

Theoretical outlines for management of technogenic risks and development of organizational structure of their environmental insurance

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Abstract: The current period of development of a society is characterized by growth of contradiction between a human being and environment. It is reflected in the level of anthropogenic load on the ecosystem of Kazakhstan. In spite of outlined in recent years reduction in technogenic accident trend, as a whole condition of the technogenic situation in the republic arouses great concern, since processes of scale pollution of the atmosphere and water resources, desertification and degradation of fertile lands, depletion of flora and fauna are still in progress. For achievement of equity in economic and environmental values, it is necessary to develop and implement integral economic mechanism for management of technogenic risks, one such a method is insurance of technogenic risks (environmental insurance), as environmental liability can be implemented either by means of regulatory legal acts enforcement or by means of technogenic risks management and their insurance.

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1. Introduction

A great number of industrial enterprises are usually potentially dangerous objects both for human beings and for the environment. They create high risk for occurrence of emergency situations and accidents which can lead to irreparable economic and social effects. At first such causes as administrative management methods for economic influence mechanism, permit of ecological strain with the help of quick environmental measures at the cost of delay of transfer to the new technological processes cardinally improving environmental situation, and also failure of these enterprises to carry out environmental activity contributed to the strain environmental situation in the Republic of Kazakhstan.

Understanding of this situation and necessity to develop new key points require conversion of any kind of economic operations into reliable, i.e. compatible with requirements for harmonious development of the society and nature.

2. Material and Methods. The methods of statistical, economic analysis, economic and mathematical modeling have been used as a part of the research.

Study degree of the problem. Theoretical outlines for the management of technogenic risks are widely presented in the works of foreign and national scientists-economists. However, in spite of variety of covered in the literature issues on development of the risks management system, aspects on provision of

compensation for damage appeared in connection with technogenic emergency situation remain to be insufficiently studied.

Aim of the research is concluded in statement of theoretical approaches and development of methodical principles for the management of technogenic risks and their insurance.

Subject of the research is a complex of theoretical and methodical problems for the management of technogenic risks.

Object of the research is industrial enterprises of South Kazakhstan oblast as sources of origin of technogenic risks.

Theoretical and methodological principles of the research are the works of foreign and national scientists-economists in the field of theory and practice for the management of technogenic risks, economic mechanisms for the environmental management, and also legal acts, Decrees of the President of the Republic of Kazakhstan, RK Governmental Regulations on the issues of management and insurance against technogenic risks, etc.

Information base of the research is materials of RK Agency for statistics, data of the regional administrating authorities, RK Emergency Management Agencies, reports of scientific-research institutes, normative-reference materials.

3. Results and discussion: An economic class of risks is rooted in conception of danger, as an objective

law determining processes of quantitative and qualitative changes of all systems acceptable in the form of threat to vitally important interests of people. In its genesis and level of probability, the danger as a perceived threat has natural and social origin and can be rated as a potential and real. Depending on conceptual representations one and the same events can be assessed differently. For manageability of processes which the society perceives as the danger, various makes of global, subregional, and national safety are being developed, institutional, economic, and engineering systems are being created, resources for its provision are being attracted. Risk, a narrower concept, is one of the kinds of danger connected with political, social, and economic activity of the society, really perceived, probabilistically assessable, for which minimization of consequences resources and capabilities are attracted [1].

In terms of the systems theory, the risks are considered as an attribute common to any kind of the efficient activity appearing in the form of probabilistic indefiniteness for implementation of target functions which character, content, direction, and achievement conditions are not fully clear to the subject making a decision.

Modern economic theory determines risks from differing points of view. At the same time the point in question requires detailed study as economic trends make allowances. In the early 20th century, increase in the scale of material production and consumption, active use of natural resources were considered as positive aspects of development of civilization, at the same time, a number and scale of industrial accidents, and also loss of a human society's property as their consequence had increased dramatically.

Modern society more and more clearly realizes the fact that further development of civilization is impossible without establishment of strict control over potentially dangerous productions. The issues on the security enforcement have been laid forefront. Practically none of the new projects have no any chance to be realized without strict environmental expertise [2].

A result of the new thinking formation is origin and mushroom growth of the new economic category – the technogenic risks management. Analysis of the national experience shows that reasons of increase in number and severity of consequences of serious industrial accidents are as follows:

- high deterioration level of equipment in productions;
- location of dangerous productions in close proximity or in the point of residence of people;
- vicious economic mechanisms for enforcement of economic, social, and environmental safety from technogenic risks;

- poor regulatory and legal framework related to the protection of people and territories from industrial accidents and disasters.

Under the management of risks we consider changes in different fields of human activity influenced by accidental events having physical and material loss.

The main objective of the management of risks is reduction or reparation of damage for objects at occurrence of undesired events, forecasting of attachment of a risky event, taking steps on a risk reduction. Damage minimization and risk reduction are nonadequate concepts. Thus, the damage minimization means either reduction of possible damages or reduction of probability of undesired events. At the same time there are different financial management mechanisms, for example, a damage compensation insurance which has no influence on its size and probability [3].

It should be noted that objectives of a strategy for the management of risks are in a direct relation to continuously changing external and domestic economic environment in the country.

The further principles should provide the basis for the management of technogenic risks:

- forecasting of potential occurrence of emergency situations and endamagement;
- financing of risks, economic encouragement of their reduction;
- responsibility and duty of supervisors and staff members;
- carrying out of clear-cut policy and creating of mechanisms for the management of risks;
- coordinated control over risks in all subdivisions and services of human activity;
- control over the management of risks procedures efficiency;
- prevention (prediction) of risks and their minimization.

Nowadays the management of technogenic risks is one of the dynamically developing classes of insurance activities. In many developed countries there is position of a risk manager in the staffs of enterprises whose duty is to provide reduction of all types of risks. The risk manager together with other specialists participates in making decisions with high risk and seeks out methods for avoiding undesired events.

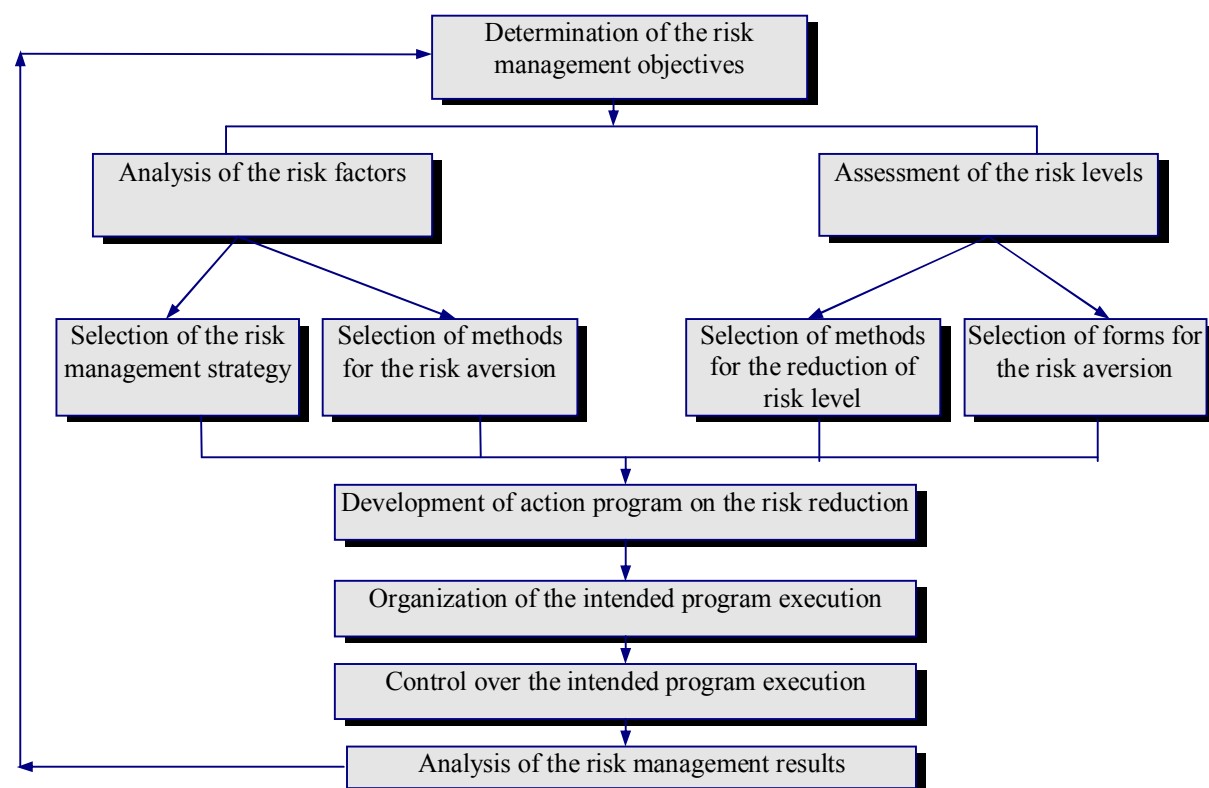
The management of technogenic risks requires knowledge in the field of theory of enterprise, insurance industry, analysis of economic activity, etc. related to the protection against risky consequences, impending to acquisition of income, and favoring to the solution of priority entrepreneurship objectives. Qualitative management of risks increases chances of

enterprises in obtaining success in the long-term outlook and reduces their financial reliability riskiness. Objective of the risk assessment is obtaining of necessary information on the structure and character of the subject. The collected information should be sufficient for making an adequate decision on the further stages. The analysis consists of two stages: the first stage is detection of all risks inherent to the studied system, and the second one is assessment of risks, i.e. assessment of probability and size of possible damage, formation of a set of scenario on development of undesired situations.

Considering problems of technogenic risks it is always necessary to take into account a valuable fact that the reduction of technogenic risk is very expensive measure, enhancement in value of protection measures on two and more orders causes reduction of risks on one order.

Economic assessment of a damage to the society and environment by regular accidental exposure of potentially hazardous production facilities, energetics and transport, which in many ways influences on the efficiency of economic mechanisms for the management of technogenic risks, has not been determined sufficiently yet. Taking into account requirements of market reforms, high depreciation degree of the operated major productive assets and equipment, the insurance of technogenic risks is very relevant for our country.

One of the most important functions of the management of technogenic risks is organizational which presents system of interconnected in the integrated technological cycle management processes (Figure 1).



Note - Compiled by the authors

Figure 1 – Determination of the risk management objectives

The management of technogenic risks also involves strategy and tactics of the risk-management. The strategy is based on the long-term objectives and estimated uncertainty in the subject's activity, effective methods for achievement of these objectives during long-term period, and predetermines the tactics, i.e. complex of methods and techniques used

in conditions of the subject's activity for achievement of the set objectives.

A process of the management of technogenic risks implies priority orientations for use of committed facilities for the purpose of decrease in probable risky activity and its reduction till the minimum level. It should rely on the optimal relation of costs connected with the reduction of technogenic risks, results

expressed in their decrease, and as the final result, on the achievement of acceptable level.

The insurance is one of the ancient categories expressing social, mainly, economic relations inherent to any historically fully developed form of people's joint activity [4]. Being originated in the period of primitive formation it has gradually become indispensable companion of public production.

However, the most problematic is definition of "environmental insurance" concept which makes possible to formulate objectives, tasks, directions, and mechanisms for enforcement of environmental safety and neutralization of its threats, develop concepts on its development at the country and regions level.

There are also various definitions of the environmental insurance, essentially differing from each other, in the literature.

Then, the following authors involve into the environmental insurance concept "a system of measures on creation and use of cash (insurance) fund at the expense of the participants' shares, means of the fund recover economic damage caused to the environment, also these means can be paid in connection with occurrence of definite events" [5].

To our opinion, this definition requires refinements, for example, "recover economic damage caused to the environment". The environmental insurance in practice considers recovery of damages not only to the environment, but also to the affected physical and legal bodies, i.e. to the "third parties". Then, it is not clear, what is meant by "occurrence of definite events", as the theory and practice considers insurance of damages occurring in a result of unexpected, unintentional accidental pollutions of the environment. Therefore, this definition may form misconception on the full recovery of ensuing damages.

We agree with opinion of several authors who consider that the "environmental insurance" concept should be presented in two fundamental forms [6-8]:

- liability insurance of enterprises – sources of enhanced environmental threat and property interests of insurers occurring in a result of accidental (unexpected, unintentional) pollution of the environment, providing possibility of compensation of arising damages and creating additional sources of financing for environmental measures and ecological safety;

- liability insurance of owners (possessors, users) of "pre-contaminated" natural objects, presenting potential environmental threat to vital interests of citizens and legal entities - retrospective insurance of environmental risks.

To our opinion, these definitions are the most precise and cover all aspects of the environmental insurance.

Using this definition we tried to make it integrated, trying not to lose general meaning of the environmental insurance. We propose the following alternative interpretation of the definition: the environmental insurance is one of the types of civil liability insurance of owners (users) of high threat locations for infliction of damage due to the accidental (unexpected, unintentional) pollution of the environment and endamage to the vital interests of citizens and legal entities providing partial compensation of these damages.

Together with the environmental insurance there are also different types of insurance aimed on protection against the environmental risks. For example, for the owners (users) of high threat locations, in consequence of emergency or catastrophe, there is a risk of to lose own property (the decay of a building, contamination of agricultural property by toxic and other agents, firing of property, etc.), which is insured within the framework of contract for property insurance. Besides, the owner of this object may protect his/her life or health against possible negative effects within the framework of the relevant contract for private insurance.

Therefore, the environmental insurance differs from its other types that the object is risks of civil liability, and presentation of property claims by citizens and legal entities to the insurers is in accordance with norms of the civil legislation on compensation of damages.

For this reason, the state management policy in the field of technogenic safety should be primarily based on creation of stable institutional approaches for enforcement of preventive measures, and also on enhancement of limited financial resources at technogenic post-accident clean-up. Realization of the directions can be achieved by creation of scientifically grounded and well-organized system of the environmental insurance that would allow:

- to develop forecast of impact on the environment and causes of its origin at normal use of equipment, and in the case of accidental (sudden) situation;

- to attract scientific research organizations at the expense of extra-budgetary sources to the works on estimation of technical and technological level of productions and enterprises, emergency situation risk in these productions and enterprises necessary for calculation of insurance rates;

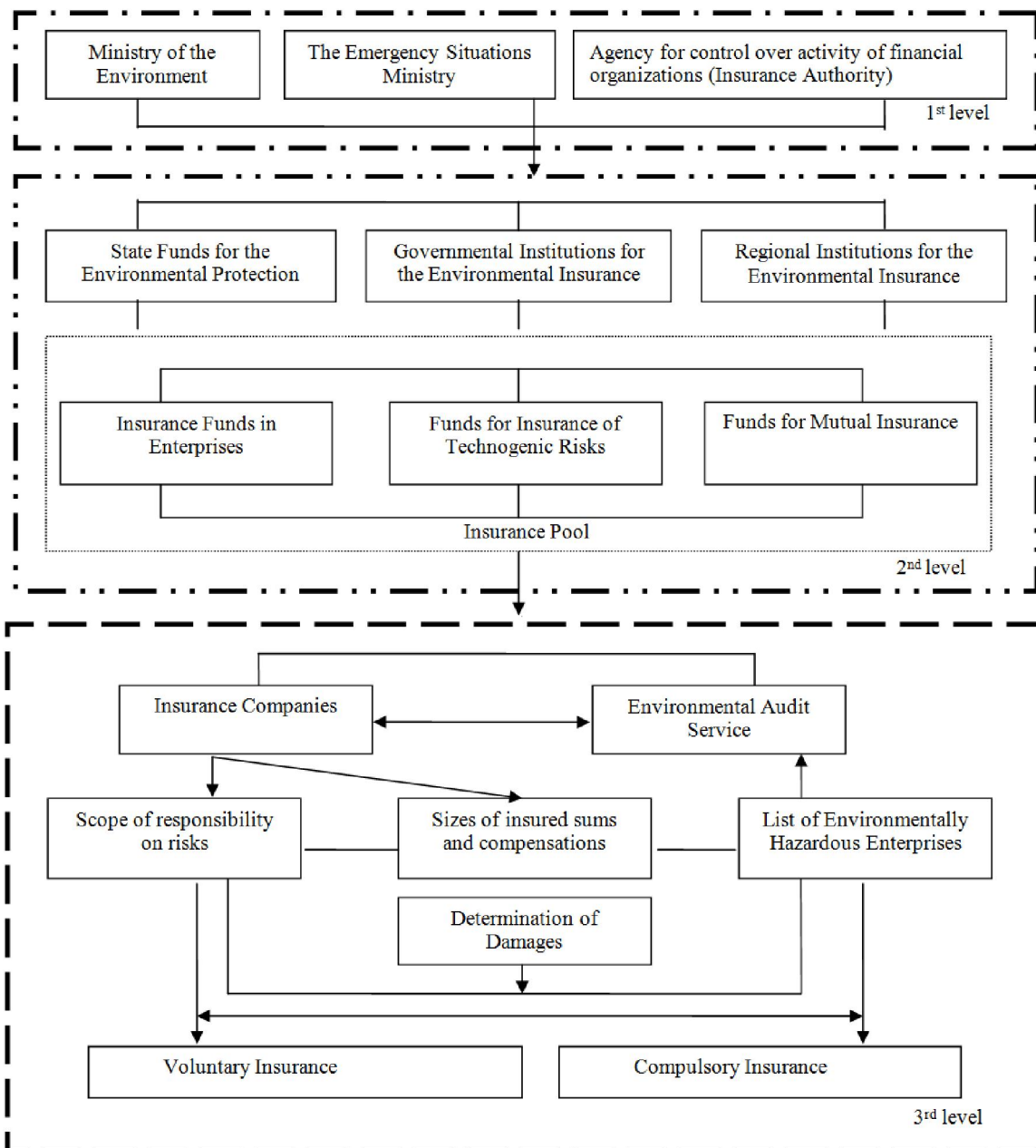
- to provide improvement of technological safety at productions, compensation for losses caused to enterprises and third parties by accidental pollution of the environment;

- to attract investors and ensure compensation of their material losses at accidental situations in industrial objects;

– to attract commercial entities and insurance companies to increase environmental and technological safety, financing of innovative projects at the expense of their profit and fund of preventive measures.

In this connection, we propose organizational structure for management of the environmental safety consisting of three levels: the first is already operating

environmental authorities and regulating insurance activity, and also social relations on prevention and response of emergency situations of natural and technogenic character; the second one is newly created authorities, and the third one is a functional part of the environmental insurance organizational structure (Figure 2).



Note - Compiled by the authors

There no national and administrative boundaries for harmful substances, that's just is a regional characteristic of the environmental insurance

and condition for prevention of technogenic public safety.

Achievement of the regional (state) objectives, as in any other field of activity, is possible only in the presence of general methods of the work, i.e. integrated legislation on the management of technogenic emergency situations and its consequences, assessment of technogenic risks and its consequences, legalized financial schemes for receipt of insurance contributions, charges of emergency reserve funds and preventive measures funds.

4. Conclusions

All this can be developed and implemented within the frameworks of the government institutions, more or less engaged with insurance coverage of economic and environmental social interests.

Taking into consideration mentioned above it is necessary to make the following conclusions:

- study and solution of questions on the environmental insurance is very important and essential in the current conditions. On the assumption of the environmental insurance functions, we can say that it could be a strong influencing factor on the situation in the field of control over negative influence of enterprises on the environment, and by the same token to reduce environmental risk and damage;

- development of the environmental insurance in Kazakhstan is complicated not only for the lack of perfect legal base, but also for the tight financial situation of enterprises;

- as far as the environmental insurance institute has been created comparatively recently, difficulties in realization of the environmental insurance system are connected with the lack of experience and qualified personnel;

- the problem of the liability insurance of hazardous productions should be solved by compulsory participation of the state;

- development of the environmental insurance depends not only on the state vigorous activity in this direction, but also on the insurance appropriateness for enterprises/productions themselves, the sources of heightened technogenic danger;

- such points, when risk of accidental situations involving extensive economic damage is very high, when there are no means on their prevention and response of consequences, when damages to the affected are not being compensated, makes this problem of development of the environmental insurance system in the republic as very actual, as the environmental insurance is that environmental-

economic reserve which will allow attract means from the private sector into the field of the environment protection with regard to compensation of damages from its accidental pollution and additional financial provision of the environmental measures.

Declaration of Conflicting Interests

The author(s) stated no probable conflicts of interests with deference to the authorship and/or publication of this article.

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