

Role of Ecological Marketing in Formation and Development of Ecological Cluster

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Abstract

The authors ground the necessity of managing processes of wastes emission into the environment; suggest methodic for assessing damage, caused by polluting and clogging up land resources due to violation of environmental legislation; and assess damage of polluting land area in Volgograd region due to the activity of LLC 'EcoCluster'. The authors analyze the influence of institutional environment of ecological cluster on the value of transactional costs of economic activity as a factor of economic development of a territory and work out a mechanism of developing ecological cluster as the result of ecological marketing. The article also gives a definition of ecological marketing, discusses the basis of conducting ecological marketing and its main instruments. The authors give an example of successful development of ecological cluster in the result of conducting measures on ecological marketing. Events of ecological marketing within the given ecological cluster, combining government and business, are planned till 2020 and are directed on recycling of municipal solid wastes. The experience of this cluster can be useful for other ecological clusters, because it clearly shows its development in the result of conducting ecological marketing events.

Keywords: institutional environment, environment, ecological cluster, ecological marketing, economic development

1. Introduction

Due to scientific technical progress, contemporary human cannot imagine their life without consumer electronics (TV-sets, computers, peripheral devices, mobile phones, etc.). Workability of the main part of such devices depends on their ability of being self-energizing.

Though any power elements early or later deteriorate and become waste, so then their second life begins, which is related to potential danger to ecosystem and human health.

If worn-out power elements are not treated correct, the toxic substances, they contain, pollute the environment and cause significant damage, the extent of which is not determined till nowadays. In this connection, the problem of assessing ecology economic damage, caused by in-flow of worked-out power sources, seems to be relevant and needs to be solved. Works of numerous scientists are devoted to the methodological aspects of evaluating ecology economic damage; Popkova, Volosatova, Leathwick, Snelder, Lehmann, Guisan, etc. are among them. Nevertheless, in spite of the obvious interest of researchers in this problematic, a range of issues, concerning economic evaluation of consequences of anthropogenic pollution, caused, in particular, by in-flow of electronic wastes into environment, is not studies well enough.

The publications, devoted to the problem of processing electric and electronic equipment wastes, discuss in first turn the organization economic aspects of managing this kind of wastes, analyze dynamic of their formation and accumulation. Nevertheless, there are works, describing methodological approaches to assessing damage, stipulated by electronic wastes. At the same time, the issues, concerning determination of the value of damage, stipulated by deterioration of ecosystems due to pollution by other electronic wastes, are practically not developed.

2. Method

In order to assess the damage of environment pollution, an author methodic was developed, which allows determining the value of damage, stipulated by pollution and clogging up of land resources due to valuation of environmental legislation, according to which the damage extent is determined by formula (Popkova et al., 2012a):

$$D=C*MA*S*Kp*Ks*Ke \quad (1)$$

where D – damage extent of land area pollution, thous. rub.;

C – costs on removal consequences of land area pollution, thous. rub.;

MA – normative monetary assessment of land area, which was polluted, thous. rub./m²;

S – square of land area, m²;

Kp – coefficient of land area pollution, which characterized the amount of polluting substance in the volume of polluted soil, %.

Ks – coefficient of polluting substance danger, %;

Ke – coefficient of ecology economic significance of lands, %.

With the help of the developed methodic the land area danger in Volgograd due to activity of LLC ‘EcoCluster’ in 2013 was assessed.

$$D=129 \text{ thous. rub.} * 34 \text{ thous. rub./m}^2 * 234 \text{ m}^2 * 12\% * 4\% * 8\% = 394,11 \text{ thous. rub.}$$

In order to determine the dependence between development of ecological cluster and conduction of ecological marketing actions, let us attend to LLC ‘EcoCluster’ of Volgograd region (table 1, figure 1).

Table 1. Dynamic of development and dynamic of conduction of ecological marketing actions of LLC ‘EcoCluster’

Year	2012				2013			
Quarter	1	2	3	4	1	2	3	4
Costs of conduction of ecological marketing events, mln. rub.	15,6	18,3	19,1	23,4	27,1	29,6	31,4	33,5
Clear profit, mln. rub.	215,7	234,50	269,30	278,20	295,40	306,10	312,70	322,80

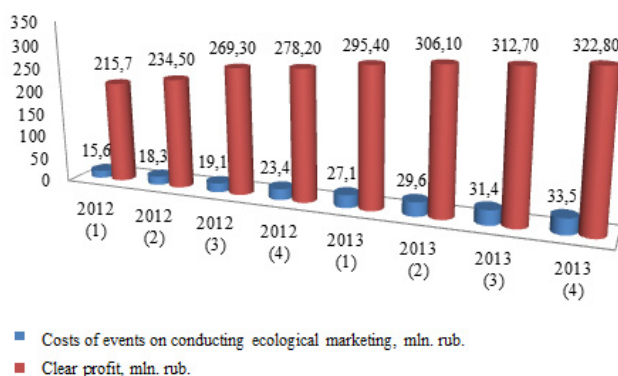


Figure 1. Dynamic of development and dynamic of conduction of ecological marketing actions of LLC ‘EcoCluster’

In the result of calculations with the help of program MathCad the values $b_1=5,9$, $b_0=4,6$ and the following equation of binary linear regression were obtained:

$$\hat{y}(x)=5,9+4,6x.$$

Index $b_1=4,6$ shows that while increasing expenses on ecological marketing by 1 mln rub., increase of clear profit by 4,6 mln rub. occurs. Correlation coefficient for the obtained model is $r_{xy}=0,954$. That means, that we can make a conclusion, there is a close interconnection between expenses on ecological marketing and volumes of clear profit of LLC 'EcoCluster'. Let us calculate the determination coefficient (Popkova et al., 2012b, p. 199):

$$D=r_{xy}^2*100\%=95,4\%.$$

Consequently, the growth of clear profit of LLC 'Innovazstroy' by 95.4% is explained by conducting events on ecological marketing. Let us evaluate the model of linear regression through mean error of approximation, which constitutes 6.2% for the obtained model. The fact let us conclude that the model is qualitative. Let us evaluate the model of linear regression through Fisher F-criterion. Proposed null hypothesis $H_0: b_1=0$.

$$F=\frac{r^2}{1-r^2}*(n-2)=\frac{0.95^2}{1-0.95^2}*(8-2)=55,53.$$

$F_{tbl}(crit)=5,99$. Since $F_{obs}>F_{tbl}$, the regression equation is significant at the set level. That is why the hypothesis H_0 is false (Popkova et al., 2013, p. 75).

Thereby, according to the obtained equation of linear regression, as the ecological marketing costs increase by 1%, the clear profit increases by 1.4 thous. rub. The connection between the considered characteristics is strong and direct ($r_{xy}=0,954$). The variation of clear profit by 95.4% (D) is explained by variation of ecological marketing costs. The approximation error (6.2%) shows good correspondence of calculated and factual data. As $F_{obs}>F_{tbl}$, the H_0 hypothesis about random nature of detected dependence and statistic non-significance of parametres of equation, indicators of strength of links.

3. Results

Let us consider the influence of institutional environment of ecological cluster on the value of transactional costs of economic activity as the factor of economic development of territory. The first group of transactional costs of ecological entrepreneurship represents costs of legal activity, which include costs related to business registration and activity licensing, tax and social charges, etc. (Leathwick et al., 2010).

Economic agent besides non-recurrent 'access costs', related to legal entering the market, constantly incurs costs, being regulated by manufacturing standards, norms of labour organization, and can bear losses due to inefficiency of arbitral proceedings. Choosing illegal form of business organization, economic agent has to pay 'shadow rent'. The second group of transactional costs, related to illegal activity, includes costs and avoidance of legal sanctions, costs of revenue legalizing, increased rates in shadow capital market, weak protectability of property rights, possible reputation loss (Snelder et al., 2009).

Nowadays, the formed paradigm of development of enterprises in Russia, embodying concentration of capital and priority of using manufacture factors, creation of large holding unitary structures, is in crisis and is not able to improve its competitiveness in future. The most effective and wide-spread form of integrated formations of enterprises are clusters.

Ecological clusters represent structures, based on combination of vertical and horizontal integration of judicially independent enterprises (good producers, processors, service suppliers, technology creators, infrastructural objects, financial institutions, scientific research, investing organizations and consumers) providing environmental protection.

The Conception of cluster development, which was worked out by scientists of Russian Academy of Sciences and is based on system synergetic approach, determines an ecological cluster as a system of many-dimensional interconnected forms of organization of activity, which are integrated with the aim of simultaneous and interconnected solving problems of environmental protection and introduction of ecological technologies, transforming 'wastes' into resources of economic development (Chen, 2009).

Creation of large integrated formation is intended to solve the problem of decreasing quantity of loss-making enterprises. Entering the cluster structure, non-profitable enterprises receive loans on developing own manufacture, qualified support and consultations of specialists (jurists, accountants, financiers). Such measures of rehabilitating loss-making economies lead to their further development and growth, but within the cluster.

Also, while creating successful, from the point of view of competitiveness, clusters, a synergetic effect of interaction of participators within clusters arises as within quasi-integrated association. Clusters possess an ability of good adjustment to constantly changing environment, and the investing component of cluster is able to support its development (Hortal et al., 2009).

The motif for creating and successful functioning of ecological cluster is that fact that every its subject achieves increase of revenue not due to infringement of interests of subcontractor, but on the basis of reduction of losses, improvement of quality of production and increase of manufacture volumes. Besides that creation of clusters can encourage manufacture of goods with new characteristics.

Modernization of economic relations within cluster gives new opportunities and leads to getting competitive advantages. During the process of interaction of enterprises within an ecological cluster, and their common participation in scientific developments, approachment of their interests, coordination of activity and interchange of information between them, establishment of long and strong economic relationship occurs, which favourably impacts their competitiveness (Dolev & Carmel, 2009).

The main principle of ecological cluster operation is specialization and concentration. Under the contemporary conditions formation of economic organizational mechanism of ecological cluster occurs on the basis of existing macroeconomic indicators of territory functioning, which influence formation of solvent demand of population, state of resource potential of agro-industrial manufacture and development of food connection.

Thereby, the advantage of ecological cluster constitutes in innovations and growth of labour productivity in medium-term and long-term prospect as compared with separate enterprises. At the V Interregional Forum 'Cluster Policy – Basis of Innovational Development of National Economy' an agreement about creating Volga cluster of wastes treatment was signed. Volga cluster of wastes treatment is formed as coordinating structure according to the interests of the parts of the agreement. In the result of forming high-technological cluster of secondary resources conditions for increasing extent of wastes processing right up to final product, and for encouraging development of sector due to establishing and strengthening manufacturing connections between enterprises of a sector within the region.

Unit capacity of enterprises, constituting the basis of a cluster, is 1.5 million cubic meters of wastes per year. The interaction of them would result in deeper treatment of wastes, and not more than 20% of waste would go to polygons. The sense of cluster creating constitutes in uniting forces of different enterprises and government in order to improve the ecological situation in our region.

The conception of cluster development, prepared by consulting company 'Development of business-system' in cooperation with All-Russian Thermal Engineering Institutions, was considered by the members of regional government. The conception includes organizational legal, technological and financial economic models of functioning complex on collection, transportation, treatment and utilization of solid municipal wastes. It is assumed till 2020 the whole territory would be covered by contemporary system of collection and treatment of SMW. A unit centre of regulation and monitoring would be established, and a unit operator as well, whose functions would contain management of the complex on all stages of technological cycle. Afterwards, the whole Novosibirsk region is supposed to be covered by this system with the observance of unit standards and approaches to management.

The Regional Agency of Investing Development reported that solution of the problem needs creation of high-technologic facilities on deep thermal treatment of wastes. Till 2020 construction of two garbage-processing plants with total capacity of 600 thousand tons per year is planned. Investments are estimated at fifteen billion dollars. Till 2015 lead-in of the first stage with capacity of three hundred tons per year and realization of pilot project of selective garbage collecting is planned. Lead-in of the second stage of construction of ecological cluster is planned on 2016-2020.

Nowadays, more than three million cubic metres of wastes are produced every year, and 40% of them apply to the share of SMW. There are no manufactures on treating wastes in our region. Some enterprises utilize worn-out automobile tires. Waste tires are processed into rubber crumb, which is further used for producing anti-traumatic covers. Last year almost two thousand tons of old automobile tires were processed in the region, and since the beginning of 2012 – already more than 320 tons.

Now there is a whole network of such wastes pickup centre, besides they are received by enterprises, realizing collection and utilization of worn-out auto-tires, - said the department manager. For these purposes complex areas of collection, utilization of wastes, including worn-out auto-tires. Also, picking-up of worn-out auto-tires is provided in mobile wastes pickup centres – ecomobile. It is planned to organize five such centres in the regional centre. Mentioning the importance of establishing complex of collecting and utilizing SMW, it is necessary to pay attention to the fact that state of ecology is one of the key indicators of life standards of the territory.

4. Discussion

Nowadays, the more pressing is the question of environmental preservation, because the consumption rates are growing and this irreparably damages biosphere. That is why many large companies began to think about ecological safety of their production, which led to appearance of such a definition as ecological marketing, which now becomes more and more popular. Usually, a conception of ecological marketing means that a company, promoting their goods or services, does minimal harm to the nature by producing, selling and further utilizing goods. The last means final placement of original or worked over product within environment. Thereby, ecological marketing at an enterprise means that natural resources extracting, further stages of goods manufacturing, deliverance to consumer, use of goods and placement of wastes are absolutely safe for the biosphere.

Due to the growth of consumer prosperity and significant influence of advertisement, people purchase more goods, which they, basically, could do without. This significantly worsens the state of environment, because more raw materials are used for manufacture, and cheap technologies of producing do a lot of harm. At that the problem of wastes disposal achieves unthinkable scales. Vicious circle appears: worsened quality of environment decrease material prosperity of people, they tend to buy cheaper goods and all repeats again. That is why ecological marketing is very important.

Many managers of large companies become aware of the fact that they would bear big losses, if they don't start to solve ecological problems; therefore strategies of ecological marketing at enterprise are developed in all countries of the world. In order to decrease the level of pollution of environment ecological marketing assumes conducting of the following events:

- Acceptance of obligatory legislative norms, prescribing certain standards of using nature goods;
- Besides, the conception of ecological marketing reckons monitoring and licensing nature resources extracting;
- Economic encouragement of manufacturers, directed on making everyone interested in using nature protecting technologies;
- Financing scientific researching sphere, encouraging working out of new waste-less and safe technologies, which would use less toxic compounds, manufacture methods, etc.;
- Development of a system of economic taxes and fines for nature pollution.

Usually, the conception of ecological marketing at enterprise is realized by the following way:

- choice of most ecologically safe way of manufacture;
- careful monitoring of equipment operation and observance of manufacture technology, its improvement if needed. This allows to significantly economize on energy and raw material, which are priceless nature resources;
- timely planned repair of equipment, especially environmental, including capital;
- control of ecological norms observance in order to avoid additional fine sanctions from the side of monitoring authorities, and additional costs of enterprise;
- choice of safest technology of utilization and constant control of their contents.

Under Russian conditions the category 'ecological marketing' appeared relatively recently due to entering of the country into market relations, at which under the conditions of competitiveness manufacturer is obliged to carry out their obligations not only according to competitiveness of production, but to its ecologization. In its turn, ecologization of production, services demands ecologization of the whole multiplying process, at all levels: goods producer, participants of system of labour division (including international). The last is cause by the fact that ecological space, where the human activity takes place, is unit and doesn't obey administrative state borders (Snelder et al., 2008).

The essence of category 'ecological marketing' in the authors' opinion objectively should contain both essential characteristics and peculiarities of both components: marketing and ecology. If marketing traditionally represents as an element of the system (instrument) of management in organization, activity of producer of goods and services in order to keep their niche within the system of labour and competitiveness division, the ecologic component of this category means the necessity of regulating of the first by the means of ecological requirements, conditions (Arponen et al., 2008). The principal differences between so called general marketing and ecological one are presented in Table 1.

Ecological marketing is intended to adequately reflect ecological aspects of activity of an enterprise, taking place both in operative component (preparing and realizing of process of manufacturing goods and rendering services) and in sphere of management (including interaction of enterprise with environment on the ecology issues and its

obligations, including wastes utilization) in order to maximally decrease (prevent) possible negative consequences to ecosystem and human. (Vellend et al., 2008).

Table 2. Differences between the principles of general and ecological marketing at enterprise

Elements, stages of multiplying process	General marketing	Ecological marketing
Resource provision of manufacture and service rendering	Regularity, guarantee of delivery, meeting of quality standards	Ecological co-ordination of supplier and manufacturer on maximal prevention of negative impact on ecosystem and population
Product manufacturing, service rendering	Wide assortment, availability. Manufacturer is responsible for guarantees during the whole production life cycle	Fulfillment of ecological obligations (ecological liquidity) during the whole production life cycle (creation, use), right down to including non-treatable remains (wastes) into the substances turnover
Production turnover: consumption and recycling	Maximal satisfaction of demand, needs under the conditions of manufacturers competitiveness	Optimization of consumption of resources, product. Observance of quality of products and services in order to prevent negative impact of human health, all biological populations 'today and tomorrow'

Thereby, the functions, niche of ecological marketing are determined as a complex of measures, taken by an enterprise, directed on maximal decrease (prevention) of ecological risk of the enterprise, of their products and services consumers (other enterprises and the society in whole); on increase of ecological responsibility of business, enterprise's image, that means its ecological liquidity (ability of the enterprise to 'pay ecological debts').

It is specific for the functions ecological marketing of an enterprise not as much to sell, as to buy more – to purchase, in order to ecologize their manufacture on the basis of advanced achievements within this activity, and in future to meet the requirements of ecologization of the society in whole, to be competitive, to keep their niche within multiplying process, the system of labour division with taking ecological requirements into account (Kilroy et al., 2008).

The mechanism of ecological cluster development in the result of conducting ecological marketing is presented in figure 2.

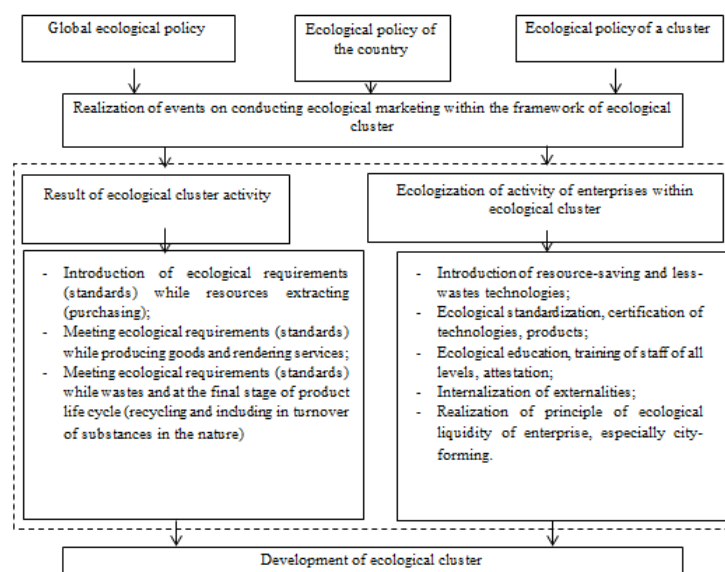


Figure 2. Mechanism of ecological cluster development in the result of conducting ecological marketing

Reasoning from the objective necessity of global ecologization of human activity, ecological marketing is global, as under the conditions of globalization, integration of economies of the countries of the Earth, an ecologization process is needed for all kinds of activity, and, first of all, within the system of international labour division (Rodrigues & Brooks, 2007).

The question is the ecosystem of the highest level - the ecosystem of the Earth is unit, and any interference in it, any consequences in local aspect, regional aspect would influence the general state. The specification of ecological marketing on the local level is its manifestation form of ecological micromarketing of administrative territories, first of all - municipal establishments, and of marketing of large enterprises territories, especially city-forming. A specific feature of realizing ecological marketing of this level is the opportunity of managing the process that means here ecological management if possible.

Fractional ecological marketing is realized within the framework of internal, realized within an enterprise with differentiation according to industrial processes, technological areas and, in whole, to stages, elements of multiplying process of enterprise of economic entity (Nica, 2010).

This level is the level of ecological marketing, as an enterprise, a firm is the main level within the system of interaction: 'social-natural environment', here ecological problems arise and here they should be solved. Moreover, this aspect is strengthening, if the enterprise is city-forming.

Strategic ecological marketing is intended to study correlation of external factors and internal resources of an enterprise, influencing ecologization of activity of enterprise. These functions are priority, because administrative decision making can be non-efficient for keeping niche, image of the enterprise as ecologically trust-worthy partner and element of system of economic entities within the relationship 'manufacturer-consumer' and in contents of municipal unit.

5. Conclusion

Institutional functions of ecological marketing are stipulated by relations with ecological authority in the region aimed at achieving correspondence of final results with ecological requirements, standards. Managing functions of ecological marketing are directed, first of all, on spreading ideology of ecologization of manufacture in all departments of an enterprise: manufacturing, supplying, selling, etc., even if they don't take part in marketing activity directly. Realization of ecological marketing functions, related to public, population in the zone of enterprise functioning, is stipulated by a wide range of aspects of social life (Guisan & Cancelo, 2014).

Understanding of the necessity of optimal combination of economic interests of an enterprise and complex of population's interests by the enterprise and the society is especially significant for city-forming enterprises of the city, because the main part of citizens are the members of the enterprise staff and corporative aims, interests coincide with interests of ecologizing activity of the enterprise themselves (keeping their niche within the system 'manufacturer-consumer', supporting favourable and ecologically safe labour conditions), as much as the employees are interested in keeping and supporting qualitative parameters of ecosystem of the settlement and surrounding territories within the zone of the enterprise functioning in long-term prospect ('for us and our descendants').

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