Research on the Value Achievement Model of the Chinese Aerospace Enterprise Capability

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Abstract: Based on the analysis of value achievement of the Chinese aerospace enterprise, this paper expatiates the connotation and characteristics of facing the value achievement of the Chinese aerospace enterprise capability, and establishes the value target function of Chinese aerospace enterprise, and constructs ability system of Chinese aerospace enterprise, and constitutes the fuzzy evaluation model, and estimates the ability, and establishes　"ability achievement value" as the mathematics function model of Chinese aerospace enterprise, and then designs a comparing method between the "ability achievement value" and the value target of an aerospace enterprise.

Keywords: aerospace enterprise, capability of enterprise, value achievement, value target

1 Introduction

Aerospace engineering is a kind of activity of human to explore, realize and exploder universe, and then benefit for human [1]. After fifty years development, Chinese aerospace industry has acquired the illustrious accomplishments, and many important techniques in the domain of launcher, missile, satellite, spacecraft have been the part of advanced range in the world[2]; and has established a full set of research, design, manufacture and testing system; the aerospace application system has been elementary formed, and the application benefit has been evidently improved[2]; and formed the basic and integrated ability with the specialty, establishment, and co-operation relationship[3]; and developed international bilateral cooperation, area cooperation, multilateral cooperation and business launch service etc. Multi-form international aerospace cooperation, and Chinese aerospace industry has been an important part of "world-class aerospace club" [4,5,6,7].

From initial stages of development to nowadays, Chinese aerospace industry came through a developing course: In first stage, Chinese aerospace has resolved aerospace technology breakthrough issue; the second stage, realized the span of Chinese aerospace technology from test to application[8]; the third stage, for aerospace technology all-sided application and industrialization development. At present, we are in the third stage, the mission is aerospace field technical study, engineering development, and the aerospace industrialization collateral development. Under the acutely change of aerospace industry market condition, and under the request of aerospace enterprise value target multi-aspects, and under the background condition of Chinese aerospace industry and products have entered into international aerospace industry chain step by step, to study the capability issue of Chinese aerospace enterprise, and then cultivate the Chinese aerospace enterprise capability system which could adapt new environment change, and obtain the ability of continuance development, and become a more and more pressing academic and realistic issue.

2 Summarize of the value achievement model of the Chinese aerospace enterprise capability

2.1 The value target of the Chinese aerospace enterprise

The mission of NASA is to explore outer aerospace, science discovery, and research aerospace technology[9]. <China's Space Activities in 2006> which issued in 2006 clarified the tenet of aerospace career developed by China: to explore outer space, and enhance understanding of the Earth and the cosmos; to utilize outer space for peaceful purposes, promote human civilization and social progress, and benefit the whole of mankind; to meet the demands of economic construction, scientific and technological development, national security and social progress; and to raise the scientific quality of the Chinese people, protect China's national interests and rights, and build up the comprehensive national strength[2]. There are some requests of advance the change of aerospace industry from testing model to operation service model, and develop communications, navigation, remote sensing etc. Satellite and other application, and then form an industry chain of aerospace, ground and terminal products manufacture, operating service [10]. In the <Medium and long-term plan of national science and technology development (2006~2020)> and <the 11th five-plan of Chinese space development>, raised the future development of Chinese aerospace would be directed by science development viewpoint, and would carry out the science and

technology guideline of "independent innovation, keystone span, support to development, lead to future", and would service for national economy construction, national safety and society development, and then bring along the national science and technology development, and support national bigness policy and the establishment and implement of strategic[11,12].

Comparing with the initial stage of Chinese aerospace development, the present mission of the Chinese aerospace enterprise has expanded. As the essential body of the aerospace technology development, the aerospace industry development, the Chinese aerospace enterprise undertakes historic obligations of developing Chinese aerospace, safeguarding the security of our motherland, advancing Chinese economy society development, promoting science and technology advancement, and improving national strength [13,14]. Due to the expanding of the undertaking burden, the value achievement of Chinese aerospace enterprise will be diversification, and will be from single national defense construction to national defense construction, aerospace science development, national economy construction and the self-value achievement of aerospace enterprise.

The value of enterprise is a correlative advantage complex system[15], and it emphasizes on different value achievement to different enterprises. The value campaign of the Chinese aerospace enterprise not only deploy on inter value chain of an enterprise itself, but deploy on Chinese aerospace industry value chain, and it will be changed with the development of Chinese aerospace industry and his mission [16,17]. The value achievement of the Chinese aerospace enterprise needs to satisfy the developing request of Chinese aerospace industry through the value of an enterprise itself, and at the same time, it should assure to establish the competitive advantage inside the Chinese aerospace industry chain[18]. At present, under the policy background of Chinese national defense science and technology industry, Chinese aerospace enterprises are facing the competition in the same industry, on the one side, for the orientation of Chinese aerospace enterprise itself specialty development or the tache of Chinese aerospace industry, the government layout and manage from the national defense industry system, and on the other side, in the Chinese aerospace industry chain, "hold the high quality and eliminate the inferior, dynamic management" is the one of dominant idea of Chinese national defense science and technology industry system management[19]. Therefore, despite this kind of competition relatives to other industries is ongoing under the layout and control by the government, but the competition is also the key factor of the Chinese aerospace enterprise whether continuance develop or not. During the course of this value achievement, Chinese aerospace enterprise has to strengthen the exploitation of core technique, and improve itself capability, and acquire the develop strategy of global competitive advantage, and then realize the development.

2.2 The connotation of the Chinese aerospace enterprise capability

The Chinese aerospace enterprise meets the needs of Chinese aerospace industrial development by a series of value achieving process, meanwhile, the capability system for achieving self-benefits is a combination of various of activities, such as design, manufacture, sales, delivery, etc. All these activities can be figured by value chain. On the basis of BOTER value chain model, two part can be regarded as the consist of Chinese aerospace enterprise on valuable activity: Basic and assistant activity, which structure the Chinese aerospace enterprise inner value chain[16]. Both basic and assistant activities are all necessary process in achieving the value target for Chinese aerospace enterprise. To carry thought these activities, correspondent qualification and ability must be provided with[20].

In regard to value target, the ability of Chinese aerospace enterprise is to adapt to the developing demands of Chinese aerospace industry. Through conformation inner and outer resources from enterprises in effective way to support enterprises gain persistent competitive advantages in one or more aspects of the aerospace industrial value chain; constantly providing the technologies, products and services, which satisfy the developing needs of Chinese aerospace industry. This is the definition for capability of Chinese aerospace enterprise facing value achievement.

2.3 Characters of the Chinese aerospace enterprise capability

Characters of Chinese aerospace enterprise facing value target are followed:

(1) Value Achievement. The final target of all activities is to realize the mission and task of Chinese aerospace industry. Endlessly exploiting specialties, developing technologies, supply qualified products and services, fulfilling enterprise tasks in Chinese aerospace industrial value chain, that lead Chinese aerospace enterprise develop incessantly.

(2) Innovation. Chinese aerospace industry is one of the typical industries in national scientific and technical innovation. The fast development of Chinese aerospace industry induces that Chinese aerospace enterprise always is in a dynamically changing environment. The developing strategy of the Chinese aerospace enterprise should be dynamically in accordance with changes of outer environment. In order to fit the changes of the inner and outer environment, Chinese aerospace enterprises need constantly to enhance capability by developing endless innovation, including technological innovation, conception innovation, management innovation etc, which guarantee the harmony between enterprise and environment. That is to say, the capability of innovation is the core of whole ability system.

(3) Extending Development. With the evolution and application of specialty and technology development in the Chinese aerospace industry, the developing features that new specialty replacement, new technological

system update, application for new products exist in every specialty, technology system and product process in aerospace industry, that directly results in the changes on aerospace industrial value chain. Under governmental layout and management system, facing nowadays and potential developing trend of aerospace technology and industry, on the one hand, The feature makes Chinese aerospace enterprises to keep alert for the points that if replacement risk exists in aerospace technology and product development, and to retain the leading situation in aerospace industrial value chain; on the other hand, to grasp possibility for enterprise to step into new field of the aerospace industrial value chain.

(4) Integration and Conformity. The capability of Chinese aerospace enterprise is a combination of abilities of scientific research, organization, management, human resource, and basic establishment and so on.

(5) Uniqueness. Concerning the competitors, Chinese aerospace enterprise possesses its uniqueness and especially, which indicates three connotation: one, "having other don't have", saying, the unique competitive ability that rivals don't have, so it hard to be replaced, reproduce, or to be replicated by long time and high price; Two, "more advance than others", namely, transcend, the competitive ability, which more advance than trials, the more outstanding on ability, the more excellent it will be and harder to reproduce, which lead to the more obvious on competitive advantage and more supporting; Three, "others are excellent, I am update", it is to say, Chinese aerospace enterprises must form competitive advantage through constant innovation.

3. The value achievement model of the Chinese aerospace enterprise capability

3.1 Identification of the value target of the Chinese aerospace enterprise

(1)Value target function of the enterprise

The value target of the Chinese aerospace enterprise includes demand of the national defense construction, the aerospace science development, the national economic construction and the self-value achievement of the aerospace enterprise. Therefore, while establishing the value target model, using the aforesaid factors to make the enterprise value as a vector with magnitude and orientation, which could significantly reflect the multidimensional character, and facilitate the enterprise to settle the value achievement direction.

From the national economic construction side, in consideration of the demand between the enterprise and the Chinese aerospace enterprise having kinds of overlapped factors, one is as the investor, and the other is from the enterprise interior. In some way, their target is the similar .In order to simplify of the model, this paper will combine the dimensionality between the national economic construction demand and the enterprise development demand into one, which is named economic development target dimensionality. After such simplification, the paper will establish a

three-dimensional value vector model, constituted by the national defense construction target(x), the aerospace science development target(y), and the economic development target(z), see Fig.1.
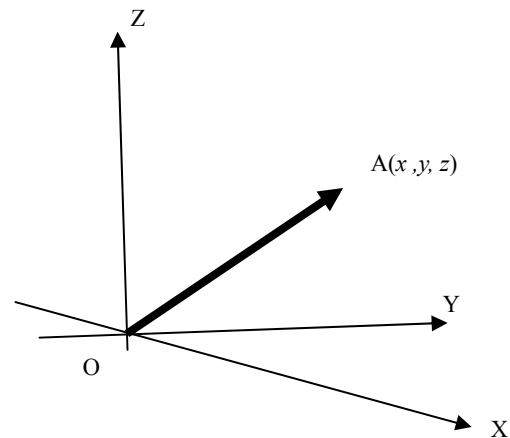

Fig.1 Illustration of the value target vector of the Chinese aerospace enterprise

If in a certain period "t", a Chinese aerospace enterprise situates at the $A(x, y, z)$ point of the value target space, the enterprise value target VP could be expressed as the following:

$$VP = \overrightarrow{OA} = (x(t), y(t), z(t)) \qquad (1)$$

If the target of the national defense construction, the aerospace science development, and the economic development is known, the magnitude and orientation of the enterprise value target could be settled.

The value target vector model of aerospace enterprise established by the aforesaid demand reflects the government's expectation to the development of the aerospace science and technology, the defense equipment demand, and the economic efficiency of the Chinese aerospace enterprise. The height of a certain dimensionality value could not represent the others, every dimensionality have no linearity relations.

(2) Fuzzy evaluation to the value target of a Chinese aerospace enterprise

According to the characteristic of the Chinese aerospace enterprise and the aerospace industry, following the scientific and reasonable principle, the target's detailed description set should include as the following in a certain time "t" period:

① Fulfilling the demand of the national defense construction. In the fields of design, research and manufacture of the Chinese aerospace industry chain, the product (such as system product, key sub-system product, and single machine product) should consider the following factors, The sort demand of the product; The technology demand of the product, and The quantity demand of the product

② Fulfilling the demand of the aerospace science development: The target demand of the relevant specialties development in the domestic and the overseas aerospace scientific areas.

Tab.1 Two class value factors of the Chinese aerospace enterprise

item	Value Target	The first class factor	The second class factor
1	National Defense Construction (X)		
1.1		Product Sort(X_1)	
1.1.1			Product Pedigree (X_{11})
1.1.2			Product Sort(X_{12})
1.2		Product Technology(X_2)	
1.2.1			Advantage of Product (X_{21})
1.2.2			Technological Maturation(X_{22})
1.3		Product Amount(X_3)	
1.3.1			Product Amount(X_{31})
2	Aerospace Science Development(Y)		
2.1		National Leading Advanced Technology (Y_1)	
2.2		International Leading Advanced Technology (Y_2)	
3	Economic Development (Z)		
3.1		Economy Gross(Z_1)	
3.1.1			Total Income(Z_{11})
3.1.2			Profit(Z_{12})
3.1.3			Total Capital(Z_{13})
3.2		Economic Efficiency (Z_2)	
3.2.1			Profit Margin on Capital (Z_{21})
3.2.2			Profit Margin on Cost (Z_{22})
			Productivity(Z_{23})
3.3		Tasks of Scientific Research(Z_3)	
3.3.1			Completing Rate of Scientific and Research Task (Z_{31})
3.3.2			Rate on Quality Accident(Z_{32})

③ Fulfilling the demand of the economic development: The demand of the economic gross; the economic efficiency; and the tasks of Scientific &Research.

According to the aforesaid requirement, to establish the value target index system of the Chinese aerospace enterprise, see Tab.1.

On the basis of index system on value target, using fuzzy mathematics, we can establish the fuzzy evaluation model of *X, Y, Z*.

Take the economic development target (*Z*) as an example, model is built as following:

①Establish evaluation factor set.

$$Z=(Z_1, Z_2, Z_3) \quad (2)$$
$$Z_1=(Z_{11}, Z_{12}, Z_{13}) \quad (3)$$
$$Z_2=(Z_{21}, Z_{22}, Z_{23}) \quad (4)$$
$$Z_3=(Z_{31}, Z_{32}) \quad (5)$$

②Establish the weight set of each factor.

Assuming weights of Z_i to Z are b_1, b_2, b_3, the weight set should be：

$$B=(b_1, b_2, b_3) \quad (6)$$

Thereinto: $b_1+b+b_3=1$

In the same way, we can define weight sets of Z_{ij} to Z_i, as following:

$$W=(W_1, W_2, W_3) \quad (7)$$
$$W_1=(W_{11}, W_{12}, W_{13}) \quad (8)$$
$$W_2=(W_{21}, W_{22}, W_{23}) \quad (9)$$
$$W_3=(W_{31}, W_{32}) \quad (10)$$

The above weights can be evaluated throng Expert Evaluation Method (EEM).

③Establish the comment set of Z_{ij}.

$C=(excellent，preferable，good, generic，bad，worse，worst)=(C_1, C_2, C_3, C_4, C_5, C_6, C_7) \quad (11)$

④Evaluate each single factor in Z set.

Confirm the fuzzy evaluation matrix R of Z.

$$R=(R_1, R_2, R_3) \quad (12)$$

According as the comment set C, Each factor (Z_{ij}) can be figured out by expert research：

$$R_1=\begin{bmatrix} r_{111} & r_{112} & r_{113} & r_{114} & r_{115} & r_{116} & r_{117} \\ r_{121} & r_{122} & r_{123} & r_{124} & r_{125} & r_{126} & r_{127} \\ r_{131} & r_{132} & r_{133} & r_{134} & r_{135} & r_{136} & r_{137} \end{bmatrix} \quad (13)$$

$$R_2=\begin{bmatrix} r_{211} & r_{212} & r_{213} & r_{214} & r_{215} & r_{216} & r_{217} \\ r_{221} & r_{222} & r_{223} & r_{224} & r_{225} & r_{226} & r_{227} \\ r_{231} & r_{232} & r_{233} & r_{234} & r_{235} & r_{236} & r_{237} \end{bmatrix} \quad (14)$$

$$R_3=\begin{bmatrix} r_{311} & r_{312} & r_{313} & r_{314} & r_{315} & r_{316} & r_{317} \\ r_{321} & r_{322} & r_{323} & r_{324} & r_{325} & r_{326} & r_{327} \end{bmatrix} \quad (15)$$

Calculate fuzzy evaluation set A

$$A=(A_1, A_2, A_3)=W\times R \quad (16)$$
$$A_1=W_1\times R_1=(a_{11}, a_{12}, a_{13}, a_{14}, a_{15}, a_{16}, a_{17}) \quad (17)$$
$$A_2=W_2\times R_2=(a_{21}, a_{22}, a_{23}, a_{24}, a_{25}, a_{26}, a_{27}) \quad (18)$$
$$A_3=W_3\times R_3=(a_{31}, a_{32}, a_{33}, a_{34}, a_{35}, a_{36}, a_{37}) \quad (19)$$

Calculate final evaluation set E. The final evaluation set for economic developing target can be concluded by calculating $E=B\times A$

$$E=B\times A^T=\begin{pmatrix}b_1 & b_2 & b_3\end{pmatrix}\begin{pmatrix}a_{11} & a_{12} & a_{13} & a_{14} & a_{15} & a_{16} & a_{17}\\ a_{21} & a_{22} & a_{23} & a_{24} & a_{25} & a_{26} & a_{27}\\ a_{31} & a_{32} & a_{33} & a_{34} & a_{35} & a_{36} & a_{37}\end{pmatrix}$$

$$=(e_1 \quad e_2 \quad e_3 \quad e_4 \quad e_5 \quad e_6 \quad e_7)$$
(20)

Unitary disposal to E,

$$e_i^{'}=e_i/\sum_{j=1}^{7}e_j \tag{21}$$

And get,

$$E^{'}=(e_1^{'},e_2^{'},e_3^{'},e_4^{'},e_5^{'},e_6^{'},e_7^{'}) \tag{22}$$

Calculate evaluation result of value target for Economic Developing target Z(t)

$$z(t)=C\times\left(E^{'}\right)^T/7=\sum_{i=1}^{7}\left(c_i\times e_i^{'}\right)/7 \tag{23}$$

In the way of calculating the Economic Developing target evaluation result $z(t)$, the National Defense Construction target evaluation result $x(t)$ and the Aerospace Science Development target evaluation result $y(t)$ can be gotten.

Finally, get the value target of Chinese aerospace：

$$VP=\overrightarrow{OA}=(x,y,z) \tag{24}$$

Or,

$$VP=\|VP\|(\cos\alpha\cdot i+\cos\beta\cdot j+\cos\gamma\cdot k) \tag{25}$$

Thereinto:

$$\|VP\|=\sqrt{x^2+y^2+z^2} \tag{26}$$

$$\cos\alpha=x/\|VP\| \tag{27}$$

$$\cos\beta=y/\|VP\| \tag{28}$$

$$\cos\gamma=z/\|VP\| \tag{29}$$

The size on X,Y and Z axis are $x/y/z$, which respectively express evaluation result for National Defense Construction target, Aerospace Science Development target and Economic Development target, $\alpha/\beta/\gamma$ are angle between target value and X,Y and Z axis.

Therefore, we can confirm the size and direction of value target of a Chinese aerospace enterprise in a period.

3.2 The evaluation of the Chinese aerospace enterprise capability

(1)The Chinese aerospace enterprise capability system

The Chinese aerospace enterprise capability system is a complicated structured system, comprise of many capabilities, such as strategy, management, technology, organization, resource, culture, etc. According to the connotation and Characters of the Chinese aerospace enterprise capability, on the basis of former study, we establish the Chinese aerospace enterprise capability system, which is comprised of two points: compositive ability and several class ability factors. The compositive

ability is realized by means of integrating ability factors.

(2)Evaluate Chinese aerospace enterprise capability.

On the basis of foresaid capability system, we establish a measurement model of the Chinese aerospace enterprise capability to measure strategic ability(SA), innovative ability(IA), industrialization ability(PA).

Hereinafter, as a example, we give the measurement step and method of the industrialization ability(PA).

①Establish evaluation criterion system

Evaluation criterion is comprised of three class set, the first class set is comprised of R&D ability, manufacture ability, market ability, supply chain management ability, technical support and service ability, human resource management ability, basic management ability, organizing and culture management ability, their weight are A_1-A_{10}.

Here we set R&D ability as a example, design a second class set and a third class set, see Tab.2. The other second and third class set of other first class is not detailed listed here. We invite fifteen experts who should have engaged in Chinese aerospace industry study and management field for many years to mark the weight and number of Tab.2.

②calculation of industrialization ability(PA)

$$PA=\sum_{i=1}^{10}\left[A_i\times\sum_{j=1}^{m}\left[A_{ij}\times\sum_{k=1}^{n}\left[A_{ijk}\times R_{ijk}\right]\right]\right] \tag{31}$$

When calculating (SA) and (IA), the weight of the first class factor set is changing, the second and third class weight keep the same with the (PA), we give the weight of (SA) and (IA) weight set separately as B and C. we can calculate (SA) and (IA).

$$SA=\sum_{i=1}^{10}\left[B_i\times\sum_{j=1}^{m}\left[A_{ij}\times\sum_{k=1}^{n}\left[A_{ijk}\times R_{ijk}\right]\right]\right] \tag{32}$$

$$IA=\sum_{i=1}^{10}\left[C_i\times\sum_{j=1}^{m}\left[A_{ij}\times\sum_{k=1}^{n}\left[A_{ijk}\times R_{ijk}\right]\right]\right] \tag{33}$$

3.3 The value achievement model of the Chinese aerospace enterprise capability

At 3.1 we concluded the value target of Chinese aerospace enterprise(VP), at 3.2 we conclude $(SA),(IA)$and (PA).

On these basis, we define $X'/Y'/Z'$ which respectively represent the actual value of national defense construction, aerospace science development, economic development, which created by the Chinese aerospace enterprise capability.

The factor set list as following.

$$VO=(X',Y',Z') \tag{34}$$
$$X'=A(SA,IA,PA) \tag{35}$$
$$Y'=B(SA,IA,PA) \tag{36}$$
$$Z'=C(SA,IA,PA) \tag{37}$$

Among above, $A(SA,IA,PA)$separately figured the contribution, which the strategic ability, innovative ability, industrialization ability made in the national defense construction aspect; $B(SA,IA,PA)$separately figured the contribution, which the strategic ability, innovative development ability, industrialization ability made in the aerospace science development;

Tab.2 R&D capability set of the Chinese aerospace enterprise

Second class set		Third class set		
Name	Weight	Name	weight	number
Equipment pre-research capability	A_{11}			
		Field	A_{111}	R_{111}
		Technology level	A_{112}	R_{112}
Advantage specialty	A_{12}			
		Specialty field	A_{121}	R_{121}
		Advantage specialty capability level	A_{122}	R_{122}
Production status	A_{13}			
		Technology storage status	A_{131}	R_{131}
		Innovation quantity and quality	A_{132}	R_{132}
		Technology import and absorbency	A_{133}	R_{133}
		The capability of Technology transfer,cooperation,and trade	A_{134}	R_{134}
Production transform status	A_{14}			
		Production transform ratio	A_{141}	R_{141}
		New production status	A_{142}	R_{142}
		Integration of Production,study and r research	A_{143}	R_{143}
Organizeing capability and condition	A_{15}			
		Innovative structure	A_{151}	R_{151}

Tab.3 Marking table of experts

Value target sort		Strategic ability=SA		Innovative ability=IA		Industrialization ability=PA	
First class set	Second class set	weight	Contribution	Weight	Contribution	weight	Contribution
Gross economy Z_1							
	gross income Z_{11}	W_{111}	V_{111}	W_{112}	V_{112}	W_{113}	V_{113}
	Profit Z_{12}	W_{121}	V_{121}	W_{122}	V_{122}	W_{123}	V_{123}
	Gross assets Z_{13}	W_{131}	V_{131}	W_{132}	V_{132}	W_{133}	V_{133}
Economy efficiency Z_2							
	Capital profit margin Z_{21}	W_{211}	V_{211}	W_{212}	V_{212}	W_{213}	V_{213}
	Cost profit margin Z_{22}	W_{221}	V_{221}	W_{222}	V_{222}	W_{223}	V_{223}
	Overall productivity Z_{23}	W_{231}	V_{231}	W_{232}	V_{232}	W_{233}	V_{233}
scientific research production Z_3							
	scientific research assignment point accomplish ratio Z_{31}	W_{311}	V_{311}	W_{312}	V_{312}	W_{313}	V_{313}
	Quality accident ratio Z_{32}	W_{321}	V_{321}	W_{322}	V_{322}	W_{323}	V_{323}

$C(SA,IA,PA)$ separately figured the contribution, which the strategic ability, innovative ability, industrialization ability made in economic development aspect.

(1)Marking of experts, referenced target is enterprise economic development value target, see Tab.3.

In Tab.3, W_{ijk} is weight, $W_{ij1}/W_{ij2}/W_{ij3}$ are separately figured the second factor Z_{ij} effected degree by the strategic ability, innovative ability, industrialization ability.

$$W_{ij1}+ W_{ij2}+ W_{ij3}=1 \tag{38}$$

Thereinto: $i=1,2,3$ $j=1,2,3$

V_{ijk} is contribution value. In second index Z_{ij}, It figures that, when strategic ability=SA, to concludes contribution value of gross income Z_{11}, by Experts Evaluation Method(EEM).

The marking definition is when strategic ability=SA, which can bring or achieve the degree of gross income value target, the marking criterion is 0~10 points, fully

achieved ones are 10 points. Other V_{ijk} is similar.

(2)calculate the value target achievement figure σ_{ij}.

$$\sigma_{ij}=(W_{ij1}'\times V_{ij1}'+ W_{ij2}'\times V_{ij2}'+ W_{ij3}'\times V_{ij3}')/10 \tag{39}$$

Thereinto: $i=1,2,3$ $j=1,2,3$

(3)calculate alteration matrix R_1',R_2',R_3'

Use value target to realize figure σ_{ij}. Alteration experts marking R_1,R_2,R_3, hereinafter we can conclude:

$$R_1'=\begin{bmatrix} \sigma_{11}\times r_{111} & \sigma_{11}\times r_{112} & \sigma_{11}\times r_{113} & \sigma_{11}\times r_{114} & \sigma_{11}\times r_{115} & \sigma_{11}\times r_{116} & \sigma_{11}\times r_{117} \\ \sigma_{12}\times r_{121} & \sigma_{12}\times r_{122} & \sigma_{12}\times r_{123} & \sigma_{12}\times r_{124} & \sigma_{12}\times r_{125} & \sigma_{12}\times r_{126} & \sigma_{12}\times r_{127} \\ \sigma_{13}\times r_{131} & \sigma_{13}\times r_{132} & \sigma_{13}\times r_{133} & \sigma_{13}\times r_{134} & \sigma_{13}\times r_{135} & \sigma_{13}\times r_{136} & \sigma_{13}\times r_{137} \end{bmatrix} \tag{40}$$

$$R_2'=\begin{bmatrix} \sigma_{21}\times r_{211} & \sigma_{21}\times r_{212} & \sigma_{21}\times r_{213} & \sigma_{21}\times r_{214} & \sigma_{21}\times r_{215} & \sigma_{21}\times r_{216} & \sigma_{21}\times r_{217} \\ \sigma_{22}\times r_{221} & \sigma_{22}\times r_{222} & \sigma_{22}\times r_{223} & \sigma_{22}\times r_{224} & \sigma_{22}\times r_{225} & \sigma_{22}\times r_{226} & \sigma_{22}\times r_{227} \\ \sigma_{23}\times r_{231} & \sigma_{23}\times r_{232} & \sigma_{23}\times r_{233} & \sigma_{23}\times r_{234} & \sigma_{23}\times r_{235} & \sigma_{23}\times r_{236} & \sigma_{23}\times r_{237} \end{bmatrix} \tag{41}$$

$$R_G'=\begin{bmatrix} \sigma_{31}\times r_{311} & \sigma_{31}\times r_{312} & \sigma_{31}\times r_{313} & \sigma_{31}\times r_{314} & \sigma_{31}\times r_{315} & \sigma_{31}\times r_{316} & \sigma_{31}\times r_{317} \\ \sigma_{32}\times r_{321} & \sigma_{32}\times r_{322} & \sigma_{32}\times r_{323} & \sigma_{32}\times r_{324} & \sigma_{32}\times r_{325} & \sigma_{32}\times r_{326} & \sigma_{32}\times r_{327} \end{bmatrix} \tag{42}$$

(4) calculate Z'

Using Fuzzy Evaluation Model to get Z'.

According to this ,we can calculate the value X' and Y'.

Consequently we get the vector of The Chinese aerospace enterprise capability creates value:

$$VO=(X',Y',Z') \tag{43}$$

3.4 The comparing of Chinese aerospace enterprise capability value achievement and value target.

In the 3.1 and 3.3 of this paper, we have get the mathematical function mode of (VP) and (VO). The different between the two may be large or small. We use a mathematical model to express the gap, see Fig.2.

$$\Delta V(t)=VP-VO=(X-X',Y-Y',Z-Z') \tag{44}$$

From the management science eye, this $\Delta V(t)$ should as soon as possibly be narrowed through ability system being built by the Chinese aerospace enterprise. This is the state's requirement on the Chinese aerospace enterprise doing the capability system building in a certain period. It also is the inevitable choice to maintain a certain competitive position in aerospace industry chain, and to keep the sustained development.
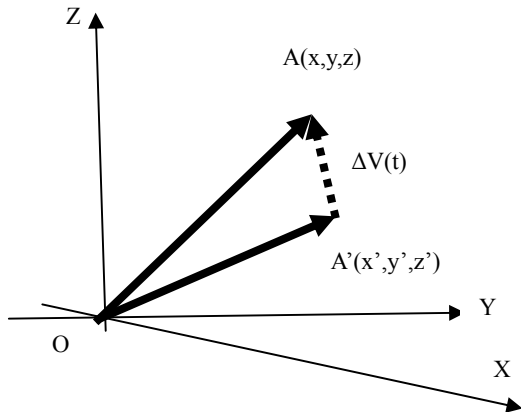

Fig.2 Illustration of the vector disparity between the value target and the actual value-achievement

As the international political, military, economic environment and aerospace technology development needs and other factors are dynamically changing in different time periods, the value target is being dynamically changing. The Chinese aerospace enterprises also aim at the value targets, to strengthen their own ability system, to minimize $\Delta V(t)$. In this sense, with the dynamically changing of the value target, the Chinese aerospace enterprise must aim the value target, and constantly enhance self-capability.

If the value target has changed from point A to point B, the change can be expressed as:

$$\Delta VP=\overrightarrow{AB}=(x_b-x_a, y_b-y_a, z_b-z_a) \tag{45}$$

The change of actual value achievement can be expressed as:

$$\Delta VO=\overrightarrow{A'B'}=(x_b'-x_a', y_b'-y_a', z_b'-z_a') \tag{46}$$

While the points are linked with a smooth curve, it can get a dynamic actual value achievement curve. In general, this curve is basically following the dynamic curve of the value target, see Fig.3.
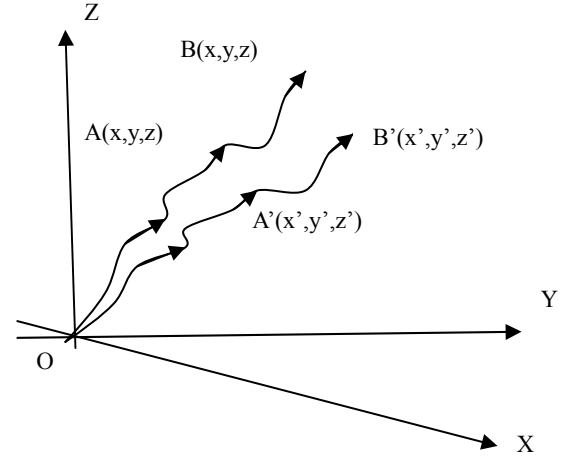

Fig.3 Illustration of the vector curve of the value target and the actual value-achievement of the Chinese aerospace enterprise

4 Conclusion

Through above evaluation and study, it can be drawn the following conclusions.

(1)The capability of the Chinese aerospace enterprise is the foundation to achieve its value target. Setting the value target, we can have a more accurate assessment with the actual capability.

(2)As the essential body of the aerospace technology development, the aerospace industry development, the Chinese aerospace enterprise undertakes historic obligations of developing Chinese aerospace, safeguarding the security of our motherland, advancing Chinese economy society development, promoting science and technology advancement, and improving national strength. Due to the expanding of the undertaking burden, the value achievement of Chinese aerospace enterprise will be diversification, and will be from single national defense construction to national defense construction, aerospace science development, national economy construction and the self-value achievement of aerospace enterprise.

(3)The Chinese aerospace enterprise capability system is a complicated structured system, comprise of many abilities, such as strategy, management, technology, organization, resource, culture, etc. We can establish the Chinese aerospace enterprise capability system, which is comprised of two points: compositive ability and several class ability factors. The compositive ability is realized by means of integrating ability factors.

(4)The Chinese aerospace enterprise value target can be figured by value target vector function. And it is always being a dynamic change. The actual value

achieved by capability can be calculated and also be figured by value vector function. Comparing of the value target vector and the actual value achievement vector, we can calculate the gap of the value, and to build the capability more to meet the value target.

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