

Chapter 11

Continuous Improvement Method of Chinese Enterprises Based on Study of Benchmarking

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Abstract As a continuous increasing process of the company level innovation ability, continuous improvement is an important strategy for the company to keep competitive. This paper mainly studies the present situation and implementation methods of continuous improvement. The motivation of continuous improvement about Chinese enterprises is firstly analyzed with the help of Continuous Innovation Network (CINet) Program. The study shows that the most important motivation of Chinese enterprises conducting continuous improvement is to gain higher customer satisfaction. Secondly, the performance of continuous improvement about Chinese enterprises is studied. The research shows that production volume, safety and working conditions are the emphasis that Chinese enterprises need to focus on in the next stage. Thirdly, the methods of continuous improvement that Chinese enterprises can learn are studied by using benchmarking. At last, the specific advices for every method are put forward. The study of this paper is to provide reference for the conduction of continuous improvement about Chinese enterprises.

Keywords Continuous improvement • Motives • Performance • Improvement measure

11.1 Introduction

Continuous improvement (CI) mainly refers to continue to do small, gradual reforms to improve the efficiency constantly. Continuous improvement is a continuous increasing process of innovation ability in company level; it combines the development of enterprise with the improvement of performance organically and can make direct and lasting contribution for the evolution of enterprise [1]. The appearance of continuous improvement theory could not be separated from quality management. Bounds divides quality

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management into four stages, namely inspection, statistical quality control, quality assurance, strategic quality management [2]. In fact, even the method of strategic quality management is difficult to cope with the business environment which is rapidly changing and highly uncertain. The fifth stage of quality management-competitively continuous improvement comes into being to meet this challenge [3].

Continuous improvement is not only limited to quality and production in workshop, but also includes innovation and business performance and learning behavior in the whole enterprise. It is not only a method of practice, but also a strategic competitive weapon. The theory of continuous improvement is gradually applied to wider areas, such as innovation or new product development [4, 5]. Bessant believes that continuous improvement is a concentrative, evolving process of innovation throughout the whole company and a key strategy that keeps the manufacturing competitiveness of the enterprise [6].

The international survey data from Continuous Innovation Network (CINet) show 37 % of the sample enterprises think it is difficult to commit to continuous improvement activities continuously, while only 22 % think it is easy to do so. In Chinese enterprises, 51.2 % of the sample enterprises think it is difficult to commit to continuous improvement activities continuously, while only 11.6 % think easy. As can be seen from the above data, it is difficult to conduct continuous improvement in enterprises, and the difficulties of Chinese enterprises conducting continuous improvement are far greater than foreign enterprises.

What kinds of continuous improvement method are more effective to improve the performance? The issue will be researched depending on the database from CINet in this paper. We hope that the research results of this paper could make people have a deeper understanding about continuous improvement activities and provide advices for Chinese enterprises conducting continuous improvement.

11.2 Research Model

This paper will analyze the performance that Chinese enterprises mostly need to improve in the following two aspects:

- (1) Analyze the reason for Chinese enterprises conducting continuous improvement. The reason for improvement reflects the motivation and the importance of demand that enterprises conducting improvement activities.
- (2) Analyze the level of performance that Chinese enterprises conducting continuous improvement. The performance indicators in middle and low levels are the key points to research in this paper.

The key points of this paper are the indicators that need to be improved dramatically and the performance of which is poor. The method of benchmarking will be used to study the continuous improvement methods. Blue chip companies will be selected, and the continuous improvement methods they use to improve the key performance above will be analyzed.

11.3 The Survey of Data and Description of Indicator

11.3.1 *The Survey of Data from CINet*

The data of this paper are all from the questionnaires designed by the working group of CINet. The working group of CINet is composed of more than 50 experts, scholars and business elites who are from 20 countries. The working group investigated 586 companies from 11 countries and regions in Europe, Asia and Australia and so on in 2003.

11.3.2 *Indicator System*

The questionnaire lists 18 indicators about motivations, 16 indicators about performances and 18 indicators about methods for enterprises conducting continuous improvement. The five-point scale of Likert is used to measure these indicators, 1 means the highest and 5 means the lowest.

11.3.3 *Reliability and Validity*

11.3.3.1 **Research**

The reliability coefficients of various indicators are calculated using internal consistency in this paper (Cronbach's α). Cuieford considers that the number of Cronbach's α means high reliability if larger than 0.7 and low reliability if smaller than 0.35 [7]. Nunnally considers that the number of Cronbach's α must be larger than 0.5 at least in practical applications [8]. Wu Tongxiong thinks that the most common range of the number of Cronbach's α is between 0.5 and 0.7 [9]. The reliability analysis results of every indicator are shown in Table 11.1. As can be seen from Table 11.1, the smallest number of every set of indicators is 0.796, most of them are larger than 0.8. Therefore, the indicator system of this paper has a stronger internal consistency.

11.3.3.2 **Validity**

The validity refers to the accurate degree of the variables measured by tools, namely the accuracy. The higher the validity, the more efficient the measuring results that show the true nature of the object which is measured. During the research period of CINet, the managers of the enterprises being researched were contacted closely. The

Table 11.1 Analysis of inner reliability and construct validity

		China	The whole samples	
Cronbach's alpha	CI motivation	0.883	0.864	
	CI performance	0.892	0.904	
	CI method	Importance	0.879	0.796
		Usage	0.822	0.834
Cumulative %	CI motivation	70.17 %	57.25 %	
	CI performance	64.62 %	58.39 %	
	CI method	Importance	71.78 %	60.26 %
		Usage	64.49 %	51.10 %

respondents of the questionnaires are managers of enterprises to ensure the accuracy and validity of the research data. The method of factor analysis could also be used to examine the construct validity of the questionnaire; the results of the analysis are shown in Table 11.1. The cumulative variance contribution rates of each set of common factors are all meet the requirement larger than 40 %, [10] and the load values of the largest common factors about each indicator are greater than 0.4. Therefore, the structural validity of the questionnaire is pretty good.

11.4 Benchmarking of Continuous Improvement Methods

11.4.1 Select Blue Chip Companies

The samples are classified using the method of hierarchical cluster (514 enterprises, not including Chinese enterprises). The appropriate number of categories is determined by the curve chart (screen plot), which makes use of coefficients changing by the number of categories. The result of the analysis shows that it is appropriate to divide the samples into three categories. The result of classification is shown in Table 11.2.

Table 11.2 Sample classification

		Production volume	Safety and working conditions	Sample size
Excellent performance	Mean	1.84	2.23	235
	Std. deviation	0.57	1.02	
Normal performance	Mean	3.44	2.5	210
	Std. deviation	0.69	0.6	
Bad performance	Mean	3.82	4.23	69
	Std. deviation	0.79	0.45	
Total	Mean	2.76	2.61	514
	Std. deviation	1.07	1.03	

11.4.2 The Methods of Continuous Improvement Methods about Excellent Performance Enterprises

Two hundred and thirty-five excellent performance enterprises are analyzed. The result shows that the most important method of continuous improvement is support from managerial staff (mean value <1.5), followed by monitoring the improvement activities (measures, follow-ups), supportive leadership, regular shop floor visits by management, face-to-face communication, work in teams/work groups, training of personnel in problem-solving tools, use of quality standard, a general problem-solving format, use of total productive maintenance, formal policy deployment(1.5 < mean value < 2.5).

The continuous improvement methods which are frequently used are as follows: use of quality standard, face-to-face communication, monitoring the improvement activities, support from managerial staff, regular shop floor visits by management, work in teams/work groups, supportive leadership(1.5 < mean value < 2.5).

The comprehensive analysis finds that the importance of these 7 indicators which are frequently used is much higher than the importance of the others. Therefore, these 7 indicators are the continuous improvement methods that need to be learned by Chinese enterprises. As shown in Table 11.3.

Table 11.3 The continuous improvement methods of excellent performance enterprises

	Importance		Usage	
	Mean	Std. deviation	Mean	Std. deviation
Use of slogans	3.62	1.07	3.79	1.13
Training of personnel in problem-solving tools	1.88	0.80	2.85	1.02
Monitoring the improvement activities	1.52	0.57	2.17	0.91
Support from managerial staff	1.41	0.64	2.19	0.92
Incentive systems	2.74	1.13	3.58	1.18
Supportive leadership	1.70	0.76	2.47	0.94
Work in teams/work groups	1.83	0.85	2.38	1.03
A suggestion scheme	2.76	1.11	3.34	1.25
A general problem-solving format	2.35	0.98	3.19	1.18
Promotion on notice boards	2.75	1.07	3.12	1.24
Promotion through internal media	2.95	1.12	3.40	1.22
Promotion through competitions and awards	3.40	1.11	4.06	1.05
Face-to-face communication	1.76	0.83	2.16	0.96
Regular shop floor visits by management	1.73	0.76	2.25	1.04
Use of quality standard	1.89	1.03	1.84	1.10

(continued)

Table 11.3 (continued)

	Importance		Usage	
	Mean	Std. deviation	Mean	Std. deviation
Use of total productive maintenance	2.38	1.06	3.14	1.23
Quality awards	3.25	1.21	4.08	1.16
Formal policy deployment	2.43	1.09	2.91	1.20

11.5 Advices for Chinese Enterprises Conducting Continuous Improvement

Use of quality standard On the one hand, using ISO9000/2000 or other quality standards could provide standards for employees conducting continuous improvement activities; on the other hand, it could encourage the staff to do more activities about continuous improvement.

Face-to-face communication The employees are encouraged to communicate with each other, and the conditions for full exchange of staff are created by enterprise. Individuals and groups at all levels share (make available) their learning from all work and improvement experiences.

Monitoring the improvement activities There must be an emphasis on monitoring the continuous improvement activities, and the frequency of monitoring must be ensured. The staff and team continuously monitor and measure the improvement activities and the effects, as well as the impact on the strategy or the object of department; the impact of reorganization to organizational improvement should be taken into account when planning the reform of enterprise, and it could be adjusted appropriately if necessary.

Support from leadership and managerial staff Leadership should pay attention to and support the continuous improvement work of enterprise frequently and correctly guide the direction of enterprise conducting continuous improvement to make it match with the strategic objectives of enterprise. All the managers could respond to the views and suggestions about improvement which were put forward by the staff timely and clearly. Managers should also serve as models and participate in the design and implementation of continuous improvement system actively. Managers encourage practice. They do not punish the employees who make mistakes, but encourage them to learn lesson from mistakes. Meanwhile, providing sufficient time, fund and other resources for improvement activities is needed.

Regular shop floor visits by management It could help managers find the problems existing in the shop floor timely and accurately and respond to them quickly. Being small and trivial, some problems exist for a long time. Continuous improvement starts with some preventive measures and promotes the formation of large improvement by adding them up. Managers regularly visiting the job shops could also boost the morale and enthusiasm of the staff.

Work in teams Continuous improvement should be regarded as activities done by staff or team rather than parallel activities. Employees and teams work efficiently in

the departments on each floor and carry out improvement activities in business the whole time. Design an organizational mechanism to make staff learning be a part of it.

11.6 Conclusion

The motivation and performance levels of continuous improvement about Chinese enterprises are analyzed on the base of Continuous Innovation Network program, and then, the continuous improvement methods of Chinese enterprises are studied. The following conclusions are obtained:

The most important motivation of Chinese enterprises conducting continuous improvement is higher customer satisfaction; the other important reasons are meeting customer demands, reduction cost, improving customer relations, improving quality conformance and increasing productivity.

The performances of Chinese enterprises in customer satisfaction, quality conformance, customer relations, cost and productivity are significantly good, but in other aspects like absence, supplier relations, lead times, delivery reliability, organization, cooperation and communication, administrative routines are not good, especially in production volume, safety and working conditions. Chinese enterprises meet great demands in these two elements, but the performances are not good.

Analysis shows that the enterprises which do well in production volume, safety and working conditions are in favor of the improvement methods, such as quality standard, face-to-face communication, monitoring the improvement activities, support from managerial staff, regular shop floor visits by management, work in teams, supportive leadership.

The specific policy advices about the continuous improvement methods of Chinese enterprises are put forward in this paper on the basis of the foregoing conclusions. We hope that the research results of this paper could make people have a deeper understanding about continuous improvement activities and provide supports for Chinese enterprises conducting continuous improvement.

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