$

- For households:

$$E + A_2 = F + D \quad (4)$$

It can be said first, that in a closed economy, in which is not achieved net stocks respectively stocks of buildings, factories, durable goods and so on, do not change the order of magnitude, it is valid the basic relationship mentioned, although in other cases it is alleged that discharged waste mass is greater than the mass of materials used, consumed oxygen.

Second, the principle of material balance shows that treating residues from economic activity does not reduce their mass, only transforms them according to the law of matter conservation, which can not be created or destroyed, although its shape can be changed. In this context, waste management gains importance not because it reduces the mass of waste, but because by treating them changes their status, becoming less harmful to the environment.

The principle of the material balance provides us a coherent framework for economic analysis in this area and draw attention to long-term indicators of the economic activity.

An simplified aggregate model is shown in figure 4.

The flows significance is as follows:

F1 - physical and biological environmental factors requested for the production processes and services;

F2 - waste discharged into the environment by the production processes and services;

F3 - physical and biological environmental factors, requested by the socio-cultural activities;

F4 - waste discharged into the environment by the social, cultural and recreation activities from the population;

F5 - flows of production for final consumption;

F6 - materials and residues rezulted from the consumption, recovered and returned to production;

F7 - the part of the production flow for the final consumption as net accumulation of durable goods for long personal use;

F8 - waste discharged into the environment, resulting from final consumption;

F9 - the production flow part for capital accumulation;

F10 – the recovery of the production assets physically and morally worn and returned in the production;

F11 - waste discharged into the environment, from wear of the production assets;

F12 – the recovery of the durable assets for long personal use, worn and returned in the production;

F13 - waste discharged into the environment, resulting from the wear of the durable assets for long personal use.

The relations arising from this model are:

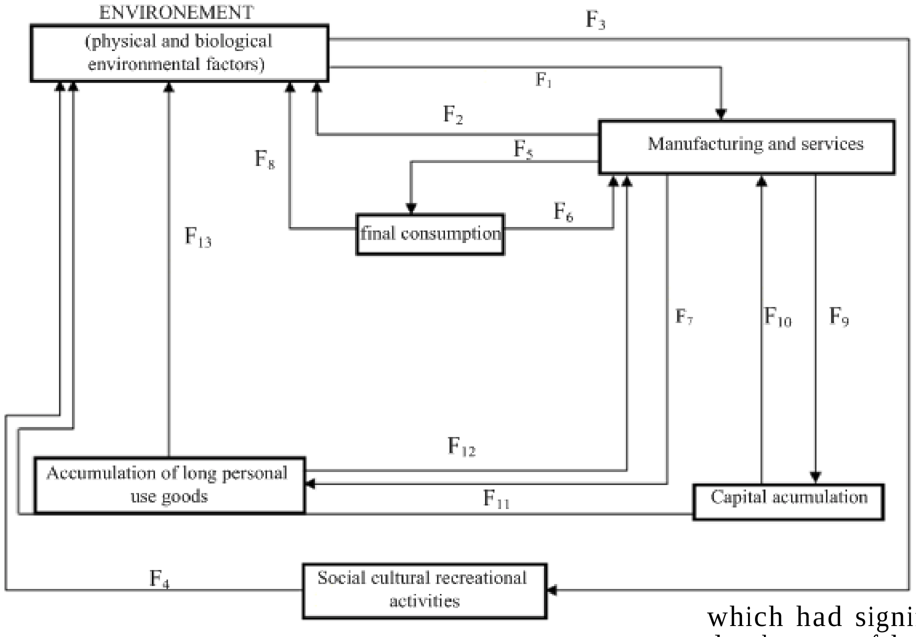

Fig. 4 The model of the material flows between environmental factors and socio-economic activities

F1 + F3 = the amount of the resources required from the environmental factors in a certain period of time;

F2 + F4 + F8 + F11 + F13 = the volume of the waste discharged into the environment by the various activities of the company during the period considered;

F6 + F10 + F12 = the volume of the materials and waste recovered and reused in the production.

From this model is obviously that F6 + F10 + F12, reduce the demand for the new resources required to the environmental factors, which means, basically, to protect them.

As we can see, the models may include or all the bonds indicated by the arrows, or only the most important.

The research shows that it can be used a simplified mathematical relationship:

$$M + A \times Y, \quad (5)$$

where M is the total quantity of residue discharged in nature;

Y-the final demand of materials or the flow material that the production is providing;

A-the flow materials conversion coefficient of the waste released to the environment.

Assuming that the expressed connection is direct and that the increasing of the production is exponential, the mathematical relationship can become:

$$M_{(t)} = AY_0e^{rt}, \quad (6)$$

where: t is the time;

Y_0 – the final material demand in the base period;

r - the demand and the production rate of growth.

Because some of the waste accumulates in the form of stocks in the nature and another part is assimilated by this with a K rate, the residual pollutants evolution of may be determined by the following mathematical relationship:

$$dM(t) = AY_0e^{rt}dt - KM(t), \quad (7)$$

and the inreasing related to time t is calculated with:

$$\frac{dM(t)}{dt} = AY_0e^{rt} - KM, \quad (8)$$

The calculations can be made overall or by the categories of the pollutants.

Conclusions

The resources used and their environmental impact have been studied both by the economic analysis (classical and neoclassical economics) and by the natural sciences, which had significant influence on the economic developmentof the environment.

The material balance principle, refers to the equality that must be maintained between the physical flows in any closed system, according to the laws of thermodynamics. On the basis of it, can be identified some conditions which must be satisfied for the economic processes friendly environmentally coexist for a long term, meaning to have an minimal impact in that the residues from the economic activity of the organization to be less harmful as possible to the environment. This can be achieved, always elaborating models of material balance and flows between environmental factors and social economic activities for the organization whose impact on the environment, we want to study it.

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Manuscript received: 18.03.2016