

# Culture Reference Product Design ---Case Study of Hans J.Wegner China Chair Design

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## Abstract

Recent research shows that culture can be referenced as product design inspiration. This culture reference product design method can make cultural inheritance ,at the same time create new modern design value comparing with traditional function improving design method and bionics design approach. So this paper take one case study to explain this culture reference product design value by semantic evaluation in the point of users. The meaning of this research is to prove this design method has positive value judging by users, so in future, this culture reference product design method may be applied in wider range. The case study of this paper is Hans J.Wegner China chair. Author discusses how Hans J.Wegner referenced traditional Chinese chairs into modern chair design, meanwhile find out the value of this reference design method .The method in this paper is mainly on questionnaire investigation、 semantic differential evaluation(SD)、 SPSS statistical analysis. The results of this paper include three parts, one is the high possibility of Hans J.Wegner China chair referenced design method from traditional Chinese round-backed armchair .The second one is Hans J.Wegner China chair and five traditional Chinese chair have discrepancy evaluating factors in SD evaluation system , Hans J.Wegner China chair takes aesthetic factor as the first factor because of organic modernism design approach combing with the aesthetical essence of round-backed armchair, while the five traditional Chinese chairs' first evaluating factor is emotion owing to the ancient Chinese feudal social hierarchy influence of chair symbol for ruling power. The final result is that Hans J.Wegner China chair has positive value in modern design evaluation criteria . With the study of Hans J.Wegner China chair's culture referenced design ,we can summary that culture reference design is one progressive and valuable modern design method .

**Keywords:** culture reference ,product design , China chair, semantic differential evaluation, positive value

## 1. Introduction

A growing number of studies suggest that designer refers to culture to do modern design is one method of product design. In modern product design ,designers hardly ever start from scratch ,but design by modifying existing culture or products (Claudia eckert, 2005)(1). Also nowadays most products are designed by modification from existing designs (Otto and Wood 2001)(2), Eckert et al describe this design method by modifying existing design : Changing existing based to meet individual user need or developing a modular product design range (3). The design of new product based on adaptations from existing products ,or by the combination of existing design elements ,is today becoming a dominating approach to new product development(4,5). Reference design refers to a blueprint of a system that is intended for others to copy. The main purpose of reference design is to support designers in development of next generation products using latest technologies (PC Magazine Encyclopedia. December 2011)(6), but how the past culture are referenced by new product design ,and what the people's attitude about the original culture and referencing modern design we still know little now. So here comes out two purposes of this paper, one is to explore how designer dose design referenced by culture ,the other one is to find out whether this method is valuable or not .This paper takes Hans J.Wegner China chair and five traditional Chinese chairs as case studies to discuss two issues.


The main research method of this paper are questionnaire investigation ,semantic differential evaluation, SPSS statistical analysis. Three phased questionnaire investigation were done .The first questionnaire was about how Hans J.Wegner chose and referenced five traditional Chinese chairs. The second and third questionnaire were about the semantic differential evaluation of people's perceptual judgement between Hans J.Wegner China chair and five traditional Chinese chairs .

## 2. Hans J.Wegner China chair and five typical traditional Chinese chairs

### 2.1 Hans J.Wegner China chair

The China Chair was designed by Danish designer Hans J. Wegner in 1944, which is the most predominant chair in product design history(7) ,Hans J. Wegner referenced Chinese ancient traditional chair as model to this(8) . In this paper ,author analyzes what kind of Chinese chair Hans J. Wegner may reference from by contrasting the similarity with five typical traditional Chinese chairs and the value of this reference design method that Hans J. Wegner applied .






Table 1 Hans J. Wegner China Chair

Name	Country	Time	Designer	Social background	Design Theory	Design superiority
 China chair	Denmark	1944	Hans J. Wegner	Construction period of World War II	Organic modernism Design	Exquisite furniture manufacturing technique

### 2.2 Five typical traditional Chinese chairs

There are five typical traditional chairs in China history ,they are round-backed armchair, mandarin chair, folding chair, rose chair,fauteuil chair. These chairs originate from different times with different background .The table 2 shows the information of each chair.

Table 2 The information of five traditional type of Chinese chair

Type					
Information					
Name	Round-backed armchair	Mandarin chair	Folding chair	Rose Chair	Fauteuil chair
Origin time	618 A.D. Tang dynasty	960 A.D. Song dynasty	202 B.C Han Dynasty	960 A.D. Song dynasty	960 A.D. Song dynasty
Background	Its form of outer circle and inside square show the Chinese philosophy of "heaven is round" and "land is square".	Its morphology is inspired by Chinese ancient officials hat.	For easy to moving ,it firstly for emper hunting ,gradually It was popular among officials,putting in living room.	This chair is manily for female.	It is a symbol of power and status, putting in the Imperial Palace, or the gate of office house.

The reason chooses Hans J.Wegner China chair as case study is because this chair is the symbol of modern organism design,In this chair,designer applied the referencing design method that is representative as the integration of eastern and western cultures.So it is valuable to choose it do this chair culture and design combination research.

## 3. Methodology

### 3.1 The first questionnaire

The first questionnaire is about the similarity comparison of Hans J.Wegner China chair and five typical traditional Chinese chairs by chair backrest,armrest,seat,leg and entire shape these five comparing items. Four levels of score is given from 0 to 3.In order to compare Hans J.Wegner China chair with each traditional Chinese chair concretely, they are divided into 5 groups .A group is China chair and round-backed armchair ,B group is China chair and mandarin chair,C group chair is China chair and folding chair ,D group is China chair and rose chair ,E group is China chair and fauteull chair. 30 participants ranged in age from 21 to 58 years old did this questionnaire. The content of questionnaire shows in tab3

Table 3 The first questionnaire

Comparing Group	Comparing items	(1) Similarity of backrest	(2) Similarity of armrest	(3) Similarity of Seat	(4) Similarity of Leg	(5) Similarity of entire shape
A Group:	And	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _
B Group:	And	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _
C Group:	And	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _
D Group:	And	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _
E Group:	And	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _	3 2 1 0  _ _ _

Remarks : Extremely 3 Partly 2 Slight 1 Not at all 0

Participants gave out their opinion scores in each group comparison . According to the score calculation,we drew out the calculation result of each comparison item ( Figure 2) ,It can clearly see that the A group similarity scores are the highest in all of five comparing items .The second highest similarity in backrest and armrest is the C Group . While the second highest similarity in seat , leg and entire shape is B group. The E group is the lowest points of backrest,armrest,seat ,leg comparison items.

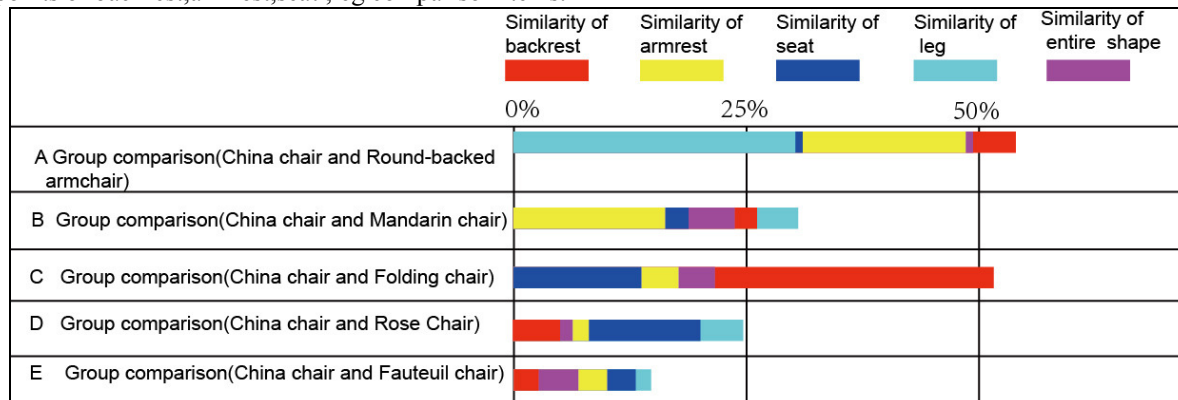


Figure1 Data analysis of first questionnaire

### 3.2 The second questionnaire

The second questionnaire is about how people judges Hans J.Wegner China chair and five typical traditional Chinese chairs by semantic differential evaluation.In semantic differential evaluation system, there are 68 pairs of adjective words ,author should select which adjectives are the proper ones to do the semantic differential evaluation in these six chairs firstly.So this questionnaire is about the participant choice of proper words to describe these six chairs from SD 68 pairs adjectives.24 participants, including 12 foreigner and 12 Chinese did this questionnaire ,aging from 20 years old to 37 years old. All the 68 pairs of SD adjectives showing in questionnaire.Participants need to select 5 positive adjectives and 5 negative adjectives from 68 pair adjectives based on their perceptual evaluation of each six chairs .

According to the participants selection of 68 pairs adjectives,21 pairs of adjectives are high frequency to to be chosen .They are pairs of bright-dark、 soft -hard、 warm-cold、 silent-noise、 cheerful-gloomy、 beautiful-ugly、 heavy-light、 active-inactive、 kind-unkind、 intense-gentle、 stable-unstable、 masculine-feminine 、 dynamics-static、 happy-sad、 deep-superficial、 calm-restless、 rational-emotional、 round-square、 new-old、 rich-poor、 flourishing-lonely .The percentage of each chosen pair adjective is showing in table 2 .In the following research ,we will use these 21 pair adjectives to do SD to judge the value of Hans J.Wegner culture reference design method .

SD Adjective	Percentage	SD Adjective	Percentage	SD Adjective	Percentage
Bright--Dark	20%	Soft --- Hard	50%	Warm--Cold	33%
Silent--Noise	33%	Cheerful--Gloomy	20%	Beautiful--Ugly	33%
Heavy-- light	29%	Active--Inactive	16%	Kind--Unkind	16%
Intense--Gentle	25%	Stable--Unstable	29%	Masculine -Feminine	20%
Dynamic--Static	29%	Happy--Sad	16%	Deep--Superficial	16%
Calm--Restless	45%	Rational--Emotional	20%	Round ---Square	33%
New--Old	66%	Rich--Poor	20%	Flourishing --Lonely	16%

Table 4 The selecting out of 21 adjective pairs

### 3.3 The third questionnaire

The third questionnaire is about people judgement of China chair and five traditional Chinese chairs by SD based on the 21 pair adjectives selected out in the second questionnaire. As the SD evaluation approach, seven level scores are given in each pair. 3 and -3 scores represent extremely agreement, 2 and -2 scores represent quite agreement, 1 and -1 point represent slightly agreement, 0 represents no agreement. Participants need to choose proper scores among these 7 levels in each six chair separately. 10 foreigners and 10 Chinese totally 20 participants did this questionnaire, they were 12 female and 8 male, aging from 20 years old to 65 years old.

	Extremely 3	Quite 2	Slightly 1	Neither 0	Slightly -1	Quite -2	Extremely -3
Bright							Dark
Soft							Hard
Warm							Cold
Silent							Noise
Cheerful							Gloomy
Beautiful							Ugly
Heavy							Light
Active							Inactive
Kind							Unkind
Intense							Gentle
Stable							Unstable
Masculine							Feminine
Dynamic							Static
Happy							Sad
Deep							Superficial
Calm							Restless
Rational							Emotional
Round							Square
New							Old
Rich							Poor
Flourishing							Lonely

Figure 2 The semantic differential evaluation questionnaire

#### (1) Factor data analysis

Collecting the above questionnaire data, the first analysis is about what factors are the most important influencing factors for participants to do the factor perceptual evaluation by SPSS statistical software. In order to get clear comparing results between China chair and five typical traditional Chinese chairs, we made five traditional Chinese chairs data as one data, contrasting with Hans J. Wegner China chair data. According to data input, SPSS gives out four evaluating factors both in Hans J. Wegner China chair and traditional Chinese chair. In China chair, beautiful-ugly, new-old, flourishing-lonely these aesthetic describing adjective appear in factor 1, we summary the first evaluating factor is aesthetic. The second factor is emotion factor, including cheerful-gloomy, happy-sad, calm-restless these emotional describing adjectives. The third factor is strength factor, including masculine-feminine, deep and superficial, the fourth factor is ergonomic factor, including stable-

unstable ,heavy-light .The figure3 describes the detail of these four factors.

	Variable	Factor1	Factor2	Factor3	Factor4
<b>Aesthetic</b>	New-Old	0.818	0.032	-0.115	0.098
	Beautiful-Ugly	0.675	0.254	0.144	-0.004
	Flourishing-Lonely	0.876	0.065	0.028	0.224
	Dynamics-Static	0.746	0.042	0.204	0.178
	Active -Inactive	0.861	-0.168	0.046	0.129
	Rich-Poor	0.731	-0.319	0.206	-0.024
	Intense -Gentle	0.871	0.149	0.203	-0.349
<b>Emotion</b>	Kind-Unkind	0.266	0.868	0.283	0.032
	Cheerful-Gloomy	-0.53	0.588	-0.313	0.447
	Silent-Noise	0.083	-0.648	0.414	0.361
	Calm-Restless	0.155	0.788	0.452	0.114
	Soft -Hard	0.287	-0.829	-0.161	0.243
	Happy-Sad	0.583	0.626	-0.048	0.026
<b>Strength</b>	Deep-Superficial	0.118	0.055	0.825	-0.005
	Round-Square	0.431	-0.12	-0.557	-0.05
	Rational -Emotional	0.415	0.246	0.735	0.005
	Masculine-Feminine	0.496	-0.006	0.691	0.455
<b>Morphology</b>	Bright-Dark	0.062	0.100	0.122	0.724
	Warm -Cold	-0.306	0.109	-0.495	0.540
	Stable -Unstable	-0.168	0.301	-0.083	-0.647
	Heavy -Light	0.150	-0.141	-0.336	0.443

Figure 3 The four influencing evaluationfactors of China Chair

Comparing with the China chair ,the five traditional Chinese chairs evaluating factors are different, the first factor is emotion factor,including happy-sad ,cheerful-gloomy,kind-unkind these emotional describing adjectives .The second factor is dynamic factor,including silent-noise,calm-restless dynamic describing adjectives. The third factor is morphology factor,including soft-hard,bright-dark ,flourishing-lonely morphological describing adjectives. The fourth factor is strength factor, including intense-gentle,deep-superficial,masculine-feminine ( figure 4).

	Variable	Factor1	Factor2	Factor3	Factor4
<b>Emotion</b>	Beautiful-Ugly	0.603	0.452	-0.104	0.374
	Cheerful-Gloomy	0.681	-0.192	0.216	0.082
	Active -Inactive	0.705	-0.208	0.148	-0.001
	Kind-Unkind	0.694	0.210	-0.188	-0.086
	Dynamics-Static	0.729	-0.207	0.083	-0.115
	Happy-Sad	0.675	0.294	0.161	-0.270
<b>Dynamic</b>	Rational -Emotion	-0.300	0.498	0.102	0.431
	Rich-Poor	0.162	0.492	-0.447	0.306
	Stable -Unstable	0.023	0.502	-0.446	0.202
	Calm-Restless	0.052	0.651	-0.014	0.150
	Silent-Noise	-0.166	0.708	-0.004	0.010
<b>Morpholo</b>	Warm -Cold	0.396	-0.034	0.578	0.248
	Bright-Dark	0.144	0.087	0.724	0.005
	Soft -Hard	0.133	-0.211	0.656	-0.175
	New-Old	0.249	0.380	0.466	-0.326
<b>Strength</b>	Flourishing-Lonel	0.343	0.069	-0.575	0.117
	Masculine-Feminir	0.024	0.105	0.123	0.647
	Intense -Gentle	0.346	-0.076	-0.090	0.600
	Heavy -Light	-0.138	0.206	-0.236	0.587
	Deep-Superficial	-0.062	0.396	-0.219	0.454
	Round-Square	0.150	-0.119	0.110	-0.627

Figure 4 The four influencing evaluation factors of five traditional Chinese chairs

Comparing with figure 3 and figure 4 , we make a summary of evaluating factors of these six chairs giving out at tab 5, In this table ,it can be clear see that the factor difference existing between them.

Considering the design background of these chairs ,it can be easy to understand how these difference come out . Hans J.Wegner designed China chair in the background of design theory converting from cold machine aesthetics to organic modernism design , Hans J. Wegner created organic furniture design form referencing from traditional Chinese chair based on exquisite Danish furniture manufacturing technique(9).The smooth curve and organic shape fully displays the aesthetic characteristic of modern design . So when participants did the SD evaluation,the aesthetic factor is highlighted obviously . While in five typical traditional Chinese chairs ,the first evaluating factor is emotion ,as these chairs are the product of Chinese feudal society,the ancient craft man did

the chair design to cater for the pursuit of power in feudal hierarchy system(10).So the chair itself is the symbol of host's psychological mood .In that case , the emotion factor hiding in the chairs presents obviously becomes the first evaluating factor in SD evaluation.

(2) SD line analysis

Author calculated each chair's each adjective evaluating average scores,and connecting average scores by line, ,showing in fig 5 . From this figure ,It can see that there is two features of six SD lines ,one is most of China chair average scores are in positive adjective side .The second one is the distance of some average scores is obvious between China chair and five traditional Chinese chair ,such as soft--hard,heavy--light,masculine--feminine,rational-emotional ,round-square,new-old these six pairs of adjective,which shows the relatively large perceptual evaluating difference of six chairs.

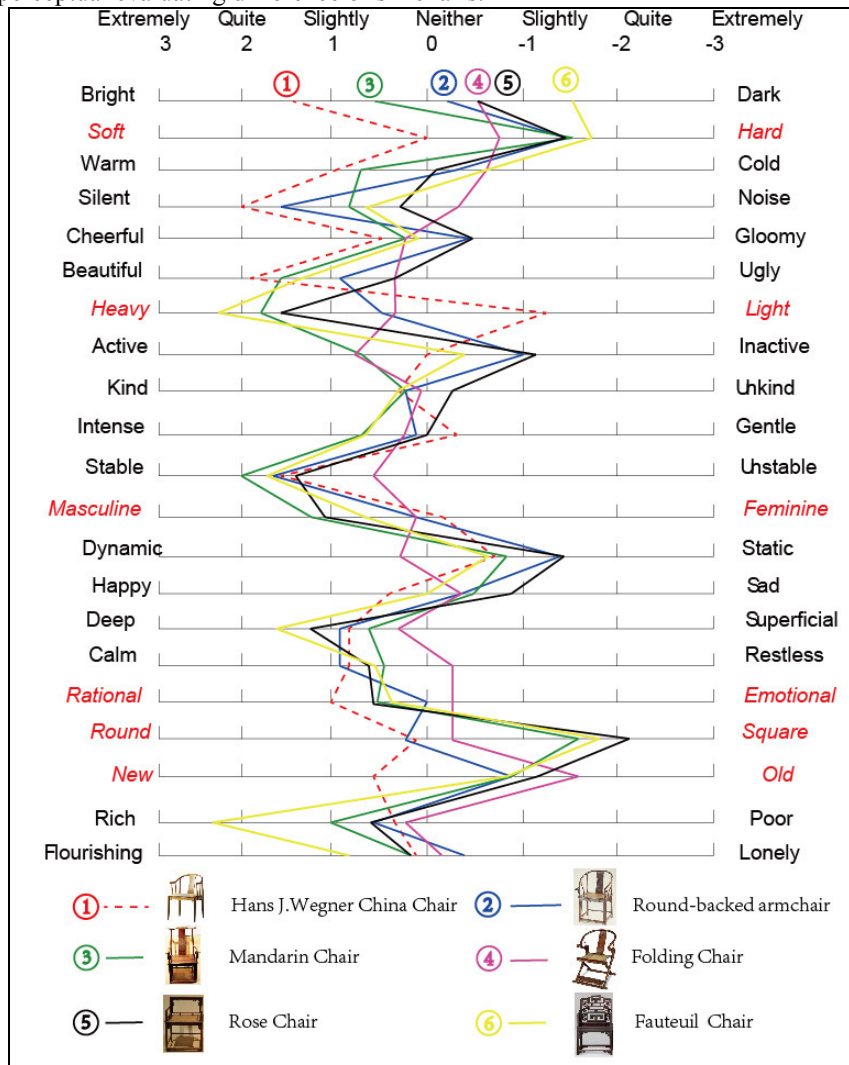


Figure 5 SD line of six chairs

In order to explain how much and why these six chairs existing difference in SD lines, The tab 6 shows the mean and standard deviation data of the above six evaluating adjective pairs ,and how Hans J.Wegner made this change by modern design approach(11) .From this table we can see that owing to the application of organic modernism design theory , Hans J.Wegner designed the backrest,armrest,leg by simple ,smooth and coherent line to realize the organic shape ,which presents compact and natural outlook .Because of this modern design approach, contrasting traditional Chinese chairs,Hans J.Wegner China chair changes the semantic differential evaluation from hard to soft ,heavy to soft, masculine to feminine ,rational to emotional ,square to round,old to its design .This change not only show the people's attitude of modern design,but also implicates the positive value of this culture reference design method. In Hans J.Wegner China chair ,it is the multiplying of eastern and western culture and the creative culture reference modern design paradigm(12).

Chair Change Adjective	Five traditional Chinese Chairs		Hans J.Wegner China chair		The Changes of Hans J.Wegner China chair	
	Mean	SD	Mean	SD	Direction	Approach
Soft--Hard	-1.24	1.287	0	1.7	Hard→ Soft	Curve ,smooth backrest and armrest design
Heavy--Light	1.22	1.418	-1.2	1.476	Heavy→ Light	Light color wood selection
Masculine--Feminine	0.6	1.565	-0.1	1.524	Masculine→ Feminine	Overall curve and organic outline design
Rational--Emotional	0.32	1.584	1	1.633	Rational→ Emotional	Organic shape,simple component and structure design
Round--Square	-1.08	1.441	0.1	1.449	Square→Round	Organic backrest,armrest,leg design
New-Old	-1.06	1.671	0.4	1.713	Old→New	Organic outlook and concise structure design

Table 6 The difference of six adjective pair evaluation

#### 4. Result

This paper revolves the culture reference design thinking method in Hans J.Wegner China chair design , explains how Hans J.Wegner referenced traditional Chinese chair into modern design and the value of this design method .There are three results of this paper.

(1) According to the first questionnaire data ,Hans J.Wegner China chair is most similarity with Chinese ancient round-backed armchair. as some literature pointed out that Hans J.Wegner referenced ancient Chinese Chair, combining the above two points, author deduces that Hans J.Wegner did China chair reference design mostly based on Chinese ancient round-backed armchair.

(2) In the semantic differential evaluation of Hans J.Wegner China chair and five typical traditional Chinese chairs , the evaluating factors are different by the calculation of SPSS ,the first factor of Hans J.Wegner China chair is aesthetic factor ,the second factor is emotion ,third one is strength ,forth factor is ergonomic .The five typical traditional Chinese chair evaluating factor sequence is emotion factor,dynamics factor,morphology factor and strength factor .The reason of this difference is because China chair is designed guided by modern organism design theory ,while five traditional Chinese chairs is the ruling power symbol of ancient Chinese feudal social hierarchy. So background difference determines the evaluating factors even though Hans J.Wegner China chair is referenced by traditional Chinese chair .

(3) The overall semantic differential evaluating line of Hans J.Wegner China chair is in positive side.This positive side line indicates people’s positive attitude for Hans J.Wegner China chair. Meanwhile, the change in Hans J.Wegner China chair takes shape of the multiplying of eastern and western culture and creates the innovative culture reference modern design paradigm.

#### 5. Discussion

This paper research the possibility and value of culture reference design in Hans J.Wegner China chair. Based on the above results , there are two issues need more discussion:

(1) The detail of how Hans J.Wegner did traditional Chinese chair reference design in his design process is not conducted concretely in this paper.This is also this paper’s limitation .Only we know clear about how Hans J.Wegner did culture reference design can we deduce the hypothesis of culture reference design method in the following research.

(2) The value of culture reference product design is positive and meaningful in Hans J.Wegner China chair by the semantic differential evaluation system .In author ’s future culture reference research ,If we can carry out the criteria of what the values are ,it will be much more convinced for the application of this reference design method in any other product design .

#### 6. Conclusion

This paper researches culture reference product design method in Hans J.Wegner China chair.The result present that the culture reference design method of Hans J.Wegner China chair applied from traditional Chinese round-backed armchair.By the SD evaluation system, The reference design method of Hans J.Wegner China chair is positive and valuable.In the future research ,author will focus on two direction:one is to make a model of this method to make designer easy to apply it to wide range design.Second one is to make logical evaluation system to judge the efficient value of culture reference product design method,and to improve the defect of this design method.

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