ISSN : 0974 - 7435 Volume 10 Issue 7

2014

BioTechnology

An Indian Journal

FULL PAPER

BTAIJ, 10(7), 2014 [1917-1926]

KPOVs analytical memod based on improved weighted dynamic pareto chart

Woye Liu[1], Weimin Ye[1*], Junfeng Sun[2], Zewei Dong[3], Qi Wang[4]
[1]Management Engineering Department, Mechanical Engineering College, Shijiazhuang, (CHINA)
[2]Department of Equipment Command and Administration, Academy of Armored Force Engineering, Beijing, (CHINA)
[3]Army aviation institute, Beijing, (CHINA)
[4]Application of Fire Department, Mechanized Infantry Academy, Shijiazhuang, (CHINA)
E-mail : weimin_ye@126.com

ABSTRACT

The core of Lean Six Sigma quality improvement is to identify key process output variables (KPOV) of products or services according to the "critical to quality" (CTQ), then find out the key process input variables(KPIV), so that the quality improvement focus can be ascertained. To solve the problems of traditional Pareto chart in identifying the KPOV that do not consider the fuzzy attribute of quality and unequal opportunities of improvement for KPOVs, the improved weighted dynamic Pareto chart is presented. Based on determining the CTQ, after process analysis, the membership degree analytical method of fuzzy quality is applied to dynamically analysis the relevant data of the process output variables (POVs), and the combination weighting method based on entropy theory is utilized to reasonably assess the improving opportunities of process output variables. Finally, in an instance application, the improved weighted dynamic Pareto chart is used to dynamically determine the key process output variables of the repair cycle. The method provides an effective approach for the organization to determine the direction of Lean Six Sigma improve project.

KEYWORDS

Lean Six Sigma; KPOV; Entropy weight; Dynamic threshold; Pareto chart.

INTRODUCTION

During the implementation process of Lean Six Sigma quality management process, the selection of quality improvement project is a very important initial step. The basic idea of Lean Six Sigma quality improvement is to identify the POVs of products or services based on CTQ, then find out the KPOV with the lack of process capability by analysis and assessment. Taking KPOV as the dependent variables, by further data and technical analysis, the KPIV which named independent variables that influence the dependent variables can be found. Finally, specific improvement measurements for KPIV can be taken to achieve the purpose of improving quality. This will establish a relationship of "customer focus → CTQ → KPOV → KPIV → improvement measures ", which can be the basis of the understanding of the law of the independent variables and the dependent variable. Then the independent variable can be optimized by the control of underlying variables, and the corresponding result is to enhance the ability of CTQ to meet customer demands, which ultimately improves customer satisfaction with a product or service[1].

The above ideas can be expressed by the following mathematical functions:

$$Y = f(Xs)$$

Where Xs are key reasons which are multiple independent variables of f, and they can also be indicated as KPIVs; then Y is the result which is a function of f, and it can also be expressed as KPOV. This equation accurately reflects the transformation between inputs, processes and outcomes, but also reflects the specific application ideas of Lean Six Sigma.

Pareto chart is a common method used to confirm the KPOVs, which is based on the Pareto principle that result of 80% is from the causes of 20%. It was named as first used by Italian economist Vilfredo Pareto in the statistical work of the community property distribution. He found a few people occupy most of the wealth in society, while the vast majority of people in poverty, the so-called " critical few and minor most " is a quite common social phenomenon[2]. Juran, the American quality management scientist, put this principle to be applied to quality management, and consider that nonconforming products caused by a small amount of problems accounted for most of the total nonconforming product. Under conditions of limited investment resources, solving the few key quality problems can improve the overall quality to great degree. So Pareto chart has become a powerful tool for finding key problems in quality management activities[3].

The Existing Pareto chart is wildly applied in the field of quality management, Sanjay Srikantaiah[4] saw the Pareto chart as a six sigma improvement techniques, while the other two technologies is team work and statistical tools. Wang Yue[2], Jerry D.Kahn[5] etc. applied Pareto chart to grass maintenance applications, highlighted its important role in the maintenance organization in the lower level. Liu Hui, Zhou Yunzhu[6] used it for boiler accident analysis, Wang Yajun and Wang Keqin[7] put it in manufacture knowledge quality control, Li Shan[8] bring it into its application in quality inspection agencies improve their work, and they all had a good application effect .

However, overall, the current research literature on the Pareto chart is not too much, most of the content focuses on the existing literature describes and summarizes the application process, so there is a lack of research on the theoretical level. Moreover, the analysis methods are too simple, and the analysis process is very subjective. Its application mainly relied on personal experience, so it is effective in the analysis of simple data, and the main factors causing the problem occurs can be found very easily, but it also shows many deficiencies in the improvement problem of the complex quality issues. As definition for disqualification of different defects is fuzzy, multi-scale may be used in defects measurement, improvement difficulty of different defects is not the same. Therefore, this paper attempts to introduce the PPI weight analysis method and fuzzy membership grade distinction method into the existing Pareto chart, in order to overcome the above shortcomings, and provide some guidance for analyzing the quality of data and identifying the KPOVs in complex situations.

BASIC THINKING FOR KPOV DETERMINING OF TRADITIONAL PARETO CHART

On the basis of SIPOC analysis, various problem elements (nonconformity, defects, accidents, time, amount, etc.) relevant to the determined CTQ can be analyzed by the existing Pareto chart. First, the data is collected according to its reasons type or the phenomenon type, then it can be sorted by the amount of the loss, time consumed, or the occurrence frequency, at last the result will be shown by histogram column and the cumulative curve. In general, the Pareto chart consists of double Cartesian coordinate and a horizontal coordinate. The left ordinate stands for the frequence, i.e., a number of problems; the right ordinate stands for the frequency, i.e., the cumulative frequency of occurrence of a problem; abscissa stands for various problems, arranged from left to right according to the degree of influence in the diagram. In the analysis of Lean Six Sigma quality improvement, follow the 80/20 principle, Pareto chart can be used to ascertain which POV should be focused on, then it can be chosen as KPOV for improvement.

In quality analysis activities, Pareto chart can be applied to determine the key issues to focus on treatment among the various quality problems, and it can be also applied to confirm the main factors from the various factors that affect the quality problem. In quality improvement activities, via the comparison of former and latter Pareto chart, the visual improvement effect can be clearly seen, and quality improvement project in the next step can be easily determined.

The procedure of analysis quality data by Pareto chart generally consists of the following steps:

(1) Classify the data items collected by their contents as $Y = \{y_1, y_2, \cdots y_i, \cdots, y_n\}$;

(2) Consolidate the data items and calculate the cumulative number e_i ($i = 1, 2, \cdots, n$) of each item, then $e = (e_1, e_2, \cdots, e_n)$ can be produced;

(3) Draw the vertical axis and the horizontal axis, arrange the data items from left to right according to the degree of influence (the cumulative number), and then draw histograms with a column height indicates the cumulative number of each item;

(4) Calculate the occupancy of various types of data items (the ratio of appearing frequence of each item to the frequence number of the total) and the cumulative occupancy;

$$f_i = e_i \Big/ \sum_{j=1}^{n} e_j, \quad j = (1, 2, \cdots, n) \tag{1}$$

$$F_i = \sum_{j=1}^{i} f_j \tag{2}$$

(5) Draw the cumulative occupancy curve (Pareto curve), with a horizontal line rule off around $F_i \approx 80\%$, then the left classes $\{y^*\}$ of the intersection P^* with the Pareto curve can be defined as the KPOVs.

SHORTAGE IN THE ANALYSIS OF TRADITIONAL PARETO CHART

The calculation of this existing Pareto chart is simple, while the problem size is intuitive, and the order is absolutely clear, and also it is very convictive. The most critical KPOVs can be easily found from the arranged problem, and the size of the impact of the problem on the overall can be comprehended objectively. Pareto chart can be flexibly applied not only to a variety of reports and records, but also to determine the main objectives of the quality management improvement, and can be also used to compare the operational change of the quality data records, in order to confirm the improvement effect of quality management. However, in many cases, using this simple analysis method to determine KPOV also revealed many deficiencies.

For each category of data items, the traditional Pareto chart think its weight is the same, so its occupancy and the cumulative occupancy can be directly calculated with Eq.(1) and Eq. (2), however, it must be noted that in many cases identifying "critical" and "non-critical" factors only on frequence and occupancy of defects / problems is unreasonable.

This is because that although the upper-level defect elements absolutely accounted for the major in the Pareto chart, lower-level defect elements may be more appropriate priority to be improved. For example, the equipment pending repair is the customer imperative, even if funding factors in the host, may the customer cares more about the lower-level time factor; or the implement of improvements will be easier for the lower-level defect elements, For example, enamel consumes a long time during the process of equipment repair, then it may be the preferential element, but due to technical, financial and environmental constraints, it is not easy to improve, so the QC project team may need to dedicate more resource to shorten the lettering and modification time which element is subordinate.

Therefore, the traditional simple Pareto analysis method needs be improved in the actual work, and we can use the weighted Pareto analysis to give different weights to identify the key factors in the process.

On the other hand, the definition of traditional Pareto chart on problems is based on the common set. The definition of on problems(such as defect type, operation type, equipment type, accident type, failure causes, time and region of accidents, etc.) is simply "Yes" or "No", with no transition, while ignoring the situation that many problems cannot be divided according to the exact boundaries. For the vast majority of things in real life, there is an intermediate state, and links between things may be in an intermediate state. One problem may be caused by several reasons, and each reason may also be in a series of transitional states. For example, a particular quality problem may be caused by personnel operation or aging equipment; a fault types may be confirmed as a light minor problem, but some people may think that it is a serious medium failure. Thus, the impact of reasons causing quality problem on quality is fuzzy, so it is very necessary to use the cumulative analysis of fuzzy Pareto chart to determine the main cause of nonconformity.

IMPROVED PARETO CHART BASED ON WEIGHTED DYNAMIC ANALYSIS METHOD

Fuzzy quality attribute

Traditional quality management is based on the two-valued logic concept of quality. However, the acknowledgement on the ambiguity of quality, either in theory or in practice is very necessary. The international quality management authority Dr. Juran indicates that quality is the applicability. ISO9000: 2000 standard also specifies that Quality is a degree of inherent characteristics meet the requirements, and this "requirements" is multifaceted. Kano model also pointed out the non-equilibrium relationship between the quality characteristics and customer satisfaction. All of this illustrates the effect of fuzzy quality attribute on the metrics and research for quality characteristics. Fuzzy quality is just to study the applicability change caused by the differences of the quality characteristics according to the applicability quality standards[9,10].

According to the definition of fuzzy sets, fuzzy set $\underset{\sim}{A}$ in the domain $U=\{u\}$ is characterized by the membership function $\mu_{\underset{\sim}{A}}(u)$. The value of $\mu_{\underset{\sim}{A}}(u)$ is between [0,1], and its size is a reflection of the degree of membership.

(1) For the discrete quality characteristics, according to the fuzzy quality standards, its fuzzy membership grade can be obtained by grade evaluation

Set $\underset{\sim}{A}$ as a fuzzy subset corresponding to a fuzzy quality concept on the field U. $u_k \in U$, ($k=1,2,\cdots,K$) and is evaluated by K experimenters.

Set one common set A^* as the approximate representation of $\underset{\sim}{A}$, then the affiliation of u_k to A^* can clearly be distinguished. Then

$$\text{membership frequency of } u_k \text{ to } \underset{\sim}{A} = \frac{\text{number of } "u_k \in A^*"}{K}.$$

With the increase of K, the membership frequency of u_k to $\underset{\sim}{A}$ tends to stabilizing state. The stabile number of the frequency may be referred to the degree of membership of u_k to A^*. Then

$$\begin{aligned} &\text{membership frequency of } u_k \text{ to } \underset{\sim}{A} = \mu_{\underset{\sim}{A}}(u_k) \\ &= \frac{\text{number of } "u_k \in A^*"}{K}, \ (K \text{ is big enough}) \end{aligned} \tag{3}$$

(2) For the continuous quality characteristics, fuzzy membership grade can be transferred after assessment based on clarity standard.

Generally, there is a fuzzy subset $\underset{\sim}{A}$ corresponding with a fuzzy concept in the domain $U = R$. For a one-way closed quality range, if there is a quality grade interval $[a, +\infty)$ (the interval $(-\infty, a]$ or $[a_1, a_2]$ take the similar analysis process) according to the clear quality standards, the fuzzy boundary a_- and a_+ ($a_- < a < a_+$) can be set with the center of border point a, and then the fuzzy membership grade can be obtained by fuzzy treatment on the boundary with the sine function. Then

$$\mu_{\underset{\sim}{A}}(u) = \begin{cases} 1, & (u \geq a_+) \\ \frac{1}{2}[\sin \frac{\pi}{a_+ - a_-}(u - \frac{a_+ + a_-}{2}) + 1], & (a_- < u < a_+) \\ 0, & (u \leq a_-) \end{cases}. \tag{4}$$

Thus, on the basis of fuzzy quality attributes, hierarchical classification analysis of the quality data can be conduct to make the complex data and factors systematically and consecutively, in order to accurately find the main reason affecting the quality.

Weight determining method for POV based on entropy theory

For the question of importance analysis of the POVs, entropy theory combined with AHP can be used to improve the accuracy of its weight analysis.

Evaluation indexes

The application of Pareto chart is very extensive in Lean Six Sigma quality improvement, especially in the quality improvement project selection of Lean Six Sigma, so the evaluation indexes system must be concise and full representation. Learning from the BSC thinking, the evaluation indexes can be divided into the degree of customer attention, the degree of leadership support, the degree of time to ensure, the degree of economic tolerance, the degree of technical risk and the degree of sectoral coordination, as shown in Figure 1.

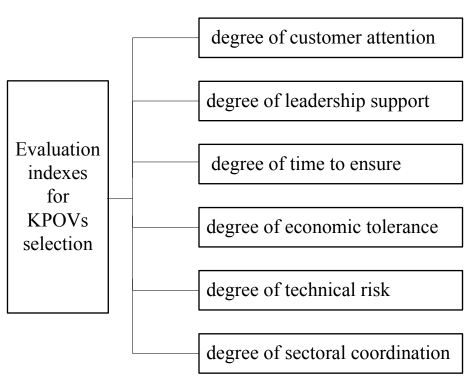

Figure 1 : Evaluation indexes for KPOVs selection

Indexes calculation

First, set judgment matrix ($U_{ab})_{n\times n}$ ($a,b=1,2,\cdots,n$) of index category $Y=\{y_1,y_2,L\ y_i,L\ ,y_n\}$ based on expert decision assignment.

Based on consistency check, work out maximum characteristic root λ_{max} and corresponding eigenvector η of the judgment matrix ($U_{ab})_{n\times n}$, and make eigenvector components the weight $\eta=(\eta_1,\eta_2,\cdots\eta_n)^T$ of each corresponding index category.

Then use entropy technology[11,12] to correct weights as follows.

Step 1: Normalize all column vectors in view of the established ($U_{ab})_{n\times n}$ to get standard matrix $V=\{v_{ab}\}_{n\times n}$ and work out the output entropy value of index y_b.

$$E_b=-K\sum_{b=1}^{n}v_{ab}\ln v_{ab} \tag{5}$$

Wherein constant $K=(\ln n)^{-1}$ and it can be verified that $0\le E_b\le 1$.

Step 2: Work out the degree of deviation D_b of index y_b.

$$D_b=1-E_b \tag{6}$$

Step 3: Work out the information weight ξ_b of index y_b.

$$\xi_b=\frac{D_b}{\sum_{b=1}^{n}D_b} \tag{7}$$

Step 4: Use information weight ξ_b to correct weight vector η obtained through expert decision making.

$$\omega_b=\frac{\xi_b\eta_b}{\sum_{b=1}^{n}\xi_b\eta_b} \tag{8}$$

Finally: Then the index weight vector is:

$$\omega=(\omega_1,\omega_2,\cdots,\omega_b,\cdots\omega_n)^T \tag{9}$$

Frequence determining method based on fuzzy membership

Here, for the classification of each data item $Y=\{y_1,y_2,L\ y_i,L\ ,y_n\}$, the fuzzy membership grade instead of the direct total frequence is introduced to represent its occupancy. So the influence degree on the issue can be assessed based on a certain standard is in the analysis of the data record and then transformed to the corresponding fuzzy membership grade.

Specific ideas are as follows:

(1) Analysis the nonconformity situation of each product, and collect nonconforming degree (quality nonconforming membership) ρ ($0\le\rho\le 1$) on each factor of products.

(2) Determine the threshold λ ($0<\lambda<1$). Where ρ is greater than or equal to λ, the product will be determined as "nonconformity" and the nonconforming membership is 1, and if ρ is less than λ, it will be identified as "conformity" and the nonconforming membership is 0.

(3) Calculate the number of the initial frequence. Accumulation "nonconformity" number of each element, then calculate the corresponding "frequence" e_i to get the vector $e = (e_1, e_2, \cdots, e_n)$.

(4) Calculate the weighted frequency:

$$e' = (e'_1, e'_2, \cdots, e'_n) = \omega .* e = (\omega_1 e_1, \omega_2 e_2, \cdots, \omega_n e_n) \tag{10}$$

(5) Calculate the occupancy f_i and cumulative occupancy F_i of all data items based on the weighted frequence.

(6) Draw the curve of cumulative occupancy, and determine the key defects according to the curve corresponding the threshold λ.

Obviously, different thresholds make different frequence series. Consequently, different Pareto chart will be shown, and the primary and secondary priority of the causes of nonconforming product will change. Of course, the threshold may not be set and the cumulative analysis can be taken directly. This method of different threshold is very effective when customer requirements for maintenance service quality are not the same level.

DETERMINE KPOV BY IMPROVED WEIGHTED DYNAMIC PARETO CHART

A certain type of artillery is a new type of army equipment, which consists of fire systems, fire control systems, photovoltaic systems, chassis and protective systems, communications equipment and accessories and other components. Because of the complex structure, high technical difficulty, the maintenance cycle of photovoltaic systems is particularly long, which affects the timely completion of the artillery overall maintenance tasks. Through further analysis, a Lean Six Sigma team found that monomer repair process takes a very long time in the maintenance sequences, which is the bottleneck that severely restricted the followed links. Thus, the Lean Six Sigma team decided to choose the monomer repair cycle as the CTQ. By determining the KPOV that impact the monomer repair cycle of photovoltaic system, analyzing the causes and proposing the improvement measures, the repair work of monomer can be completed efficiently and the overall quality of maintenance of photovoltaic system can be improved significantly.

The repair flow of monomer of photovoltaic system can be described detailed as shown in Figure 2.

Further, taking the monomer disassemble, decomposition and inspection, troubleshooting, composition and check, dry and modification, and monomer assemble as labels which can be regarded as POVs , we can make cause-and-effect diagram analysis on monomer repair of photovoltaic system, which is shown in Figure 3.

From the cause-and-effect diagram (fishbone diagram) we can found, corresponding reasons (Xs) of each POV is different, and the improvement implements for the specific reason maybe encounter different difficult, so it is necessary to assign different weights to each POV when determine the KPOV of monomer repair of photovoltaic system.

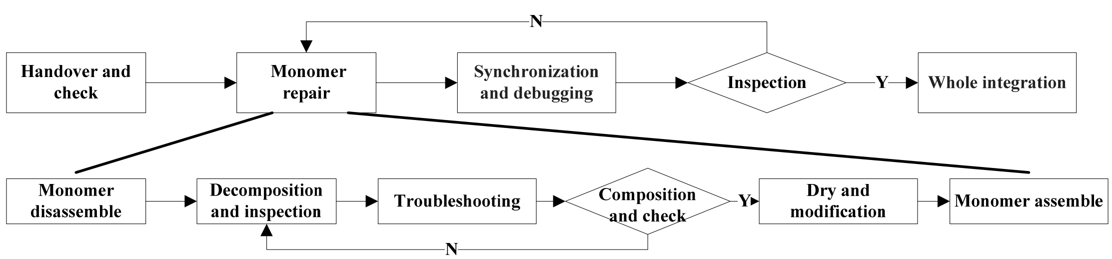

Figure 2 : Detailed maintenance flow for single part of photovoltaic system

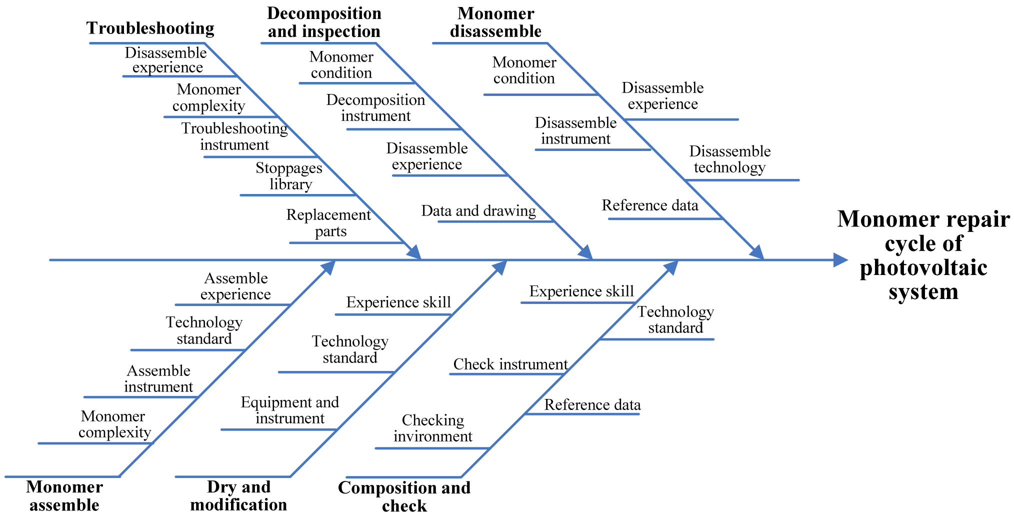

Figure 3 : The cause-and-effect diagram on monomer repair of photovoltaic system

By considering the complexity of the causes of various defects and the difficulty of improvement measures, the customer attention, leadership support, time to ensure, economic tolerance, technical risk and sectoral coordination can be analyzed for each POV. Then the combination weight can be calculated by judgment matrix operation and by the Eq. (5) -- Eq. (10) the weight vector of POVs can be calculated as $\omega = (0.10, 0.13, 0.28, 0.24, 0.11, 0.14)^T$ (the specific process is omitted).

Now fuzzy membership of each POV should be determined. Because each POV with time as its unit of measurement is continuous variable, the nonconforming membership can be converted after assessment based on clear criteria by the Eq. (4). Thus, 50 groups of maintenance data of photovoltaic systems can be rigorous measured and the membership on the defective items of each sample can be calculated (raw data omitted). Consequently, the cumulative sum and weighted cumulative sum can be calculated on the basis of getting the nonconforming membership of POVs. Of course, the cumulative sum and weighted cumulative sum on the basis of thresholds can be also calculated by set different thresholds. The calculation process is as shown in TABLE 1.

On the basis of TABLE 1, Pareto chart of different thresholds can be obtained by MINITAB software as input the corresponding data and chooses *Quality Tools* $\rightarrow$ *Pareto Chart* to make analysis, as is shown in Figure 4.

As is shown in Figure 4, in part A, the nonconforming membership of each POV item is accumulated directly, and Pareto effect basically does not exist because there is little proportion difference between the prior items. In part B, after making Pareto analysis on the basis of determining the weights for defective items, the main KPOVs relevant to the monomer repair of photovoltaic system can be confirmed as troubleshooting (y_3), composition and check (y_4), and monomer assemble (y_6). On the other hand, part C and part D shows the Pareto analysis of weighted cumulative sum on the basis of threshold $\lambda = 0.8$ and $\lambda = 0.5$.

TABLE 1 : The calculation of cumulative sum and weighted cumulative sum

POVs	Weights	Cumulative sum	Weighted cumulative sum	λ =0.8		λ =0.5	
				Cumulative Sum	Weighted cumulative sum	Cumulative sum	Weighted cumulative sum
y_1	0.10	8.8	0.88	2	0.2	4	0.4
y_2	0.13	12.8	1.664	4	0.52	18	2.34
y_3	0.28	18	5.04	2	0.56	4	1.12
y_4	0.24	18.8	4.512	8	1.92	20	4.8
y_5	0.11	8.2	0.902	2	0.22	4	0.44
y_6	0.14	21	2.94	18	2.52	22	3.08

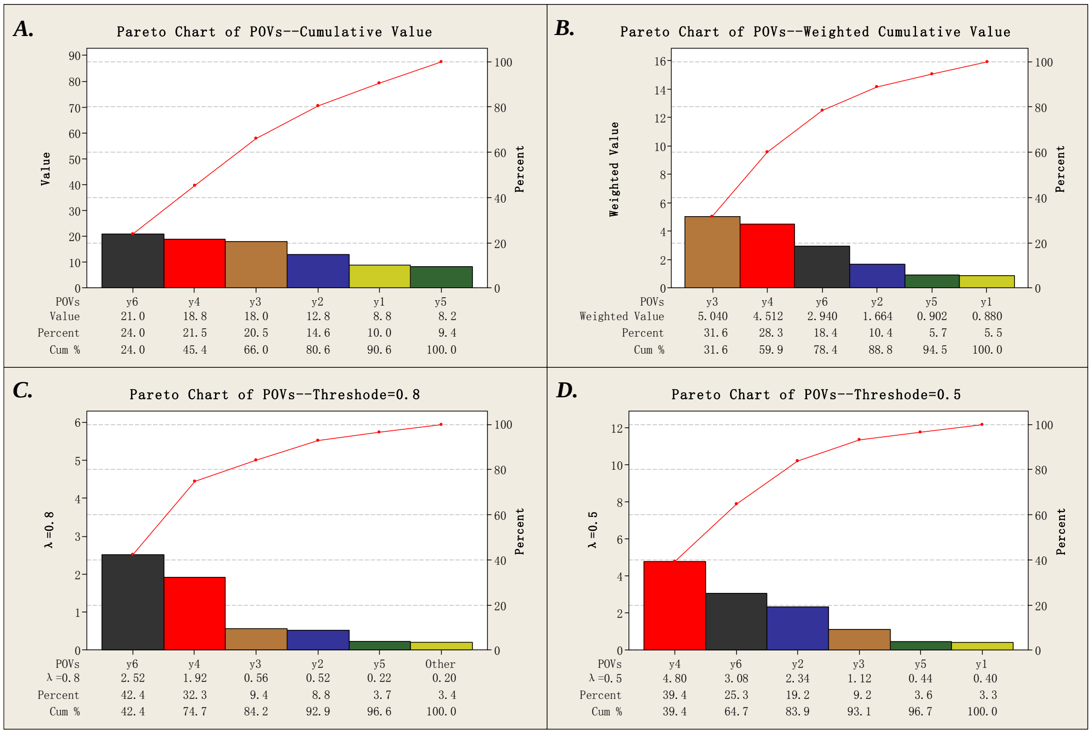

Figure 4 : The Pareto chart of POVs

Through the comparative analysis, we can find out that the weights reflect the degree of improvements implement difficulty of the POVs, and reasonable weight setting can reduce the risk of mistake in improvement choice selection. The threshold λ stands for the extent of quality requirements, the smaller the value, the greater the probability of POV to be unqualified, and the more the number of unqualified samples.The influence of different weights of POV and different threshold of fuzzy quality membership to the analysis results on the Pareto Chart is very large. In the four groups of Pareto Chart analysis, as a result of different weights and thresholds, not only the graphics of Pareto Chart and the proportions of POVs are not the same, but also the sort of POV fluctuates significantly, which had a very large impact in KPOVs selection. Therefore, in different application environment, attention should be paid to setting rational weights and scientific thresholds, so as to accurately select key KPOVs and improve quality in the most favorable means.

CONCLUSIONS

This article introduces the weighting ideas based on entropy theory into KPOV analysis of Lean Six Sigma quality improvement, and use the fuzzy attribute to classify the quality data hierarchically; then construct the improved weighted dynamic Pareto chart on the basis of both. After making Pareto analysis by MINITAB software, the KPOV of Lean Six Sigma improvement project can be well determined. The results show the important role of weights and thresholds in the quality data analysis. The use of a weighted decision can reduce the risk in the process of defects improvement, and the use of dynamic threshold analysis can determine the improvement priority of defect items according to the different levels of quality requirement, so more flexible decision can be made for quality improvement of organization. This method improves the usability of Pareto chart application, make the analysis process of quality data more targeted, and provide a new and effective way for the organization to determine the KPOV of improvement process and seek quality improvement direction. With the deepening of the specific application problem, the scientific method of determining the dynamic threshold and setting the fuzzy membership would be content for further research.

REFERENCES

[1] X.F.Tang; Six Sigma Core Tutorial. Beijing: Standard Press of China, **(2006)**.

[2] Wang Yue, Liu Jie, Guo Peng; The application of traditional quality instruments in the basic Aviation Maintenance Facilities [J]. Plant Maintenance Engineering, **11**, 14-16 **(2010)**.

[3] He Shaohong; Research of Pareto Chart applied in quality management of Aviation ammunition [J]. Jiangsu Aviation, **2**, 31-32 **(2006)**.

[4] Sanjay Srikantaiah; A Model of Lean--Sigma to Enhance a Manufacturing System through Integrating Lean Manufacturing and Six Sigma Approaches [D]. The University of Texas at El Paso, August, **(2008)**.

[5] Jerry D.Kahn; The application of 6σ in improvement projects of equipment maintenance[C] International Marketing Congzess, **(2006)**.

[6] Liu Hui, Zhou Yunzhu; A method for boiler accidents analysis based on Pareto chart [J]. Journal of China University of Metrology, **22(3)**, 285-287 **(2011)**.

[7] Wang Yajun, Wang Keqin; The application of SPC in quality control of knowledge making [J]. Productivity Research, **6**, 105-107 **(2012)**.

[8] Li Shan; The Applications of Pareto Diagram and Cause-Effect Diagram in Quality Improvement in Testing Organizations [J]. Enterprise Science And Technology & Development, **18**, 50-53 **(2010)**.

[9] Cen Yongting; Fuzzy quality management [M].Guizhou Science & Technology Publishing House, **(1995)**.

[10] C.Anghel; Statistical process control methods from the viewpoint of industrial application [J]. Economic Quality Control, **16(1)**, 49-63 **(2010)**.

[11] R.L.You, G.L.Yang; Evaluation of Ecotourism and the Sustainable Development Countermeasures Based on Entropy Technology and AHP--a Case of Jiaozuo City, Journal of Huazhong Normal University (Natural Sciences), **46(3)**, 379-384 **(2012)**.

[12] D.Wang; Evaluation Model Based on Information Entropy and DEA for Technological Innovation Capability of Enterprises, Journal of Northeastern University, **31(5)**, 742-745 **(2010)**.