Innovative and Entrepreneurial Talents Identifying Realization in Information Controlling and the Bullwhip Effect Analysis*

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Abstract Innovative Entrepreneurial talent is the ultimate goal of college personnel training, it also have made new demands sharp changing social personnel training in colleges and universities, the present situation with creative thinking, innovative approaches and innovative practical ability of graduates to adapt to the social competition theoretically and seek living space, but in fact there lies the bullwhip effect could lead to too large to make the limited resources of colleges and universities are not the greatest application with the main difference in recognition of colleges and universities recognized for innovation and entrepreneurial talents as part of personnel training to pass the large scope of cognition. Supply chain information control and inhibition of the bullwhip effect theory can be applied to such problems, through the simulation; it has certainly achieved a degree of efficiency improvements and optimization.

Key words Innovative entrepreneurial talent; Bullwhip effect; Information control; Talent identification system

1 Introduction

As the protagonist of sustained economic development, universities' quality of personnel training and information they can not meet the needs of the community-based sustainable development requirements. Universities backward productive forces constrained the development of social productive forces to a certain extent. Institutions of Higher Education and University personnel training should be derived from the standpoint of the social needs and higher than the needs of the community development in academic subjects with a forward-looking, talented people that has the potential of mining sustainability. Faced with the reality pressure, China University embarked on an expansive development needs in line with needs of the time 10 years ago. But now innovation and entrepreneurial talents training must become the inevitable choice faced with socio-economic restructuring and industrial upgrading needs in universities.

Innovation and entrepreneurial talents training has its special aspect, which is agnostic and practical. As we all know, by the complex economic and social factors, even if a person get a good entrepreneurship education and theoretical results is very good, its entrepreneurial activities may also fail, and vice versa. This indicates that entrepreneurs are agnostic, thus we are carrying out innovation and entrepreneurship training, when the outcome of education evaluation and certainly not the only use of past performance theory, it is unscientific. An innovative thinking talent, although the former may be 99 times business failure, but is likely to start to make up losses during the 100th time offset the former 99 times.

Quite a few colleges and universities made a lot of ideas to innovation and entrepreneurship training model, relevant departments have also given a great deal of funding and policy concerns, but the innovation and entrepreneurship is still little in our country, this is because of our innovation recognizing lack of entrepreneurship, self-sustained attention and follow-up lead.

2 Innovation and Entrepreneurship, Training Processes and the Existing Evaluation Review

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Innovation and entrepreneurial talent training process can be judged from the four stages: theoretical knowledge, creativity, practical ability and entrepreneurial dynamism.

2.1 Theoretical knowledge

Even if a person's theory are the high level, business failures is also possible, its causes are complex, but we must acknowledge that entrepreneurship their business success rate has a highly theoretical level than those who do not much higher, which fully illustrates the source of entrepreneurial activity importance of theoretical knowledge entrepreneurship. Theoretical knowledge can be broadly quantitative evaluation of students understanding of entrepreneurship education, within a desirable certain range.

2.2 Creativity

Innovation is the Venus of entrepreneurial activity, in the ever-changing entrepreneurial activities, entrepreneurial activity often encounter a dead end, only the use of innovative thinking, with new ideas to think about the problem can bring a new revelation and the ultimate success. Because creative thinking is a subjective sense, it is difficult to define the figures which to our evaluation criteria to bring a certain degree of difficulty.

2.3 Practical ability

Practical capacity is also formed part of the evaluation criteria system. The evaluation criteria scope of application was relatively small compared to the theoretical knowledge is concerned. That is inseparable with its characteristics. The evaluation criteria are practical ability evaluation mainly refers to the students to use the knowledge acquired in the community on business practice and its actual performance or to obtain the final evaluation of feedback from the community to determine. Practical ability has been a great influence outside of the operation up and evaluation of theoretical knowledge than the higher degree of difficulty because it involves a specific operation.

2.4 Entrepreneurial dynamism

Entrepreneurship dynamism is a subjective evaluation criterion, they often ignored. Entrepreneurial innovation and entrepreneurial initiative refers to a strong and lasting impulse to maintain a long-term enthusiasm, even in the face a range of difficulties and obstacles, it will not give up and can adhere to the ultimate success of the initiative.

Currently prevailing in the context of innovation in the information age training model is to increase production capacity (project side) for the (personnel training side), sales (manpower demand side) three productivity of the optimal model: Three-dimensional model.

(1)Using a combination of practical teaching methods with production、learning、research.On the one hand, schools and teachers use information obtained directly from the market-oriented projects in the field of extra-curricular research and the use of clients, teachers, students, development of joint planning. On the other hand, teachers and researchers find new stimulation and new creativity in those vibrant, imaginative, passionate exchanges of undergraduate students.(2)Three-dimensional innovative personnel training system. 1, 2, 3 classroom integration together constitute the creative ability of students three-dimensional information space. First class, that is the scheme classroom teaching. Through curricular teaching T type knowledge and breadth of education, many of the curriculum, especially in computer languages and information systems development courses take the theory of teaching and practice of teaching lessons of 1:2 or 1:1 format, practice teaching is mainly through case teaching, classroom training, simultaneously, experimental demonstration, simulated teaching, laboratory operations, curriculum design in the form of the subject students hands-on operational capability and innovation capability. The second class, a variety of academic exchange school extra-curricular and extra-curricular activities to develop student's research and research capacity, practical ability and innovation ability, the main is to train T type talents a depth of knowledge and skills. The third class achieves the purpose of personnel training through social practice and business practices to. Instructor arrange for students to practice base. Through a comprehensive internship、 visits to observe, students familiar with their organizational management structure and project development process.(3)Scientific research, teaching and job market Three-dimensional. Production, supply and personnel training mode is essentially a rapid response to market training model, from the market and society from the market access to the project is to obtain information on personnel training, so that university research enhance the role of the social productive forces, also to bear in college teaching with the pace of social development, improve the efficiency of student learning to guide students to establish self-direction, knowledge and ability to help students quickly and needs of the community focus based on information technology innovation and personnel training objectives.(4)To build a three-dimensional

students develop innovation ability multi-platform. Stereo means to build the five levels information technology innovation and talent of training platform. First is professional grade and class. The computer science (electronic) information engineering, information management and information systems, information and computer science and other subjects included in this training platform for students. The second layer, the establishment of professional associations and study groups train platform. Professional societies for students interested in self-training platform, by the students according to their own self-interest organizations, to guide the student organizations through the development of the constitution and opening or planning to conduct academic exchanges. The third layer, the establishment of R&D centre train platform. The establishment of information technology project planning, market research and business plan such as R&D centre. The fourth layer is project development training platform. Selection from the R&D centre with high-quality and innovative capabilities of the members of the various project development team, led by information technology specialists to conduct market operations planning and management, as well as actual project team development. The fifth is marketing management team. The team needs time to understand the market and project promotion activities and create high School brand through market operation.

However, by the information flow, pedestrian flow, traffic and other information established the four cycle of innovation and talent of self-optimization, self-replicating mechanism of the layers of progressive, practical effect is not significant. The project team organizational model and the personnel training system can be self-optimizing, self-replication and ultimately optimize the formation of super-circulation system, but the information technology innovation and talent of self-optimizing, self-replicating cycle of a virtuous circle, as a result of weakening of the interface between the existence of identifying effect, makes the society as the end acceptable to the need for innovation and entrepreneurship, the number passed to the colleges and universities of this occurred when the source the basic quantitative amplification.

3 The Introduction of Control Theory in Bullwhip Effect

In recent years, many articles study the bullwhip effect, the earliest is the study of dynamic system model proposed by Forrester (1961), since 1997, the representative of the statistical model of man-made made by Lee, Padmanabhanh, and Whang, etc., most of the literature studied based on such a model. There has been the use of control theory model of the bullwhip effect literature until 2002.

As early as 1952, Simon took advantage of the control process theory applied to up production and inventory control on Laplace transform. However, since many efficient storage strategies are discrete, which limits the Laplace transform of this application. Quickly, this method was replaced by discrete z-transform. Since z is the special circumstances of Laplace transform, so many of Laplace transform methods and tools can be used. The uses of supply chain control theory we need to use the relevant methods include: the transfer function, frequency response, spectrum analysis, transformation and so on.

Bullwhip effect describes the fluctuations in demand caused by the end of the supply chain front-end inventory, ordering fluctuations in the process. How to select an appropriate control u_k to try to weaken the bullwhip effect, especially in the supply chain end of the random fluctuations in demand, that is uncertain demand for disturbances in the outside world conditions, the selected control u_k bullwhip effect in the supply chain system to minimize. The essence of the problem is that the select control u_k so that the J disturbance smallest in the case under the bullwhip effect condition. That is: $\min J = E\left\{\sum_{k=1}^{N-1}(x_k^T Q_k x_k' + u_k^T u_k) + x_N^T A\, x_N\right\}$. Where, Q and A are semi-definite matrix. In the condition of mathematical expectation, under the objective function is the significance of supply chain management u_k how to select the order to inventory and ordering the smallest deviation, that is, under conditions of random disturbance bullwhip effect do likely to weaken. For the supply chain system is the deviation of a random control problem.

Supply chain bullwhip effect described in stochastic control problems of modern logistics management meaning is clear, that is how to consider the supply chain management strategies in order to control the deviation of inventory status and order that the cattle whip effect to a minimum level the uncertainty in the bullwhip effect,, that is: $x_k \to 0$, $u_k \to 0$. So according to the relevant literature the following two situations were random control algorithm description.

3.1 Stochastic control for white noise disturbances demand

$u_k = -F_k \hat{x}_{k|k-1}$, Where $\hat{x}_{k|k-1}$ is the use of data y_k of the state x_k estimated. The feedback control gain is: $F_k = \left[I + B^T P_{k+1} B \right]^{-1} B^T P_{k+1}$. P_k Satisfied the Likati equation: $P_k = P_{k+1} + Q - P_{k+1} B_k \left[I + B^T P_{k+1} B \right]^{-1} \times B_k^T P_{k+1}, P_N = A$ .Kalman filter of the state optimal estimator $\hat{x}_{k|k-1}$ obtained by the following formula recurrence: $\hat{x}_{k+1|k} = \hat{x}_{k|k-1} + B_k u_k + G_k \left[y_k - \hat{x}_{k|k-1} \right]$

Kalman filter gain is calculated by: $G_k = S_{k|k-1} \left[R_2 + S_{k|k-1} \right]^{-1}$, $S_{k+1|k} = S_{k|k-1} + R_1 + S_{k|k-1} [R_2 + S_{k|k-1}]^{-1} \times S_{k|k-1}, S_{1|0} = R_0$ Where R_0 is the variance of random variables x_0.

3.2 Stochastic control for colored noise disturbances demand

According to the relevant literature, for the colored noise case demand, we can expand the state variable dimension approach translate into a white noise colored noise, that is: $X_k = \begin{bmatrix} x_k \\ w_k \end{bmatrix}$,at this time $\boldsymbol{X}$ is the $2(n+1)$ dimensional vector, while the deviation of the original supply-chain system dynamic equation is transformed as follows: $X_{k+1} = \omega X_k + \xi u_k + \tau \eta_k$, where $C \equiv \begin{bmatrix} I & 0 \\ 0 & I \end{bmatrix}, Y_k \equiv \begin{bmatrix} y_k \\ 0 \end{bmatrix}, T_k \equiv \begin{bmatrix} I \\ 0 \end{bmatrix}$ .Through the above transformation, based on the separation principle, the state of the Kalman filter Meter can be used as control of quadratic state feedback by the feedback control and state estimation separately estimate.

$u_k = -F_k \hat{X}_{k|k-1}$,where: $\hat{X}_{k|k-1}$ is the use of data y_k of the state x_k estimates, feedback control gain is: $F_k = [I + \xi^T P_{k+1} \xi]^{-1} \xi^T P_{k+1}$. P_k satisfied the Likati equation: $P_k = \omega^T P_{k+1} \omega + Q - \omega^T P_{k+1} \left[I + \xi^T P_{k+1} \xi \right]^{-1} \times \xi P_{k+1} \Theta, P = A$ Kalman filter of the state optimal estimator $\hat{x}_{k|k-1}$ obtained by the following formula recurrence: $\hat{x}_{k+1|k} = \omega \hat{x}_{k|k-1} + \xi u_k + G_k \left[Y_k - C \hat{x}_{k|k-1} \right]$

Kalman filter gain is calculated by: $G_k = \omega S_{k|k-1} C^T \left[R_2 + C S_{k|k-1} C^T \right]^{-1}$, $S_{k+1|k} = \omega S_{k|k-1} - S_{k|k-1} C^T [R_2 + C S_{k|k-1} C^T]^{-1} C S_{k|k-1} \omega^T + \tau R_1 \tau^T, S_{1|0} = R_0$

Where R is a random variable x_0 variances, R_1 is the state noise covariance matrix of η, R_2 is the measurement noise covariance matrix of v .Therefore, the amount of social demand and university personnel identified relations is:

$$x_k^f = x_k + x_k^s, u_k^f = u_k + u_k^s$$

Among them, the social demand for state x_k^s and the number of college graduates reasonable u_k^s talent identification control scheme based on standard setting.

4 Talent Identification System Simulation Experiment

Talent identification system simulation experiment is based on the aforementioned personnel identified four of the circulatory system design. Suppose a comprehensive local university qualified graduates as its main products. The community can accept graduates of experimental design to simulate different kinds of talents. Suppose there are n = 5 clients a (group),the problem of employment for the personnel sub distribution system, where set $Q = I$.

Talent delivery system noise conditions: the system equation under the white noise condition of deviation $w \approx N(0, \sigma_1)$, and the covariance matrix of w is:

$$R_1 = diag(0.0081, 00076, 0.0080, 0.0074,$$
$$0.0061, 0.0105, 0.0122, 0.0066, 0.0112, 0.0115, 0, 0, 0);$$

Under the conditions of colored noise type deviation $w \approx N(0, \sigma_2)$, and the covariance matrix of w is:

$$R_1 = diag(0.0103, 00072, 0.0936, 0.0102, 0.0086, 0.0892, 0.0091, 0.0103, 0.0118, 0.0083, 0, 0, 0);$$

$v_k \approx N(0, v_k)$,

The v covariance matrix is: $R_2 = diag(0.0107, 00089, 0.0947, 0.0086, 0.0088, 0.0102, 0.0078, 0.0112, 0.0083, 0.0086, 0, 0, 0);$

The initial conditions assuming in talent identification deviation is: $x_0^T = (1.01, 1.02, 1.08, 0.91, 1.06, 0.88, 0.85, 0.89, 0.96, 1.04, 1.10, 1.20, 1.15);$

Under the condition of x_0, the white noise variance is:

$$R_0 = diag(0.05, 005, 0.05, 0.05, 0.05, 0.05, 0.05, 0.05, 0.05, 0.05, 0.1, 0.1, 0.1);$$

In the colored noise, the expansion of the state under the conditions of the variance of the random variable x_0 is: $R_0 = diag(0.05, 005, 0.05, 0.05, 0.05, 0.05, 0.05\ 0.05, 0.05, 0.05, 0.05, 0.05, 0.1, 0.1, 0.1, 0.1, 0.1, 0.1);$

Under the colored noise condition is:

$$R_0 = diag(0.6, 06, 0.6, 0.6, 0.6, 0.6, 0.6, 0.6, 0.6, 0.6, 0.6, 0.6, 0.6);$$

Assumed $k = 20$, through randomized controlled to be under the conditions of the different needs of the innovative talent identification, the bullwhip effect changes in parameters are:

In the colored noise under the conditions of the bullwhip effect than the white noise of the bullwhip effect under the conditions of strong but by stochastic control, it can make delivery of the bullwhip effect parameters v_{wk} and v_{ck}, that is, fluctuations in demand whether under the conditions in which the supply chain bullwhip effect are subject to effective control.

5 Conclusions and Outlooks

In this paper, based on the supply chain bullwhip effect theory put forward by personnel training and identification of multi-layer structure model, we applied stochastic control theory, the end of the community in identifying qualified personnel, fluctuations in demand for white noise and colored noise, under the conditions of two kinds of disturbances, how to Talent delivery system in the colleges and universities to develop or identify the number of control to suppress the bullwhip effect. Through a university's innovative entrepreneurial talent training system, Simulation results show that, no matter what kind of fluctuations in demand for the random control of the bullwhip effect can be effectively suppressed and weakened.

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