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An innovative approach of the mechanism of organizational synergetic learning in emerging economy

Abstract

The elements in an organization and its harmonious effects are critical for a successful organizational learning. Therefore, a study on the mechanism of organizational harmonious learning is an important research issue. By analyzing the relative study of organizational learning and the elements of organizational harmonious learning are given as individual learning, team learning, organizational learning and learning between organizations, which is based on learning entity – human, then the organizational harmonious learning model and the evaluation index based on system dynamics is built, further the model to measure the degree of harmony about organizational learning are designed according to harmonious theory and feed-back mechanism. Finally, the harmonious mechanism is discussed through the case study, the result illustrates that the effect of organizational harmonious learning can reflect the result of organizational learning well, the harmony of every element can effect the result of organizational learning directly, enterprise can find the main problem according to the data and the ways suggested in order to improve the organizational learning capacity and its knowledge competitiveness.

Keywords: organizational learning, harmonious mechanism, harmonious matrix, organizational learning capacity, harmonious theory.

JEL Classification: M10, M19.

Introduction

In the environment of knowledge economy, organizational learning is effective measure for enterprise to acquire, assimilate, absorb even apply and create knowledge. So the analysis of organizational learning has become an increasingly important study area over recent years. Various works have dealt with the analysis of this construct from different viewpoints. There are studies that focus on the meaning of organizational learning, the process and measure of organizational learning, the subject of organizational learning, the case and evaluation of organizational learning.

The employees are the main focus in organizational learning entity. Chen (2002) proposes that learning entity in learning organization can be classified as: I-V (individual-voluntary), I-R (individual-required), T-V (team-voluntary), T-R (team-required). The result was validated by case study. Based on previous research on organizational learning, learning entity not only include individual learning and team learning but also include organizational learning as a whole and learning inter-organization. Especially in knowledge intensive environment, the enterprise must pay more attention to holistic organizational learning and learning inter-organization.

This paper present a multilevel view of learning entity, suggesting that learning in organizations occurs at the individual, team, organization and inter-organization levels. These four levels are necessary process that composed the organizational learning altogether. In the process of organizational learning,

it comprises of the synergetic elements. According to feedback theory, the synergetic learning produces effect of positive feedback, and brings enormous performance to organization. So the study about the mechanism of organizational learning is necessary.

1. Theoretical review

Many studies that focus on organizational learning could be found in management and organizational literature. For example, Argyris and Schon (1978) search the solution, implement and transmission of knowledge in a discussion of the process of discover the problem, suggest that beeline model of learning: discovery, invention, production and generalization. Dodgson (1992) addresses the process how to save individual knowledge in the organization through cycle model of organizational learning. Nonaka (1995) developed a knowledge screw model and suggested that the process of knowledge creation include: socialization, externalization, combination and internalization. Templeton (2002), describe a set of key factors derived from their work with a number of organizations that should be include in organizational learning which include awareness, communication, performance assessment, intellectual cultivation, environmental adaptability, social learning, intellectual capital management, and organization grafting.

Tippins & Sohi (2003) proposed that organizational learning consists of following four components: information acquisition, information dissemination, shared interpretation, and development of organizational memory. Ellis & Shpielberg (2003) suggested five factors of organizational learning mechanisms such as formal learning processes, information dissemination, training, information gathering, informa-

tion storage and retrieval. Jerez-Go' Meza proposed that organizational learning include five factors which are: managerial commitment, systems perspective, openness and experimentation, knowledge transfer and integration. The common characteristic shared by all these study is that organizational learning is appeared in integrated effect and depended on dominant effect of individual.

Chen (2005) had a empirical research on the relationship between organizational learning and enterprise performance through case study, a 6P-1B model was suggested in his research. Yu (2007) suggested that organizational learning of Chinese enterprises was a multi-dimensional construct that was comprised of inter-organizational learning, organizational level learning, collective level learning, individual learning, exploitation learning and exploration learning. Xu (2004) proposed that there are several organizational learning models such as the MNCs, the supplier network and the virtual organizations. Li & Steven (2007) found that some organizational learning method have significant influences on management innovation performance. Vlado, Miha, Mok (2008) research the organizational learning process by comparative analysis of the organizational learning process in Slovenia, Croatia, and Malaysia. From above review, we can find that the synergetic learning at the individual, group, organization and inter organization levels have received limited attention from scholars.

The main purpose of organizational learning measurement is to evaluate the effect of organizational learning and explore the approach to promote the effect of organizational learning. Two streams of research typify most of the academic work on organizational learning measurement. The first stream that based on organization focuses on three aspects which are macroscopically study on enterprise and its sub-department, microcosmic study on individual and mixture of the two study methods. The second stream based on learning focuses on the measurement of the effect of organizational learning. Its common mode is to measure process and result of organizational activity to evaluate its effect on the basis of the change of productivity (Fiol, 1985, 1994). To accurate measure the effect of organizational learning, we must focus on the synergetic effect of learning at the individual, group, organization and inter-organization levels which determined the performance of organizational learning.

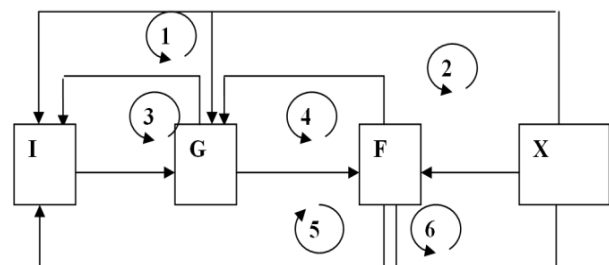
2. Synergetic theory

The word 'synergetic' come from Greek which means work together. The concept 'synergetic'

means the firms as a whole have more value than the independent parts. After Ansoff (1987) interpret the 'synergetic' as $1+1>2$, 'synergetic' theory have been thought as the principle when management researchers and practitioners alike resolve many problems. And it is a burgeoning subject which purpose was to investigate the rule of synergetic system developed from disorder to order. Hiroyuki & Ltami (1997) defined the concept of 'synergetic', and differentiated it as complementary effect and harmonious effect. However, the synergetic is in a dilemma. On the one hand, it has immense latency efficiency, on the other, synergetic effect is difficult to achieve. Actually, it is no doubt that synergetic theory is useful and synergetic effect is objectively exists. The key is the difference in how to achieve and apprehend the mechanism of synergetic effect. Synergetic theory can overcome the problems that cannot be resolved by common evaluation methods. Such as: Fuzzy mathematics cannot resolve the overlap of information caused by index correlation, intelligent evaluation is not accurate, statistic analysis needed a great deal of data (Chen & Chen, 2004). Based on system dynamics and feedback mechanism, we use the synergetic principle to analyze and clarify the mechanism of organization synergetic learning. This paper makes both theoretical and managerial contribution to the literature.

3. Synergetic learning model

Organizational learning is integrated learning action of organization. It includes multiple level, aspect and learning. Individual is the real organizational learning entity. Learning in organizations occurs at the individual, group and organization levels, which are four synergetic key elements of organizational learning. Harmonize the four key elements and exert its synergetic effect is the key to advance ability and performance of organization. The relation is demonstrated in Figure 1.



Notes: I – individual learning, G – group learning, F – firm learning, X – intra-organizational learning; 1 = individual learning group, 2 = organizational learning group, 3 = individual learning interaction, 4 = group learning interaction, 5 = firm, individual and group interaction, 6 = intra-organization learning interaction.

Fig. 1. Organizational synergetic learning model based on feedback mechanism

Since learning occurs through individuals, it is necessary to have a grasp of individual learning before adding the complexity of the organization setting. The cognitive structures of individual provide the grounding for organizational learning. We suggest that a concept of individual learning should be embedded in a concept of group learning. Although individual learning provides the foundation for understanding the organizational learning process, organizational learning is different from the sum of individual learning.

Organizational learning mainly embodied as group learning. The ability of individual learning was promoted through widely individual learning, which is the foundation of group learning. Group learning can also advance individual learning effect through create favorable organizational learning condition. Group learning is core for organizational learning and firm's competence. Excellent learning group embodied the effect of organizational learning. Organizational learning is the foundation of inter-organizational learning, which in turn advanced individual learning, group learning and organizational learning.

Based on system dynamics and feedback mechanism, we can see that between individual learning and group learning it can formed positive feedback loop through creating well group conditions, improving mental models and personal mastery.

Negative feedback loop that drives the individual learning towards group learning and the individual learning – group learning – organizational learning can be established through constitution of information plat and 'five discipline' in organization.

Technique of network information and other's learning plot, along with firm realization of the importance of inter-organizational learning, makes organizational learning and inter-organizational learning to accelerate each other. It also enormously promotes other levels learning. Finally, three positive feedback loop come into being as the model: organizational learning – inter-organizational learning; individual learning – group learning – organizational learning – inter-organizational learning; group learning – organizational learning – inter-organizational learning.

If we can well master the key elements of the model and develop systematic synergetic learning, the learning performance of every levels and the whole organization may be promoted greatly. The synergetic of every levels in organizational learning bring coupling effect that double the learning effect and advanced firms competence.

4. The connotations of synergetic system

Synergetic theory addressed that the system work best when it become a synergetic body. On the other hand, if the system can not become a synergetic body it well be in the condition of disorder. We can analyze organizational learning system from four factors: individual learning, group learning, organizational learning, and inter-organizational learning. The four factors can also be divided several sub-levels.

According to Synergetic Analysis Matrix (SAM), we first investigate the problems which exist in the process of system elements cooperation. Synergetic Analysis Matrix is:

$$H = (H_{ij}), i, j = 1, 2, 3 \dots n,$$

where H_{ij} , $i, j = 1, 2, 3, \dots, n, i \neq j$, is synergetic of factor j to i after multilevel reciprocity of system's factors. Different factors have different performance, so the synergetic is unlikeness, $H_{ij} \neq H_{ji}$. H_{ij} ($i, j = 1, 2, 3, \dots, n$) indicates the degree of synergetic corresponding system factor, where n indicates the number of system elements. We define H_{ij} = (the best cooperation α_i desire α_j to offer α_j – the real cooperation α_j can provide) / the best cooperation α_i desire α_j to offer.

We also can define H_{ij} = (the ideal synergetic state of α_i – the real synergetic state of α_j) / the ideal synergetic state of α_i , for $H_{ij} \in [0, 1]$, we can conclude that:

$$H_{ij} = \begin{cases} 0 \\ b \\ 1 \end{cases} \quad 0 < b < 1, \text{ the system in mediacy can}$$

provide certain cooperation.

Commonly, system elements α_i are related to α_j . It can desire α_j to cooperate directly or indirectly. H (the directly synergetic matrix) merely considers the directly influence among system elements. So we define HM – the entirely synergetic matrix.

When the divisions of system elements or subsystem are imprecise, the direct relation between α_i and α_j is non-conspicuous. However, it is easy to analyze and evaluate the total effect between α_i and α_j . We can get complete de-synergetic matrix (DSM), then according to the relationship between de-synergetic matrix and synergetic matrix, we can get synergetic matrix.

The system produces six negative effects from the synergetic angle: element negative effect, structure negative effect, organizational negative effect, spiritual negative effect, inside and outside maladjustment negative effect, collectivity negative effect.

Most of these negative effect caused by de-synergetic of system operation. The system must form collectivity synergetic body from every aspect. In this way, the system can possess ability of self-organizing, self-adaptability and attraction, only in this way the system can work best. On the contrary, the system not only cannot exert its function but also may face the trouble of exist.

The transfer relation of de-synergetic among system elements can be defined as:

$$DH'_{ij} = DH_{ij} + \sum_i DH'_{ii} \cdot r_{ij} \tag{1}$$

The synergetic matrix of system element can be defined as:

$$H'_{ij} = 1 - DH'_{ij} \tag{2}$$

where DH_{ij} is the de-synergetic proportion of α_i to α_j , r_{ij} is the proportion of the de-synergetic caused by α_j to the total de-synergetic proportion

$$r_{ij} = DH_{ij} / \sum_i DH_{ii}$$

5. Analysis of synergetic system

According to above formula, we can establish completely synergetic analysis matrix and analyze the synergetic proportion of system elements through calculate synergetic proportion.

$$d_H(\alpha_i) = \frac{1}{n} \sum_{j=1}^n H_{ji} \tag{3}$$

$$d_T(\alpha_i) = \frac{1}{n} \sum_{i=1}^n H_{ij} \tag{4}$$

$$d_D(\alpha_i) = \frac{d_H(\alpha_i)}{d_T(\alpha_i)} \tag{5}$$

where $d_H(\alpha_i)$ indicates the total synergetic degree of α_i to others system elements. It reflects the synergetic proportion of α_i in system.

$d_T(\alpha_i)$ indicates synergetic degree of α_i to others system elements in system development; $d_D(\alpha_i)$ indicates synergetic degree of α_i to itself.

If $d_D(\alpha_i)$ is bigger, synergetic degree of α_i to itself is higher.

6. System elements and the synergetic of collectivity

According to the definition of synergetic: $H_{ij} \rightarrow 1$ indicates the synergetic degree of α_i to α_j is higher; $H_{ij} \rightarrow 0$ indicates the synergetic degree of α_i to α_j is lower; $i, j = 1, 2, 3, \dots, n$.

According to equation (4), we can conclude the synergetic degree of system elements, and diagnose it.

Let H be the collectivity synergetic degree, then:

$$H = \frac{1}{n} \sum_{i=1}^n d_H(\alpha_i) \tag{6}$$

$H_{ij} \rightarrow 1$ indicates that the system have higher synergetic degree, and the system operate better; $i, j = 1, 2, 3, \dots, n$.

7. Diagnose the synergetic system

Let the number of individual learning, group learning, organizational learning and inter-organizational learning be n_1, n_2, n_3, n_4 , respectively. The synergetic degree satisfies

$$d_H(H_{ij}) = \frac{1}{n_i n_j} \sum_{l=1}^{n_i} \sum_{k=1}^{n_j} H_{l,k} \tag{7}$$

$i, j = 1, 2, 3, 4$.

We can conclude synergetic analysis matrix. Thus, using it the system collective synergetic degree can be analyzed, such as, the best and the worst synergetic part of system and restrict relation of these parts.

8. Methods, measurement scale and sample

In this article, we proposed an integrated model of organization synergetic learning, contending that individual learning, group learning, organizational learning and inter-organizational learning are the four key elements. The frontal three have received extensive consideration, however inter-organizational learning and its relation with others discussed only by Pedler (1991), Nonaka (1995), Holmqvist (2003), Xu-Xueguo (2004). The studies that explore the synergetic effect of organizational learning elements from the angle of organizational learning entity are rare. According to analysis of mechanism of organization synergetic learning, our paper proposes an evaluation system that comprises four elements and corresponding evaluation index (Table 1).

The questionnaire was designed according to the evaluation system in Figure 1. The measurement items were generated through a review of prior organizational learning literatures. For example, London & Mone (2002) proposed seven factor scale of organizational learning effect, Chen-Guoquan also proposed scale of organizational learning effect, Yu-haibo proposed the evaluation system of organizational learning effect.

The measurement items were generated through a review of prior organizational learning literatures. In sum, using Likert's five points scale, we construct organizational learning condition questionnaire.

Table 1. Evaluation system of organizational learning synergetic of firm 1

Elements	Index	Content
Individual learning (P)	(P1) Individual's recognition to organization	Individual's support to organization goals and its understanding of organization's working method
	(P2) Individual diathesis	Individuals education degree and work experience
	(P3) Individual creativity	The creative work the employee have done
Group learning (T)	(T1) Group goals	Can the goal be achieved and if it conflict with other goals?
	(T2) Group skill	The knowledge of group, decision ability, comprehension among group members
	(T3) Group member contribution	If the group member can achieve goals, respond, contribution accomplish assignment, information sharing
	(T4) Group atmosphere	The work fashion and work norm the group members perceived
Organization learning (O)	(O1) Organization culture	The equality, the trust and the feeling of conjuncture. If the employee care performance evaluation
	(O2) Structure	Organization's work division, regulation, organization operation
	(O3) Management	Can organization management promote organizational ability
	(O4) Function	If the orientation of organization function are correct and responsible
Inter-organizational learning (E)	(E1) Information transfer	If information transfer is smooth
	(E2) Environment	If information transfer is smooth
	(E3) Organizational consciousness	Can organization realize the relation with other organizations?

9. Data analysis

In order to validate the mechanism of organization synergetic learning, data were gathered in two phases. In phase 1 we select and achieve valid sample. Firstly, an original group of firms was constructed though the method of interview, questionnaire and e-mails. We acquired 207 firm's information. We identified 207 firms who were eligible to participate in our study, then, 17 firms were selected. The 17 firms can be divided into four types, 12 machine manufacture, 3 modern pharmacy, 2 iron and steel company and 2 modern service industry. Finally, we choose four firms as emphases on four types respectively. In phase 2 we emphasize data collection and

inventory survey. In this article we acquire data through interview, questionnaire and consult the data.

In the four elements of organization synergetic learning, three are collective level elements except individual learning. Organizational homogeneity guarantees organizational collective level learning as the result of organizational individual learning (Haibo, 2007; Bunderson, 2003). Using individual data's average as organizational level data, one can achieve data with higher confidence level. So according to aforementioned researches and the need of our study, we filter, centralize and quantify the rough data. The worked data is applicable to our research.

Table 2. The sample status of firm 1

Firms' types	Characteristic	Scale
Manufacturing	Emphasize organization function, depended on core technique and scale production	Primary large-sized enterprise
Modern pharmacy	Emphasize custom centered management, depended on core technique and production, scale production	Second class industry large-sized enterprise
Information industry	Emphasize investment in technique and agile manage to occupy market more quickly. Mass production	Medium-sized enterprise
Modern service industry	Emphasize custom and temporary operation, often absorb provisional employees.	Medium-sized enterprise

In practice, the system's de-synergetic is easier to analyze than system's synergetic. So, we can analyze de-synergetic firstly, then, translate it into

synergetic. The de-synergetic matrix of firm 1 illustrated in the Table 3 (other firms data are omitted).

Table 3. De-synergetic matrix of firm 1

Constitution	P1	P2	P3	T1	T2	T3	T4	O1	O2	O3	O4	E1	E2	E3
P1	0.40	0.50	0.40	0.60	0.50	0.40	0.50	0.60	0.50	0.60	0.70	0.50	0.60	0.40
P2	0.50	0.60	0.60	0.50	0.60	0.50	0.50	0.50	0.60	0.50	0.80	0.40	0.40	0.40
P3	0.40	0.70	0.50	0.50	0.50	0.60	0.40	0.70	0.70	0.50	0.70	0.60	0.50	0.30
T1	0.90	0.70	0.50	0.60	0.40	0.50	0.50	0.80	0.50	0.60	0.60	0.50	0.50	0.50
T2	0.70	0.60	0.40	0.70	0.35	0.50	0.60	0.60	0.60	0.50	0.80	0.50	0.60	0.50
T3	0.50	0.80	0.60	0.50	0.50	0.60	0.60	0.50	0.40	0.40	0.60	0.60	0.40	0.40
T4	0.60	0.40	0.40	0.40	0.60	0.40	0.40	0.40	0.50	0.50	0.50	0.40	0.50	0.60
O1	0.45	0.50	0.50	0.50	0.40	0.40	0.50	0.60	0.40	0.50	0.50	0.50	0.60	0.30

Table 3 (cont.). De-synergetic matrix of firm 1

Constitution	P1	P2	P3	T1	T2	T3	T4	O1	O2	O3	O4	E1	E2	E3
O2	0.60	0.40	0.40	0.40	0.40	0.50	0.60	0.50	0.60	0.60	0.60	0.40	0.70	0.30
O3	0.40	0.60	0.60	0.40	0.50	0.50	0.80	0.40	0.50	0.60	0.70	0.40	0.30	0.40
O4	0.50	0.50	0.60	0.70	0.50	0.60	0.60	0.50	0.80	0.50	0.80	0.60	0.50	0.60
E1	0.50	0.60	0.50	0.45	0.40	0.60	0.50	0.50	0.50	0.40	0.70	0.60	0.40	0.50
E2	0.40	0.50	0.40	0.40	0.60	0.60	0.40	0.60	0.40	0.50	0.80	0.30	0.40	0.50
E3	0.40	0.50	0.40	0.50	0.60	0.40	0.30	0.60	0.50	0.60	0.90	0.50	0.40	0.40

Note: According to equation (2), we can acquire completely synergetic matrix (Figure 4).

Table 4. Completely synergetic matrix of firm 1

Constitution	P1	P2	P3	T1	T2	T3	T4	O1	O2	O3	O4	E1	E2	E3
P1	0.45	0.52	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
P2	0.50	0.60	0.60	0.50	0.60	0.50	0.50	0.50	0.60	0.50	0.80	0.40	0.40	0.40
P3	0.40	0.70	0.50	0.50	0.50	0.60	0.40	0.70	0.70	0.50	0.70	0.60	0.50	0.30
T1	0.90	0.70	0.50	0.60	0.40	0.50	0.50	0.80	0.50	0.60	0.60	0.50	0.50	0.50
T2	0.70	0.60	0.40	0.70	0.35	0.50	0.60	0.60	0.60	0.50	0.80	0.50	0.60	0.50
T3	0.50	0.80	0.60	0.50	0.50	0.60	0.60	0.50	0.40	0.40	0.60	0.60	0.40	0.40
T4	0.60	0.40	0.40	0.40	0.60	0.40	0.40	0.40	0.50	0.50	0.50	0.40	0.50	0.60
O1	0.45	0.50	0.50	0.50	0.40	0.40	0.50	0.60	0.40	0.50	0.50	0.50	0.60	0.30
O2	0.60	0.40	0.40	0.40	0.40	0.50	0.60	0.50	0.60	0.60	0.60	0.40	0.70	0.30
O3	0.40	0.60	0.60	0.40	0.50	0.50	0.80	0.40	0.50	0.60	0.70	0.40	0.30	0.40
O4	0.50	0.50	0.60	0.70	0.50	0.60	0.60	0.50	0.80	0.50	0.80	0.60	0.50	0.60
E1	0.50	0.60	0.50	0.45	0.40	0.60	0.50	0.50	0.50	0.40	0.70	0.60	0.40	0.50
E2	0.40	0.50	0.40	0.40	0.60	0.60	0.40	0.60	0.40	0.50	0.80	0.30	0.40	0.50
E3	0.40	0.50	0.40	0.50	0.60	0.40	0.30	0.60	0.50	0.60	0.90	0.50	0.40	0.40

Table 5. Synergetic degree of firm 1

	P1	P2	P3	T1	T2	T3	T4	O1	O2	O3	O4	E1	E2	E3
$d_H(\alpha_i)$	0.44	0.51	0.49	0.51	0.49	0.49	0.45	0.46	0.48	0.32	0.51	0.51	0.49	0.44
$d_T(\alpha_i)$	0.50	0.47	0.46	0.43	0.44	0.46	0.50	0.50	0.49	0.48	0.41	0.48	0.50	0.49
$d_b(\alpha_i)$	0.88	1.10	1.07	1.19	1.11	1.07	0.90	0.92	0.98	0.67	1.24	1.06	0.98	0.90

According to equation (2), we can acquire completely synergetic matrix (Figure 4). According to equations (3), (4), (5), we can calculate the synergetic summation of α_i to other elements, the synergetic degree of α_i to other elements and the self synergetic degree of α_i .

From the result we can see that firm 1 have higher synergetic degree in organization structure and organization function. That according with that firm's practice. Firm 1 have developed organizational learning for a long time and achieved perfectly performance. In this process firm 1 pays much attention to the exertion of organization function and firms core technique.

According to equation (6), we can calculate firm's collective synergetic degree H :

$$H_I = 0.522143.$$

The synergetic degree of firm 1 is quite good. However, firm 1 has comparatively potential in organization synergetic learning. Many works should be

done in organizational learning, synergetic ideal and system thought. According to equation (2), we can acquire the result in Table 6.

Table 6. Structure analysis matrix of firm 1

	P	T	O	E
P	0.47	0.48	0.45	0.37
T	0.33	0.33	0.30	0.37
O	0.49	0.48	0.45	0.48
E	0.50	0.50	0.46	0.47

Further analysis shows that group synergetic degree is the lowest, because firm 1 pays excessively attention to individual performance and technique. It is related to firm's group building and performance assessment. It disobeys the rules of organization learning and severe restrict the promotion of organizational learning performance.

Firm 1 should strengthen group learning and adopt feasible measure to promote organizational learning performance. Following the same reason we can get Tables 7, 8, and 9.

Table 7. Synergetic degree of firm 2

	P1	P2	P3	T1	T2	T3	T4	O1	O2	O3	O4	E1	E2	E3
$d_H(\alpha)$	0.46	0.43	0.49	0.48	0.51	0.49	0.43	0.45	0.44	0.46	0.31	0.49	0.47	0.50
$d_T(\alpha)$	0.48	0.47	0.46	0.42	0.43	0.47	0.52	0.50	0.48	0.47	0.41	0.49	0.36	0.43
$d_B(\alpha)$	0.96	0.91	1.07	1.14	1.19	1.04	0.83	0.90	0.92	0.98	0.76	1.00	1.31	1.16

Table 8. Synergetic degree of firm 3

	P1	P2	P3	T1	T2	T3	T4	O1	O2	O3	O4	E1	E2	E3
$d_H(\alpha)$	0.48	0.41	0.49	0.47	0.51	0.48	0.46	0.42	0.44	0.47	0.31	0.49	0.50	0.54
$d_T(\alpha)$	0.49	0.47	0.46	0.42	0.43	0.39	0.38	0.52	0.50	0.49	0.40	0.49	0.51	0.51
$d_B(\alpha)$	0.99	0.88	1.06	1.12	1.18	1.22	1.20	0.81	0.88	0.95	0.76	1.01	0.97	1.06

Table 9. Synergetic degree of firm 4

	P1	P2	P3	T1	T2	T3	T4	O1	O2	O3	O4	E1	E2	E3
$d_H(\alpha)$	0.45	0.44	0.50	0.49	0.51	0.47	0.46	0.44	0.46	0.48	0.31	0.49	0.50	0.51
$d_T(\alpha)$	0.43	0.43	0.37	0.42	0.44	0.47	0.53	0.53	0.50	0.49	0.41	0.49	0.52	0.50
$d_B(\alpha)$	1.05	1.02	1.36	1.15	1.17	1.01	0.87	0.84	0.92	0.97	0.76	1.01	0.97	1.01

According to equation (6), we can calculate other three firm's collective synergetic degree H :

$$H_2 = 0.457857,$$

$$H_3 = 0.461582,$$

$$H_4 = 0.464847.$$

The result demonstrated that the synergetic degree of three firms is almost the same. Because they all focus on construct of organization norm and scientific management, and adopt similar measure to develop organizational learning. It also related to the fact that the three firm's organizational learning are in exploring stage. Group cooperation guarantees organization to accomplish organizational goals. Group cooperation is most restricted factor in all samples. According to equation (7), we achieve the following result.

Table 10. Structure analysis matrix of firm 2

	P	T	O	E
P	0.47	0.49	0.42	0.52
T	0.41	0.42	0.34	0.46
O	0.48	0.49	0.43	0.53
E	0.57	0.62	0.45	0.55

Table 11. Structure analysis matrix of firm 3

	P	T	O	E
P	0.47	0.49	0.42	0.52
T	0.41	0.42	0.34	0.46
O	0.48	0.49	0.43	0.53
E	0.57	0.62	0.45	0.55

Table 12. Structure analysis matrix of firm 4

	P	T	O	E
P	0.40	0.43	0.36	0.45
T	0.46	0.48	0.42	0.50
O	0.48	0.50	0.44	0.52
E	0.50	0.52	0.46	0.54

From the above table we can see that the three firms have similar integrated synergetic learning ability, and bright future. Three firms all are intelligence intensive enterprise. With the economic globalization becoming increasingly intensive, the enterprise must cooperate in harmony and build learning organization. In addition, four level of organization learning must cooperate sufficient to achieve organization goals. The evaluation of organizational learning synergetic can help firms realize the integrated synergetic and key restricted factors. Then firms can take effective measure to promote organizational learning and performance comprehensively.

Conclusion

In conclusion, this study used organization synergetic learning model based on feedback mechanism to explore the complexity of the phenomenon. Based on the feasibility and application of this approach, we conducted a demonstration study. Potential applications of this method include: the use of model to judge the state of organizational learning, the use of model to detect restricted factors in organization synergetic learning, the use of model to reduce or eliminate the de-synergetic phenomena in organizational learning.

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