Formation Mechanism of Green Strategic Alliances and Its Cooperative System for Coal-Mining Eco-Industrial Parks Based on Synthetic Decision Support System

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***Abstract*—Green effect is a phenomenon by which manufacturers apply themselves to environmental protection to obtain comparative advantages compared to their counterparts. Modern enterprises can form profitable green effect by greening of infrastructures, brands, marketing and culture, which contribute its development trend. Manufacturers of coal-mining eco-industrial parks should be in line with the government to strengthen propaganda about environmental protection, to advocate green and civilized consumption and to enhance the proportion of environmentalists in consumers; to increase their own propaganda; national authorities should also set up and implement green label system to allow manufacturers of coal-mining eco-industrial parks use these labels in their own products to facilitate the effective recognition of consumers. It is an effective way to access to their green effect and to achieve stability after the formation of green union by making green alliance parties gain the largest rents from the alliances which they are all likely to participate in. then it sets out from discussion on appraisive system, monitoring system and examinatorial system of green strategic alliances, presenting a new settlement including the step-up close design of green strategic alliances based on 5E ideology. It establishes a cooperative system of green strategic alliances deducing from appraisive system founded on three-dimensional combinatorial model, monitoring system grounded on SDSS and examinatorial system fixed on BP Neural Network, which provides necessary system info for green strategic alliances. The improvement of efficiency, sustainable economic development mode, environmental improvement involved with ecological civilization, regional equilibrium of harmoniously developmental manner and continuously reformative educational system (5E) are the inherent system which promote green strategic alliances jointly.**

***Index Terms*—coal-mining eco-industrial park; green effect; strategic alliance; synthetic decision support system**

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I. Introduction

With the improvement on consumers' consciousness of environmental protection, people have no longer pursued achievements of comfortable lives through consuming a large number of resources and energy. They try their best to save resources and energy on the basis of easiness, that is to say, consumer psychology and consumer behavior begin to return to nature and pursue health gradually. According to statistics of Mattoo and Singh, in the United States a quarter of adults are environmentalist; 80% of Canadians are willing to pay more for environmental products more than 10% of non-green price; and American consumers are willing to pay more than 6% of the price; at the same time 10% of people are willing to pay more 20% of the price [1].

The phenomenon that consumers voluntarily pay higher purchase price for manufacturers' environmental protection behavior in the process of purchasing the similar products which result in manufacturers of environmental protection gain comparative advantages compared to similar non-green manufacturers (the products can be manifested in the higher-price or higher consumption than the similar ones) could be known as green effect.

Coal-mining eco-industrial parks are communities, which are composed of manufacturing, and services companies, who achieve double optimization and harmonious development of ecological environment and economy through managing resources and environment cooperation, including essential elements of energy, water and materials. In the end, the makers of the communities can achieve even more significant and more effective benefits than the sum of individual benefits that realized by optimization of a single company [2]. Because of the symbiotic use of remaining material, and its full use of resources such as energy and water, as opposed to similar industries in other industrial parks, coal-mining eco-industrial parks would have obvious positive externality that shows environmental pollution reduced, energy and resources saving. Having significant green characteristic, positive externality leads coal-mining eco-industrial parks' vendors to gain green effect, and enhance their competitiveness. Based on the study of Mu Xin [3], the author describes its formation mechanism by proposing the models of green effect.

II. Models of Green Effect

A. Model hypothesis

To consider a two-oligopoly market, products of two manufacturers being alternative, the first manufacturer outside of the coal-mining eco-industrial park products environment pollution and waste resources in the production process, while the second in coal-mining eco-industrial park whose production process can reduce environmental pollution and save resources. Assuming in the market there is a consumer group, in which consumers have different preferences to the products of different environmental quality; θ is used to be a parameter which represents the preference to the environmental quality of the products and it obeys uniform distribution in [0, θ], and its density is 1/θ. If consumers only have unit demand for products, the utility function of the preference parameter may be defined as below:

$$U(\theta, p) = \theta e - p \tag{1}$$

In above formula, e represents the environmental quality of products; p is the price of unit product. Assuming produce products whose environmental quality is e, the fixed costs which manufacturers need to invest is:

$$C(e) = e^{\alpha} \tag{2}$$

Being $C'(e)>0$, $C''(e) \geq 0$ in the case of $\alpha \geq 1$, it shows that the cost of improving environmental quality of the product increases. The cost function shows that the environmental quality of products, as fixed cost, has nothing to do with marginal cost and does not need to consider variable cost (such as technology investment and production equipment investment).

Assuming there is no government environment control; the environmental quality and price of the first manufacturer is e_1 and p_1 respectively; the environmental quality and price of the second is e_2 and p_2 respectively and $e_1<e_2$, $p_1<p_2$, then the products whose environmental quality is e_1 are named as polluted products (without green characteristics) and the other are named as green products (with green characteristics).

B. Model analysis

θ_1 is defined as the critical value of preference parameter that there isn't any difference between purchasing polluted products and not buying any product; θ_2 is the critical value of preference parameter that there isn't any difference in purchasing polluted products or green product. Then, when $\theta \subset [0, \theta_1)$, consumers do not buy any products; when $\theta \subset [\theta_1, \theta_2)$, consumers buy pollution products; when $\theta \subset [\theta_2, \theta)$, consumers buy green products. Assuming the reservation utility of consumers not buying any products is 0, consumers' critical preference parameter value meets:

$$\begin{cases} \theta_1 e_1 - p_1 = 0 \\ \theta_2 e_1 - p_1 = \theta_2 e_2 - p_2 \end{cases} \tag{3}$$

Here an assumption is implicit that products of manufacturers don't cover the market completely. By above-mentioned equations to know:

$$\theta_1 = \frac{p_1}{e_1} \tag{4}$$

$$\theta_2 = \frac{p_2 - p_1}{e_2 - e_1} \tag{5}$$

Based on above assumptions that θ obeys uniform distribution in [0, θ], it can be seen that the market demand of polluted products is θ_2-θ_1 and the market demand of green products is θ-θ_2. Therefore, the market demand functions for polluted products and green products are as follows:

$$q_1 = \theta_2 - \theta_1 = \frac{1}{e_2 - e_1}\left(p_2 - \frac{e_2}{e_1} p_1 \right) \tag{6}$$

$$q_2 = \theta - \theta_2 = \frac{1}{e_2 - e_1}\left[\theta\left(e_2 - e_1\right) - \left(p_2 - p_1\right) \right] \tag{7}$$

Then their profit functions are:

$$\pi_1 = p_1 q_1 - C(e_1) = \frac{p_1}{e_2 - e_1}\left(p_2 - \frac{e_2}{e_1} p_1 \right) - C(e_1) \tag{8}$$

$$\pi_2 = \frac{p_2}{e_2 - e_1}\left[\theta\left(e_2 - e_1\right) - \left(p_2 - p_1\right) \right] - C(e_2) \tag{9}$$

According to the first-order condition $\partial\pi_i/\partial p_i=0$, i=1, 2, the equilibrium price of two products can be get as follows:

$$p_1^* = \frac{\theta\left(e_2 - e_1\right)e_1}{4e_2 - e_1} \tag{10}$$

$$p_2^* = \frac{2\theta\left(e_2 - e_1\right)e_2}{4e_2 - e_1} \tag{11}$$

The corresponding equilibrium productions are:

$$q_1^* = \frac{\theta e_2}{4e_2 - e_1} \tag{12}$$

$$q_2^* = \frac{2\theta e_2}{4e_2 - e_1} \quad (13)$$

Then net profits of two manufacturers in the equilibrium state are as follows:

$$\pi^*_1 = p^*_1 q^*_1 - C(e_1) = \frac{\theta^2 e_1 e_2 (e_2 - e_1)}{(4e_2 - e_1)^2} - C(e_1) \quad (14)$$

$$\pi^*_2 = p^*_2 q^*_2 - C(e_2) = \frac{4\theta^2 e_2^2 (e_2 - e_1)}{(4e_2 - e_1)^2} - C(e_2) \quad (15)$$

Mu Xin, etc, [3] came to the conclusion that $\pi 2^* - \pi 1^* > 0$ could be made, as long as right level of environmental quality such as e1 and e2 can be determined. That is to say, it makes the second manufacturer of producing green products gain greater competitive advantages than the first one.

By analyzing it shows that the essence of obtaining green effect lies in the change of consumers' utility function. In consumers' utility function it includes more environmental quality variables, which have positive correlations with the environmental quality variables; and these result in manufacturers of implementing environmental protection obtaining competitive advantages through the implementation of diversified strategy in environmental quality.

C. The formation of green effect's advantages

Green effect plays a positive role in enhancing the corporate profits of coal-mining eco-industrial parks' manufacturers which make manufacturers pursue green effect and green label actively in turn. Green label represents pure natural, pollution-free, green healthy and vibrant of products, which is able to form bright spots of green products. Green products can extend to the various aspects of the coal-mining eco-industrial parks, by which they can accord with the business situation of parks and demonstrate their features. Of course, the existence of many hidden dangers must be paid particular attention to. Firstly, for the possibility of increasing costs and industrial pollution, great efforts should be made to carry out system treatment to strengthen the positive foundation of green effect; Secondly, when consumption of green products becomes the tide, the products and businesses need to consider how to use green label to show their own uniqueness and gain competitive advantages; Thirdly, it is urgently need for managers to strengthen and improve management and marketing in order to prevent some low-grade products of other manufacturers from having negative effects on industries. All these problems are needed to take effective measures to solve.

At the same time, what needed to be concerned about is that people often judge the quality of products from the developmental history of products or brands (such as the brewage industry). Owning green label and passing it on effectively, an enterprise invisibly prolongs and sublimates the effectiveness of green effect. Of course, the green effect will further strengthen the region of origin effect of products.

Green effect also makes manufacturers' products of coal-mining eco-industrial parks generate a green emotion effect in character and individual image. When people link green and products or associate with these brands, it will bring resonance and yearning in psychology and recognition and sublimation in spirit and value to form a nice business association and emotional sustenance to products. These motions could enhance products' reputation and popularity, give access to competitive advantages and achieve a win-win situation at a large limit.

Modern manufacturers can exploit and develop in the following areas to form a strong green effect. Firstly, greening of infrastructures means modern manufacturers as beneficiaries should be active in protecting environment and building green environment, and strengthening solid industrial base for conservation civilization. Secondly, greening of brands means the extension of industry, product and brand to play better cluster advantages of green brand and to form group advantages and brand effect. Thirdly, greening of marketing means endeavor to extend green effect into the selling termination and to be good at green brand, which in turn makes resource advantages turn into real brand advantages and good reward. Fourthly, greening of culture means, in cultural activities of supporting the development and protection of green products, the modern manufacturers realize a win-win situation of manufacturers and conservation civilization construction and attend to the chain development of green effect to form their good and fast development trend.

III. THE PERVASION OF GREEN EFFECT: GREEN STRATEGIC ALLIANCE

The domestic and foreign scholars have different interpretations on the concept of strategic alliance, which was first put forward by J. Hopland and R. Nigel [4]. In this paper, the strategic alliance is that two or more organizations of green coal-mining eco-industrial parks in different industrial chains are self-organizing to carry out institutional arrangements in order to seek the remaining green returns generated by green effect (or as the green rents). It is the inevitable choice of green industry cluster to format green effect that green strategic alliance of coal-mining eco-industrial parks or virtual coal-mining eco-industrial parks comes from the pervasion. The author believes that the building process of green strategic alliance is still a rent-seeking process of the green effect in essence to find a green system arrangement, and its ultimate goal is to get the green rents. Organizations whether self-organization or by-organization, which establish green strategic alliances, all creates green rents through different competitive advantages formed by green effect. So to say, in essence, green strategic alliance is still a system arrangement, its process of the establishment being a rent-seeking process and its formation mechanism lying in the pursuit of rents for organizations.

Because formation mechanism of green strategic alliance lies in the pursuit of rent for the organizations, the stability of green strategic alliance is established by system designation, from which it enable the cooperative parties to obtain the largest expected rents of all possible alliances participating in it. In 1953, L. S. Shapley gave a method for benefit allocation, which is obtained by cooperation of n persons. he demonstrated that the strict and fair distribution should be the weighted average of the contribution of partners [5]. Zhang Tingfeng, etc, introduced the probability of successful cooperation into the method and gave the correction formula of Shapley value [6]. By the correctional formula, the author gives two theorems to achieve the stability of green strategic alliance:

Theorem I, the necessary conditions of maintaining the stability of green strategic alliance, is to meet:

In the first, the rents that any organization creates after entering the alliance should be greater than the sum of rents created by the organization and the original alliance respectively.

In the second, the reasonable expected rents that each member of green strategic alliance obtains are the product of the rents created by cooperative members, which are involved in a variety of alliances and the probability of success.

Proofs can be seen from [5], [6]. Theorem II is brought in the condition of meeting Theorems I.

Theorems II, sufficient conditions of maintaining the stability of green strategic alliance are the cooperative parties' obtainment of the largest expected rents from possible alliances them participate in. Proof is as follows:

Assuming Green Alliance 1 have n partners, where the first i-partner may participate in m alliances, to make Shapley value of the first i-partner participating in the first k-alliance with φki (v) (i = 1, 2, ..., n; k = 1, 2, ..., m), so the sufficient condition of the first i-partner being not out of Alliance1 is the Shapley value gained in Alliance1 (that is rents):

$$\varphi(n) = \varphi_{1i}(n) = \max_{1 \le k \le m} \{\varphi_{ki}(n)\} \qquad (16)$$

Here, the assessment of risk factor (pi) and weight (w (|s|)) in the Shapley value is a game process of the cooperative parties, and also a dynamic process. There is a problem concerning credibility and ability of the partners, for which it is essentially a subjective value. Of course, this also reflects the credibility and ability of the partner play an important role in green strategic alliance from a side.

Using the two theorems, we will be able to better analysis on various situations during the evolution of green strategic alliance [7]:

Firstly, the dissolution of the green alliance and the automatic end after achieving intended goal. When the Shapley value of cooperative parties (that is, rents) is less than their rents created respectively, the situation would happen.

Secondly, green Alliance has further extension or expansion. When the Shapley value of cooperative parties (that is, rents) is likely to continue to increase by the input of resources, the alliance will be further extended or expanded.

Thirdly, the phenomena of green alliance manufacturers' mergers and acquisitions occur in some time. When the Shapley value of one partner (that is, rents) tends to zero, it will happen.

VI. Green Strategic Alliances' Cooperative System for Coal-Mining Eco-Industrial Parks

As far as this article is concerned, panel data can be used to conduct a comprehensive evaluation of two aspects which includes mining areas (static) and continuous time series (dynamic) and to set up corresponding dynamic changes indicators in which adhere to that evaluation of entire system is changing always. Combining with in-depth empirical research, development of a sound theoretical framework is put into practice, by which a set of green strategic alliance evaluation index system is formed. Meantime, mining environment will be taken as a whole by the system which is corroborated by the 3S technology and numerical stimulation technical support and combined with on-site measurement. Under this circumstanced, improved dynamic monitoring and evaluation system of technical methods for green strategic alliance are established in order to carry out the research on Optimization of monitoring and Management Decision Support System about Green strategic alliance in mining area. Under the estimative status quo of green strategic alliance, a set of comprehensive guidelines for selection methods is put forward to establish a practical evaluation index system by which a model is based on the system and to use actual indicators' data of samples mining to assess the effect of scores for empirical analysis. The formation of green strategic alliance evaluation system, monitoring system and evaluation system will enrich and expand the theories of industrial economics, environmental & ecological economics and statistics, which could provide important reference for current practice of green strategic alliance and provide technical support for scientific development.

A. *Evaluation system for green strategic alliances*

Developed by OECD, the Pressure-State-Response (PSR) model provides a mechanism to monitor the status of the environmental. The PSR cycle also provides a framework for investigation and analysis of processes involved in environmental degradation. It has gained international prominence and can be applied at a national level, for sectoral analysis, at regional, local and other sub-national levels, and at an individual project level [8]. In statistics and econometrics, the term panel data refers to two-dimensional data. In marketing, panel data refers to data collected at the point-of-sale. Data is broadly classified according to the number of dimensions. A data set containing observations on a single phenomenon observed over multiple time periods is called time series. In time series data, both the values and the ordering of the data points have meanings. A data set containing observations on multiple phenomena observed at a single point in time is called cross-sectional. In cross-sectional data sets, the values of the data points have meaning, but the ordering of the data points does not. A data set containing observations on multiple phenomena observed over multiple time periods is called panel data. Alternatively, the second dimension of data may be some entity other than time.

For example, when there is a sample of groups, such as siblings or families, and several observations from every group, the data is panel data. Whereas time series and cross-sectional data are both one-dimensional, panel data sets are two-dimensional [9]. According to the status quo of coal-mining energy consumption and emissions of pollutants, evaluation model of three-dimensional combination is innovational structure and Pressure-State-Response (PSR) model is employed, which include two errors composition of both fixed and random effect panel data model and different methods are selected to develop a comprehensive evaluation of Coal-Mining green strategic alliance status, a comparative study of the results being advanced lately. The steps are showed as Figure 1.

Some results indicate that the use of 3S technology in figures of the ecology impact assessment is generally successful. It not only satisfies the requirements of ecology impact assessment at present, but also expands the application of TM remote sensing data [10]. Meanwhile recent research efforts focus on the aspects of numerical simulation such as: (1) taking the water system as an integrated domain; (2) coupling different processes; (3) integrating different discretization method; and (4) studying local water areas under the systems framework concerned [11].

Kun-Chieh Wang presents a novel approach of customer-oriented design for translating customer's perception into product design elements. The mapping relation between form elements and customer's Kansei is performed by the Grey System Theory and Linear Regression Model. The established mathematic mapping model is used as the prediction core to construct a design expert system. Through the help of the developed product form design expert system, users can easily catch the prototype of customer-preferred product form for a specific desired image. Further, this developed expert system provides a direct linkage to 3D drawing software and related data base; users may modify or add their creative thinking to the prototype to create popular merchandise [12].

Data warehouses are optimized for speed of data retrieval. Frequently data in data warehouses are denormalized via a dimension-based model. Also, to speed data retrieval, data warehouse data are often stored multiple times - in their most granular form and in summarized forms called aggregates. Data warehouse data are gathered from the operational systems and held in the data warehouse even after the data has been purged from the operational systems [13].

Online analytical processing (OLAP) is an approach to quickly answer multi-dimensional analytical queries. OLAP is part of the broader category of business intelligence, which also encompasses relational reporting and data mining. The typical applications of OLAP are in business reporting for sales, marketing, management reporting, business process management, budgeting and forecasting, financial reporting and similar areas. The term OLAP was created as a slight modification of the traditional database term Online Transaction Processing [14].

Taken Coal-Mining environmental systems as a whole to study, corroborated by the 3S technology and numerical stimulation technical support, combined with the on-site measurement, Decision Support System (SDSS) is integrated, which employs a number of broad quantitative models to support this decision-making, Expert System (ES) of knowledge reasoning to qualitative analysis, Business Intelligence (BI) of Data Warehouse (DW), On Line Analytical Processing (OLAP) and Data Mining (DM) Technology to maintain data-driven decision-making technology, green strategic alliances' monitoring system based on the development of Synthetic Decision Support System (SDSS) is set up. The designation is showed as Figure 2.

Accordingly, BP neural network is established, by construction of evaluation index system and study samples, and by designation of evaluate system, to analyze the effectiveness of issue determination and to verify the ability of evaluate system score; meanwhile, combined with time-varying volatility characteristics of Green strategic alliances' assessment data, Monte Carlo Simulation (MC) is taken into practice and Probability Proportional to Size (PPS) is used to control errors. The program for BP neural network based on MatLab software can be seen in Appendix.

B. Coordinated system of green strategic alliance Based on the concept 5E

This article considers that the logistic constitutional system structure of coal-mining green strategic alliances' integrated arrangement should be promoted and analyzed, cooperated with border demarcation and designation of improved distributed, feedback combination of green strategic alliances' integration system. Combined with fuzzy comprehensive evaluation model and improved of Super-efficient Data Envelopment Analysis (DEA) model [15], multi-dimensional progressive green strategic alliance coordinated system is constructed to dynamic and quantitative given integration strategies for the continued improvement for the structure of green coalition. Figure 3 gives an illustration of explanation above.

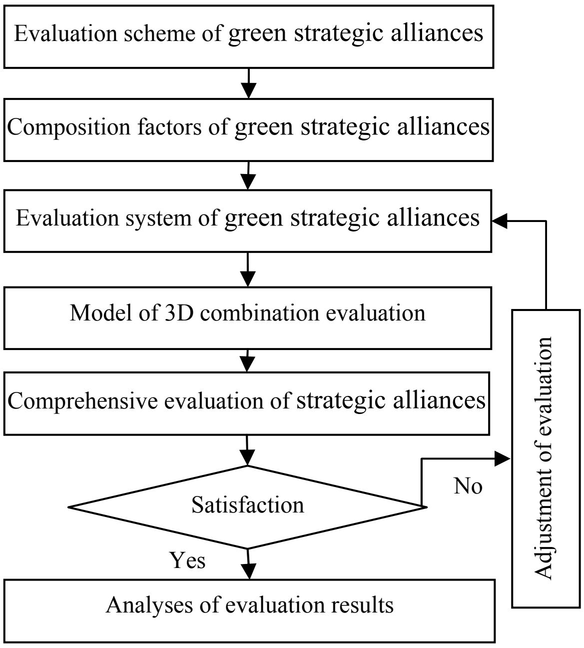

Figure 1 Evaluation system of green strategic alliances

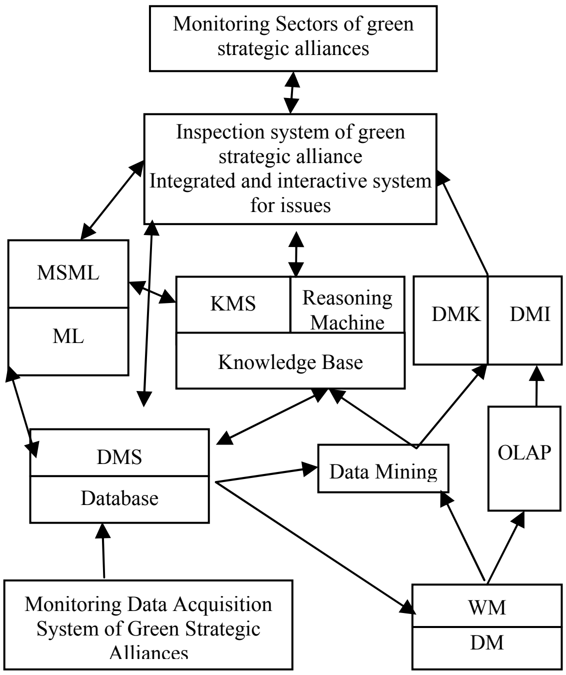

Figure 2 Monitoring System of green strategic alliances

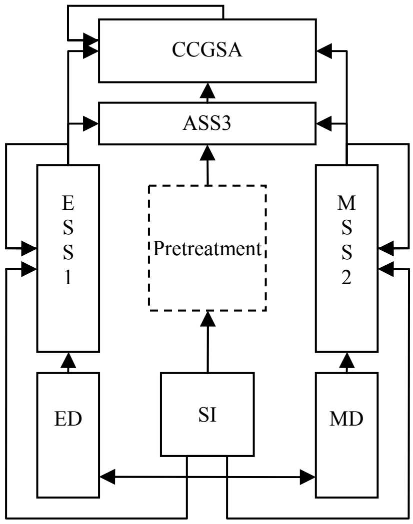

Figure 3 Coordinated system of green strategic alliances

TABLE I.
ACRONYM IN FIGURE TWO

Denomination	Acronym
Knowledge Management System	KMS
Management System OF Model Library	MSML
Model Library	ML
Database Management System	DMS
Warehouse Management	WM
Data Warehouse	DW
Online Analytical Processing	OLAP
Decision-making knowledge	DMK
Decision-making information	DMI

TABLE II
ACRONYM IN FIGURE THREE

Denomination	Acronym
Collaborative Center of Green Strategic Alliance	CCGSA
Evaluation system synergy 1	ESS1
Monitoring system synergy 2	MSS2
Assessment system synergy 3	ASS3
Supplementary information	SI
Monitoring Data	MD
Evaluation Data	ED

Therefore, it is necessary that factors that impact green strategic alliances should be analyzes comprehensively, of which evaluation of three-dimensional portfolio is innovatively used to build green strategic alliances evaluation index system. The selection of a variety of evaluation methods and comparative studies on results ought to be developed to select appropriate methods to carry out evaluation on results of empirical research of coal-mining green strategic alliances. Meantime, in many practical systems, people have found that there were many degenerate phenomena existing extensively, such as economic systems, power systems, engineering systems and so on. And this phenomenon has attracted many scholars' attention and lots of available and important results have been obtained. However, time delay is a common phenomenon in the objective world and engineering fields. We notice that, in many practical systems, in order to describe the system more accurately, we must take the influence of degenerate and delay into consideration altogether [16]. So, it has a practical significance to study the character of solutions of degenerate differential systems with delay in the course of the development of green strategic alliances' cooperative system for coal-mining eco-industrial parks.

Under such circumstances, SDSS database, model storeroom and method depository must be built to monitor green strategic alliances to develop main functions of monitor and management of a green strategic alliance, by which administrators should select a particular coal mine to carry out case studies to enhance scientific, procedural and Comprehensive quantitative level of green strategic alliance's monitoring and management. Then Green strategic alliance's evaluation index system is built, which include the establishment of an improved model of BP combined with Monte Carlo Simulation to evaluate the immediate changes of relevant departments and to adjust some of the indicators in order to reflect characteristics to be more in line with the results.

Finally, based on the improved dynamic Super-efficient DEA model of green strategic alliance coordination system, i.e. green strategic alliance evaluation system, monitoring system and evaluation system of coordinated system a new system based on quantitative 5E conceptions (Efficiency, Economy, Environment, Equilibrium, Education, 5E) is put forward to, which includes improved efficiency, sustainable economic development model, improving of environment under the concept of conservational civilization, coal-mining balanced and harmonious development model as well as the continued stability of educational system.

With economy rapid development, coal mining enterprises must enhance their competitiveness force to increase market share, better meet the need of the market and share the benefit of rapid economic growth. Competitiveness evaluation of enterprises makes sure the competitiveness advantage and core competitiveness of enterprises or enterprise groups by researching and comparing the macro, micro-business environment, internal resources and the ability to a particular business or enterprise groups. Therefore, the competitiveness evaluation is the basic content and an important link in the theoretical study of competitiveness of enterprises. However, administrators for coal mines must give proper attention to the protection of regional environment. Green Strategic Alliances' Cooperative System for Coal-Mining Eco-Industrial Parks is one of the best ways to develop the economic and protect environment simultaneously.

V. Conclusions

A conclusion can be drawn that coal-mining eco-industrial parks' manufacturers require two premises in order to obtain green effect: first, there are environmentalists included in consumers of the products, who are willing to pay excessive value for environment-friendly products; second, environment-friendly manufacturers can be effectively recognized by environment-friendly consumers. However, some studies show that when consumers make a decision to buy, the degree of concerning on the environmental characteristics determines how they act as the base of product differentiation. The preferences of consumers to environment are different in a variety of markets, as well as an internal market, and the differentiation appears to be related with income levels at least. In general, in the OECD countries such as Germany and Netherlands, the consumers are considered to be the most sensitive to the environment [17].

In order to obtain green effect and achieve its stability after forming green alliance, it is necessary, first, to strengthen propaganda about environmental protection in line with the government, to advocate green and civilized consumption and to enhance the proportion of environmentalists in consumers; second, to increase their own propaganda, the national authorities setting up and carrying out green label system in coal-mining eco-industrial parks to allow manufacturers to use the labels in their own products so as to facilitate the effective recognition of consumers; third, to make the green alliance parties gain the largest rents from the alliances which they are all likely to participate in.

The establishment of evaluative, monitoring and assessable indicator system of green strategic alliances will take reduction of energy consumption and pollution emission into the various parts of complete economic and social development of an integrated evaluation system to become performance evaluation for governmental leaders' comprehensive appraisal and business person in charge of important aspects. Strict accountability is an important basis and institutional guarantee to strengthen the responsibility of governments and corporatist, which could ensure the realization of objectives of coal-mining green strategic alliance. This system shall also be guided by systematic, comprehensive and unique principles combined with the evaluation index system settings under static and dynamic principles scientific, included with pressure indicators system, status indicators system and response indicators system, combined with hard and soft indicators. The system should make full use of average indicators and relative indicators, and explore a number of innovation indicators, integrated indicators and systematic indicators to represent essential characteristics of green strategic alliances. The results of comprehensive evaluation on coal-mining green strategic alliances ought to be verified once again of research, using methods of comparative analysis, including comparison with other research findings, results comparison in different methods, as well as comparison of the actual effects to establish coal-mining green strategic alliances' dynamic system.

APPENDIX PROGRAM FOR BP NEURAL NETWORK

```
clc;
p=[ ];
t=[ ];
plot (p, t,'+');
title('Training Vectors');
xlabel('Input Vector p');
ylabel('Target Vector t');
pause;
clc;
[pn, meap, stdp, tn, meant, stdt]=prestd (p, t);
net=newff(minmax(pn),[11, 1], {'tansig','purelin'},
    'trainrp');
net.trainparam.show=50;
net.trainparam.epochs=3000;
net.trainparam.goal=0.000001;
net.trainparam.lr=0.05;
net.trainparam.mc=0.75;
net=init(net);
[net,tr]=train(net,pn,tn);
out=sim(net,pn);
out=poststd(out,meant,stdt);
t
out
see=1-t./out
pnew=[ ];
[pn, meap, stdp]=prestd(pnew);
anewn=sim(net,pnew);
anew=poststd(anewn,meant,stdt);
Anew
```

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