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A Study Product Design of Optimal Solution for Customer Requirements

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Abstract. In this paper, the author uses an evaluative criteria model and their associated criteria status, product evaluative criteria software of results and product objective function of optimal values solution, along with product morphological analysis, to synthesize evaluative criteria and optimize product design values. This study focuses on how to use an evaluative criteria model's imprecise market information by evaluative criteria design software; product mapping relationships between design parameters and customer requirements using product predicted value method; synthesizing design alternative by morphological analysis and plan; realizing the synthesis in multi criterion decision making (MCDM), using its searching software capacity to obtain the optimal solution.
Keywords. Multi criterion decision making (MCDM), Evaluative criteria model, Digital product design, Fuzzy theory, Products design.
JEL. F31, F47, L83, L88.

1. Introduction

The aim of product design value is to build up the innovative model, to create the maximum product or service value, by using the product innovation method from the user demand in order to solve ideological modes, question, difference, benefit, and so on. It stressed only on understanding clearly the user or consumer's demand, and then proposed the feasible and correct solution to provide the biggest service to the user. However, the organization can hardly exert influence on those sources. Changes in the beliefs, values, attitudes, opinions, and lifestyles of a society as a whole are seen as social changes (Hüsing & Mann 2010).

In this paper, when the enterprise carries on the multi criterion decision-making principle, mainly by the various product designs and the study of primary achievements, to apply the new product business planning to schedule the product specification, it will generate system's transformation of product characteristic to meet the customer demand. Thus, innovation is the smart application of knowledge to transform businesses, driven by market and customer demands, not just by the commercialization of intellectual property from science and research (Kennedy, 2010).

The Fuzzy integral methods are used for synthetic utility in accordance with subjective perception environment. Empirical experimental results show the proposed model is capable of producing effective evaluation of e-

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learning programs with adequate criteria that fit with respondent's perception patterns, especially when the evaluation criteria are numerous and intertwined (Tzeng et al., 2007). The conceptual development of product design values for the evaluative criteria model is discussed in the next section, and Constructs design product integrated design plan and Hierarchical system in digital product design industry and evaluative criteria and their associated criteria status for multicriteria decision making (MCDM) problem are derived in the subsequent section. Then, we discussed the application of the evaluative criteria methods for aquatic products processors, and finally, we discuss and show that the MCDM methods in this paper are effective.

The rest of this paper is organized as follows: Product of innovation design in section 2. Case studies: Different products design of evaluative criterion in section 3. Discussion in section 4. and conclusions in the last section in section 5.

2. Product of innovation design

Changes are often initiated by innovations. Planning, coordinating and controlling change processes is regarded as change management in this paper. Those innovations start with an idea that seeks to be implemented (Rogers, 1995). Recently, research of product design for current innovation is facing the globalization chanllenge. The creative product and the customer value are the keys for the growth of an enterprise. If the enterprise decides to develop international product, the creation value is the essential condition for success. Design of many legacy products takes the technology as a starting point to meet the customer demand. The creation product and the customer value will contain four steps: excavates customer demand, developing solution, creation of competitor difference, pursuing the customer's biggest benefit so that the product and the service which the company provide can solve the customer problem, and has the distinctive quality to pursue an unevenness growth. The product creation value is found to be the turning point of an international product.

2.1 Using evaluative criteria software

The Fuzzy criteria competence set analysis was proposed. In order to obtain Pareto solutions, multi-objective evolutionary algorithm is used here. A numerical example with two Fuzzy criteria is also used to illustrate the proposed method (Huang et al., 2006). In real problems, research excavates the customer demand, using the method to construct several design products which just started to be in the Fuzzy stage, then beginning the new product business planning to schedule the product specification based on the customer demand. It will have the system conversion product characteristic first, then launches the system to each organization and all components, as well as the plan manufacture flow by grasping the management key of various stages.

2.2 Integrated product of design systems

Although there is a tendency when thinking of innovation systems, including research systems, to see them as self-organizing and adaptive, the reality is that the pathway to innovation outcomes requires vision, leadership and some element of structure (Howard, 2007). By several design product information methods, we carry on the customer modeling design andnamely participates in the project work, There are several main abilities, including product detail conception, composition order, design conception, basic plan,

design confirmation. Table 1 shows several design product integrated design and the plan:

Table 1. *Integrated product of design systems*

Product design of model idea
Product design of plan
Product style, product material, equipment development, production system
Product of sample test and cost analysis criticism
Produces of multi-criteria decision making
Product application to marketing sales and manufacturing

2.3 Multi criterion decision making system for product design

Since the industrial revolution, innovation has generally been perceived as desirable, nearly synonymous with 'progress (Mercure, 2008). Thus, studies for several design products including features like the type, the function, the outlook, the user, the market area, separate and the different price level, community opinion method, will raise the multi objective questions, and each question will have many uncertainty, the complexity, the risk conflictingly, and so on. In addition, the changeable variable will make the entire decision-making process very difficult. Several design product development flow will be used to provide the elastic appraisal research technique, the improvement product design structure question, and will deduce the system technology using logic which will help the user to face the question, and will make the best resources utilization under the limited resources. Its research development flow is shown as in Figure 1.

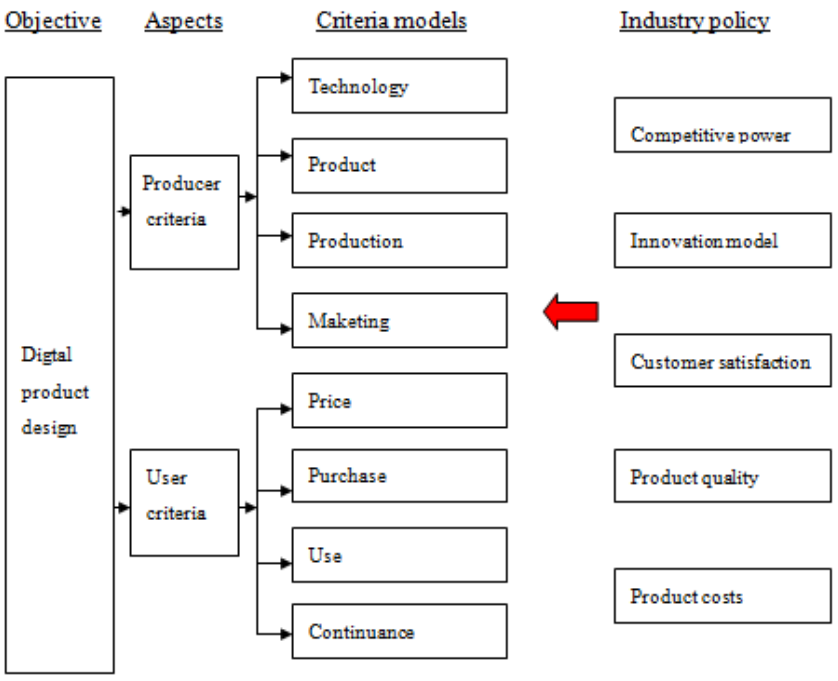

Figure 1. *Multi criterion decision making system for product design*

2.4 Building product of evaluative criteria software

The application and use of research are intended, among other things, to increase the competitiveness and sustainability of Australian industry

through both transformative and incremental research (Howard, 2007). Take several design product's appraisal criterion as the example, use appraisal standard and the union standard state, and divide into producer projects based on standard marketing, production, product, technology, condition, purchase, use, and period. Each project selects its most suitable ownership from Producer criteria (X1) and User criteria (X2) numbers disparity. The result of evaluation software product is shown in Table 2.

Table 2. *Product of evaluative criteria software*

Product evaluative criteria and criteria status	
Producer criteria (X1)	
TECHNOLOGY	
A. SYSTEM CHANGE	B. TECHNOLOGY STATUS
A5.No change or adaptation	B5.Low/current technology
A4.Minor peripheral change	B4.Applied technology
A3.Medium change	B3.Integrated technology
A2.Major core change	B2.High technology
A1.Building new core	B1.New technology
PRODUCT	
C. ADVANCEMENT	D. PRODUCT NEWNESS
C5.Radical	D5.New to world
C4.Innovative	D4.New to industry
C3.Incremental	D3.New to category
C2.Substitutive (more choice)	D2.New to company
C1.Imitative (no improvement)	D1.New to product line
PRODUCTION	
E. DESIGN SPECIFICATION	F. PRODUCTION BASIS
E5.Free to set an ideal specification	F5.Current process
E4.Major adaptation allowed	F4.Adapted process
E3.Minor adaptation allowed	F3.OEM process
E2.Options to choose matured spec.	F2.New process(to be purchased)
E1.Stick to a strict specification	F1.Dedicated process(to be developed)
MARKETING	
G. DISTRIBUTION CHANNEL	O. PRODUCER BENEFIT
G5.Existing channels	O5.Profitability and competitiveness
G 4.Channels to be strengthened	O4.Profitablity largely
G3.Available channels	O3.Competitiveness mainly
G2.Locally new channels spec.	O2.Minor to both
G1.Globally new channels	O1.None to both
User criteria(X2)	
PRICE	
H. COMPETITION STATUS	P. USER BENEFIT
H5.Absolute leading	P5.Creating or invention
H4.One competitor	P4.Comforting or entertaining
H3.Three competitors	P3.Gainging or enhancing
H2.Mild competition	P2.Convenience or saving
H1.Fierce competition	P1.Supplementing or substituting
PURCHASE	
I. MERCHANDISE STATUS	J. NEED STATUS
I5.Convenience goods(expendable)	J5.Both urgent and significant
I4.Convenience goods(durable)	J4.Either urgent or significant
I3.Shopping goods(necessity)	J3.Less urgent and less significant
I2.Shopping good(luxury)	J2.Less urgent or less significant
I1.Specialty goods	J1.Neither urgent nor significant
USE	
K. BEHAVIORAL CHANGE	N. ADOPTER STATUS

M5.Whole product(full service)	N5.For personal use
M4.Basic product or subsystem	N4.For family use
M3.Component or accessory	N3.For work use
M2.Supply or material	N2.For public use
M1.Concept or message	N1.For rarely use

2.5 Evaluative criteria parameters

Determination of evaluative criteria model parameters and the selection of method will depend on the product of the problems; we use product predicted value method to determine the criteria parameters in this paper.

For example, according to the condition grouping, the student to study the preferred plan is chosen, group the report by the user, the appraisal criterion ways, and so on. Then make the important degree order of rank on the report of proceedings.

2.6 Utility product value

In the product design, the strategy of innovation design pursues the customer biggest benefi**t** from the new thought that the work efficiency will be promoted through the increase of internal communication with the exterior cooperation, and will enhance the achievements by the application information design. The affiliation conformity product and the science and technology which define clearly the multi objective criteria and the attribute, the stimulation innovation energy, the pursue product best quality level, the biggest customer degree of satisfaction and so on, will finally achieve product crucial goal.

2.7 Using multi objective decision making

The multi objective decision making, pondering the explanation product question by angle in every way, deduces satisfied consumer's good plan for the long time interval, the gradation, and the working condition of high uncertainty. The application of the multi objective decision making method may satisfy grade of fit in each criterion, may evaluate the best technical program, and provides the policy maker the best pattern.

2.8 Linear programming model

The satisfactory solution and the goal plan in the multi goals decision making model, applies the most widespread method in the product goal precedence factor. Introduction of the goal plan is possibly dependent on the goal order of priority computation when target value transforming the goal plan standard form to goal plan equation. An example of product production case for a traditional iron cabinet company is listed in Table 3.

Table 3. *A company linear of programming model*

Resources	Each product amount of use		May use the resources
	Machine kind A	Machine kind B	
Labor force wages	1	1	6
Product material	1	2	120
Product max profit	3	5	

The production question indicated above by the following pattern is a model of product linear programming:

Goal plan equation Z=3X1+5X2

When X1+X2≦6

When X1+2X2≦10

X1≧1 X1, X2≧0

The multi- goals plan asks suitable vector, max = [Z1, Z2, Z3 - - -, ZP], usually is a one group gathering but a non spot. The oblique line partially satisfies the ABC limit feasible region, because if takes the policy making variable and coordinates space. This is called the product decision making space.

$Z=d1+d1^{-}+d2+d2^{-}$

When $X1+X2 \leq 6$

When $X1+2X2 \leq 10$

$X1 \leq 4$

$3X1+5X2+d1^{-}- d1=15$

$2X1-3X2+ d2^{-}- d2=5$

$di,di^{-},Xi \geq 0$

The hypothesis planed weight appraisal hypothesis plan parameters is the product appraisal not allowed to neglect the question. From the Fuzzy multi goals plan question, melts the general multi goals plan computation. According to studies the motive and comments the accurate policy making and inferential reasoning result, achieving the following goal:

1. Analyze resources of the plan and the product cost factor.
2. Constructs personnel duty plan or the product cost pattern.
3. Constructs the construction product flow plan or the customer satisfactory pattern.
4. Appraises the product Fuzzy multi goals plan, establishes the best policy making solution, generates the work assignment and specialist's work row of regulation, gets the best product decision making, and obtains the best work to satisfy the degree.

2.9 Evaluative product of optimize values

More recent policy initiatives have sought to foster industry clusters within these spaces to contribute to economic development and diversification and link this to economic, social and cultural regeneration (Cocuhman et al., 2008), thus, solution of customer's satisfaction, represents the goal, simultaneously arrives with the ideal recently feasible explanation, and when the goal of each unit is provided until user reaching his product s atisfaction (0ABC), as Figure 2.

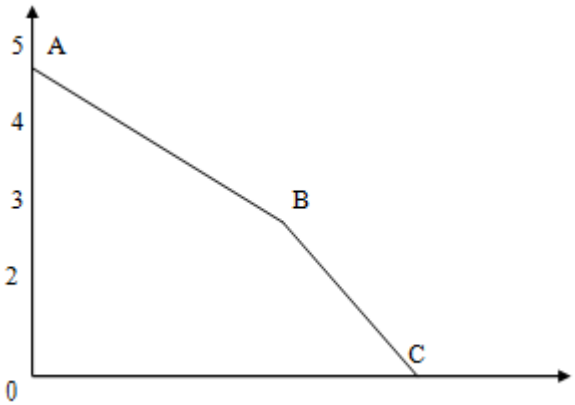

Figure 2. *Evaluative product of optimize values (0ABC)*

3. Case studies: Different products design of evaluative criterion

The case study of evaluative criterion chooses enterprises with 1~6 different products department of sales. Each establishes several design product appraisal criterion and applies in different item. In this example, 30 enterprises have been tested.

The questionnaire survey, according to the product characteristic plan, analyzes from projects based on customer demand, product characteristic, product specification, product block diagram, customer demand and product characteristic correlation matrix.

3.1 Problem description

Each enterprise which has 1~6 different products department of sale modeling was inspected whether to conform to to requested condition of the user, the performance, the specification table, the material examination design bad style analysis and so on. Question of spot, the possible bitter experience to carry on the analysis and the countermeasure appraisal, according to the user will be used to confirm that product official modeling and style, and to carry on the product construction model. Widely collecting the user demand, classification of the screening of demand item, the demand item and so on, and by the technological innovation and the creation of strategically competitive advantage, will create the successful product design value. By urging the whole staff to see clearly the customer demand, proposing the solution, and using the variance analysis to create the benefit and the value for the customer and the organization, will show the best design value display and the biggest benefit.

However, the market changes dynamically and the product life cycle reduces gradually. If we develop the new product design from grasping customer's needs and establishing the kinesiology and the multi-objective programming pattern, the design product may have the best manufacture procedures. How to strengthen the product business planning for specialized design, the product innovation and the internationalization through high quality and the creativity energy, will be the key to lead the enterprise to integral development.

3.2 Evaluating criteria parameters

Criteria product1: Handset, Product2: Bicycle, Product3: Computer, Product4: Furniture, Product5: Language machine, Product6: Teacup.

Using H value substitution, obtains P [H (IP)] parameter, in Table 4.

Table 4. *1~6 different products department of evaluative criteria parameters*

Evaluative criteria	1~6 different products of parameters					
	Product1 (handset)	Product2 (Bicycle)	Product3 (Computer)	Product4 (Fumiture)	Product5 (Language machine)	Product6 Teacup)
H.Competition status	3	2	4	1	3	1
P[H(IP)] parameter	1	2	0,5	3	1	3

3.3 Product of perfect matrix

Nowadays, the multi criterion decision making perfect matrix is in a high competitive power time, the product policy maker applying the multi criterion decision making analytic method will improve the internal potency.

Moreover, each enterprise which organizes its various internal units, basically, still has the room to be improved. In order to produce high efficiency, all internal units may calculate an integrity from the union all material analysis, use the result which many input factors and many items deliver, to improve various units' potency through its implementation step.

Step 1

Choose the tradition cabinet factory product design procedure, and establishes the related and collected works to gather by the traditional till machine shop, the product design plan route, from the beginning to end point, any node is the decision point. The designer also faces the different policy making environment, to ask the most suitable project approach in the policy making route, proposed that Fuzzy plans the law gradually.

Step 2

Ownership of function and Fuzzy set definition and ownership of function product Fuzzy theory establishes tradition till factory product attribute, according to consumer demand, user attribute discrimination for quality level, cost level, value level and so on; The user receives differences for the low income, the medium income, the high income and so on Fuzzy theory ownership function.

Step 3

The establishment product hives off the dendrogram to complete the goal which the product user hives off, displays age of level for the user, if supposing the young people have the highest faith. Therefore the development of the new product should aim at the young people in order to have the highest opportunity.

Step 4

Forecast that spot the goal plan chooses as the behavior enterprise making the product decision, uses the user's quantity of forecast goal, and plans the product design and the content properly, achieving the effect of the goal. The enterprise product uses the triggers Fuzzy set, in the product design production, is equipped with three plans, the five items target, and in overall product weight.

3.4 Using product of evaluative criteria software

In the actual work process, till factory's product design plan, the ownership of the utilization evaluative criteria software function which discovers various attributes and their relation, and the obtaining the most superior product design procedure evaluative criteria results, are indicated in Table 5.

Table 5. *1~6 different products department of sale result*

Evaluative criteria	1~6 different products of parameter of sale result					
	Product1 (handset)	Product2 (Bicycle)	Product3 (Computer)	Product4 (Fumiture)	Product5 (Language machine)	Product6 Teacup)
Producer criteria (X1)						
Technology	A2	A1	A2	A4	A1	A5
	B3	B5	B3	B5	B4	B5
Product	C4	C4	C4	C5	C4	C1
	D5	D4	D5	D1	D4	D3
Production	E2	E2	E4	E5	E2	E5
	F5	F4	F2	F3	F2	F1
Maketing	G5	G2	G1	G3	G3	G5

	O5	O4	O5	O3	O2	O1
User criteria(X2)						
Price	H5	H2	H5	H1	H2	H1
	P5	P2	P4	P2	P3	P1
Purhase	I4	I3	I5	I2	I1	I4
	J5	J5	J5	J3	J4	J1
Use	K2	K5	K1	K3	K1	K5
	L4	L3	L1	L2	L5	L1
Continuance	M5	M4	M5	M3	M2	M3
	N5	N5	N5	N4	N2	N2

The ownership total score scope, from 45~55 points to is the normal state, may be regarded by the customer as accepted. The experiment appraisal condition, the accumulation counts each score.

Evaluative criteria status: 5~1 Scores, example A5: get 5 Scores, F1: get 1 Score. In Table 6,

Table 6. *Products evaluative criteria of sale score*

	1~6 different products of parameter of sale result					
Evaluative criteria	Product1 (handset)	Product2 (Bicycle)	Product3 (Computer)	Product4 (Fumiture)	Product5 (Language machine)	Product6 Teacup)
Producer criteria (X1)						
Technology	2	1	2	4	1	5
	3	5	3	5	4	5
Product	4	4	4	4	4	1
	5	4	5	1	4	3
Production	2	2	4	5	2	5
	5	4	2	3	2	1
Maketing	5	4	2	3	2	1
	5	4	5	3	2	1
Scores	31	26	26	28	22	24
User criteria(X2)						
Price	3	2	4	1	2	1
	5	2	4	2	3	1
Purhase	4	4	3	2	1	2
	5	3	5	3	4	1
Use	2	2	1	3	1	5
	4	2	1	2	5	1
Continuance	5	4	5	3	2	3
	5	5	5	4	2	2
Scores	33	24	28	20	20	16
Total scores	64	50	54	48	42	40

3.5 Products expression models identified in the current study can be ranked

The six expression models identified in the current study can be ranked using evaluative criteria model to yield the results presented in Figure 3.

Total Scores: (Product 6) =40, (Product 5) =42, (Product 4) =48, (Product 2) =50, (Product 3) =54, (Product 1) =64.

Product 6 <Product 5< Product 4 <Product 2 < Product 3<Product 1.

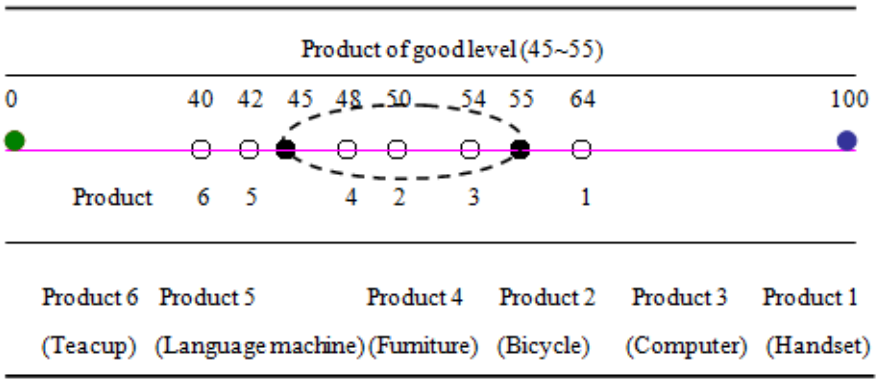

Figure 3. *Products expression in the rank*

3.6 Calculating the digital product design synthetic utilities

Table 7 shows the results of number of descriptions supplied of each expression mode over the 8 styling phases. Of the six Product modes, only the difference in classifying does not attain a significant level (T [IP]) parameter.

Table 7. *Calculating 1~6 different products department of sale result*

	Product1 (handset)	Product2 (Bicycle)	Product3 (Computer)	Product4 (Furniture)	Product5 (Language machine)	Product6 Teacup)
Producer quantitative index	4.5	3.64	4.5	3.29	2.43	2.14
User quantitative index	4.05	3.5	4.25	3.45	2.7	2.6
Variance	1.04	0.79	1.02	0.64	0.91	0.71
s parameter	0.01	0.01	0.07	0.0	0.0	-0.01
r parameter	1.03	0.68	0.82	2.	6.	0.73
T[IP] parameter	0.75	0.5	1.33	0.69	1.08	0.5
Innovation diffusion index	0.07	0.09	0.05	0.5	2.	-0.02
Innovation uses the index	1.04	0.86	0.85	0.0	0.0	0.68

1. Innovation diffusion index: 0.07, 0.09, 0.05, -0.03, -0.02, -0.02
   Product2> Product1>Product3 >Product5> Product6> Product4
   (Bicycle)> (Handset)> (Computer)> (Language machine)> (Teacup)> (Furniture)
2. Innovation uses the index: 1.04, 0.86, 0.85, 0.6, 0.99, and 0.68
   Product1> Product5> Product2> Product3> Product6 >Product4
   (Handset)> (Language machine)> (Bicycle)> (Computer)> (Teacup)> (Furniture)

3.7 Different products department of optimize values

At the same time, the product multi product of optimize values essence helps the policy maker in the limited feasible plan, according to attribute characteristic of each plan. From the product feasible plan, each plan makes a series of fit and unfit quality arrangement which are appraised and chosen, conforming to the product policy maker's ideal plan.

Table 8. *1~6 different products department of optimize values*

	Product1 (handset)	Product2 (Bicycle)	Product3 (Computer)	Product4 (Fumiture)	Product5 (Language machine)	Product6 Teacup)
Producer amount index	4.5	3.64	4.5	3.29	2.43	2.14
User amount index	4.05	3.5	4.25	3.45	2.7	2.6
Sum total	64	50	54	48	42	40
Innovation diffusion index	0.07	0.09	0.05	0.5	2.	-0.02
Innovation uses the index	1.04	0.86	0.85	0.0	0.0	0.68
Producer criteria benefit and user criteria benefit	10	6	9	5	5	2

3.8 Product objective function for optimal values solution

Z= Product max profit (optimal solution)
X1 =Each product amount of use (machine kind A)
X2 =Each product amount of use (machine kind B)
X1+X2≧Sum total (may use the resources)
X1+X2≧Producer criteria benefit and user criteria benefit

(1) Product1: Handset department of sale
Z=5X1+5X2
4.5X1+4.05X2≦64
0.07 X1+1.04X2≧10
X1>1
X1,X2>0
So, Z= Product max profit (optimal solution)
X1=12.8, X2=3.9
Z=X1+X2=5X12.8+5X3.9=83.5(0ABC)

(2) Product2: Bicycle department of sale
Z =4X1+2X2
3.64X1+3.5X2≦50
0.09X1+0.86X2≧6
X1>1
X1,X2>0
So, Z= Product max profit (optimal solution)
X1=13.7, X2=4.1
Z=4X1+2X2=4X13.7+2X4, 1=63(0ABC)

(3) Product3: Computer department of sale
Z =5X1+4X2
4.5X1+4.25X2≦54
0.05X1+0.85X2≧9
X1>1
X1,X2>0
So, Z= Product max profit (optimal solution)
X1=10.5, X2=5
Z=X1+X2=5X10.5+4X5=72.5(0ABC)
(4) Product4: Furniture department of sale
Z =3X1+2X2

3.29X1+3.45X2≧48
-0.03 X1+0.6X2≦5
X1>1
X1,X2>0
So, Z= Product max profit (optimal solution)
X1=12.5, X2=5.8
Z=X1+X2=3X12.5+2X5.8=49.1(0ABC)

(5) Product5: Language machine department of sale
Z =2X1+3X2
2.43X1+2.7X2≧42
-0.02 X1+0.99X2≦5
X1>1
X1,X2>0
So, Z=Product max profit (optimal solution)
X1=15, X2=2.7
Z=2X1+3X2=2X15+3X2.7=38.1(0ABC)

(6) Product6: Teacup department of sale
Z =X1+X2
2.14X1+2.6X2≧40
-0.02X1+0.68X2≧2
X1>1
X1,X2>0
So, Z= Product max profit (optimal solution)
X1=17, X2=4
Z=X1+X2=17+4=21(0ABC)
Followings are 1~6 products department of sale of comparison table.
Z= Product max profit (optimal solution), as Figure 4.
1: Handset department of sale
2: Bicycle department of sale
3: Computer department of sale
4: Furniture department of sale
5: Language machine department of sale
6: Teacup department of sale

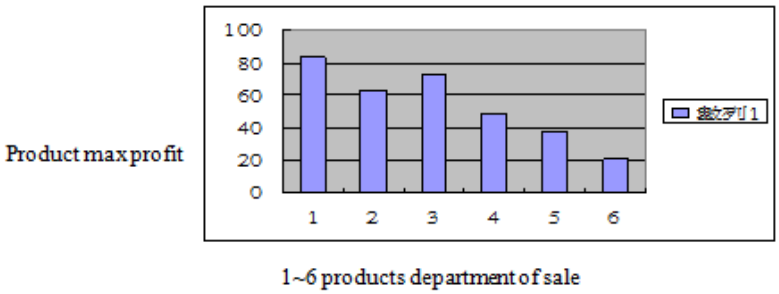

Figure 4. *1~6 products department of sale table*

Z = 83.5>72.5> 63> 49.1> 38.1>21
Z = Product 1 (Handset) > Product 3 (Computer) > Product 2 (Bicycle) > Product 4 (Furniture) > Product 5 (Language machine) > Product 6 (Teacup).

4. Discussion

4.1 Evaluative criteria model to response degree

In Figure 4, the customer feeding, using 1~6 different products department of sale evaluative criteria model to response degree, obtain the different product:

1. Innovation diffusion index: 0.07, 0.09, 0.05, -0.03, -0.02, -0.02

Product 2> Product 1>Product 3 >Product 5> Product 6> Product 4

(Bicycle)> (Handset)> (Computer)> (Language machine)> (Teacup)> (Furniture)

2. Innovation uses the index: 1.04, 0.86, 0.85, 0.6, 0.99, and 0.68

Product 1> Product 5> Product 2> Product 3> Product 6 >Product 4

(Handset)> (Language machine)> (Bicycle)> (Computer)> (Teacup)> (Furniture)

3. Level analytic method

In Figure 1, Use simple multiattribute comments the quantity technology, the policy maker must consider many kinds of different product attribute to choose –product preferred plan. During the process to evaluate the product value for the policy maker the product importance arrangement has to be given first, then the value by chance has to be set based on this importance and finally the policy maker product value function and the relative parameters are obtained.

The multi-objective decision making analysis the simple multi attribute comments the quantity technology, chooses the hypothesis plan by the product, and arranges according to the order gives the different value by chance. For example, suppose the first plan is 100, the second plan is 80, the third plan is 50, uses this kind to establish the product parameters number.

The level analytic method, uses in the product choice preferred plan order of rank, according to the first plan, the second plan, the third plan and so on, first and the second appraisal criterion is 5, first and the third appraisal criterion is 7, second and the third appraisal criterion is 3, use hypothesis product parameters number.

4. Building the best selection in product decision

In Table 1, sets hypothesis of after project evaluation and of the goal parameters, then aims at the product plan to make the graph or the sensitivity analysis. From the numerous plans, chooses satisfaction solution properly, this is also the best product decision scheme.

4.2 The biggest product effectiveness in decision making

Processes the multi objective variables by choosing the biggest product effectiveness in decision making. Apply Fuzzy logic deduction by computer auxiliary computation, if the system's membership function and the rule of designs are good, then the biggest product effectiveness may be stimulated.

Each kind of product analysis report form and plan sorting are provided In Table 2. In order to assist to appraise and to sort the complex plan, the product uses multi objective decision making analysis, passes through the multiattribute value utility theory, the multi objective decision making analysis, the value focal point ponder and so on with different probability. The description provides the diverse analysis report form and sorting, and the confirmation for the best product plan choice.

Fuzzy logic deduction, when after the system structure design completes, the product must undergo the interaction with the multi-spot appraisal, generating its project evaluation result, and check if it can conform to the

actual condition. Then apply the Fuzzy deduction system, carries on the case test, and inspects the result to obtain the better product decision making.

In Table 4, parameters of the Fuzzy logic decision making are compared, deduces product of decision making merit in the achievements, the used product values, takes the examination appraisal the auxiliary decision making as a more effective and a basic -way, carries on the Fuzzy deduction test, and inspects the better product decision making.

4.3 Using multi-criteria decision software of results

In Figure 4, When inscribing auspicious company digital product design procedure, three goals including the product design modeling, the product cost, and the productive time are mainly considered as a result of product system regulation work planning and the consideration of overall corporate goal achievements value. ─Therefore, there are numerous and diverse approaches of project, the policy-maker faces the choice to select one kind of good policy making.

The results of Z=1~6 different products department of sale, optimal solution (Z= 83.5>72.5>63>49.1>38.1>21), (Z=Product1:Handset> Product3: Computer> Product2:Bicycle>Product4:Furniture> Product5: Language machine > Product6:Teacup).

In Table 1**,** because of the fast change of the market environment, the product market life cycle gradually reduces, and so the new product design development should grasp customer demand by establishing the Fuzzy multi goals plan pattern and obtaining the product plans in order to get the best product and the most suitable solution. Facing the global competition and meager profit margin, only the most suitable solution of the designed product can enhance the enterprise product innovation value, How to design product to conform to the customer demand, to enhance the product's competitive ability, and bringing the best production efficiency for the enterprise for a bigger earning, will be the urgent topic for the management of current enterprises.

In Table 2, the multi criteria decision-making law attains the most suitable product design procedure. The opportunity which customer links up assists the individual customer and obtains the actual product decision-making demand guaranteeing correctly meeting each customer's need. Fathomer the massive guests, innovate the idea to conform to demand of the user, providing an innovation product, and this will let the customer rapidly obtain the product the information. In addition, in the product packing design, the unique style of the product service which measures the body for the customer will be presented differently for each customer.

The product model design pursues and creates the product massive guests to make the value, reducing the man power and the production cost. This rapidly provides the customer the ability to make the product, the conformity electron material exchange, the supply chain management and customer management, and uses the cross organization of the conformity synthesis effect to compare the system product for the customer.

4.4. A multi-criteria decision software for the best selection in product design

Decision making method for management and appraisal technology are widespread applications. From the product design feasible plan, penetrate the set of choice procedures to appraise the relative importance of various attributes, then limit each feasible plan and center preferred plan.

When many types of the product exist, each method resting on the theory is not the same. When using different methods, applying the identical question often leads to different result for multi-attribute policy making method. For the policy makers in many products of electron particle materialization or under the quantification appraisal criterion, when carrying on the appraisal to the feasible alternative scheme, they will decide fit and unfit quality or the execution of each alternative scheme in the order of priority.

In Table 7 and 8, 1~6 different products department of sale criteria values result, the product design uses the appraisal decision-making method, usually weighs the standard, only by smallest cost or biggest benefit sole target, but in many Yuan complex product design environment. The product question which the policy maker faces is changing day by day complex, and often facing many conflicting goals simultaneously.

5. Conclusion

The traditional enterprise product design takes long time for the process of decision-making in order to get better achievements. In fact, in our changing and complex environment, the decision maker frequently faces many criteria, multi- people and multi-questions, and also some special factors which often affect policy maker's judgment.

In this study, we find that a solution for enterprise product multi goals decision making question is difficult, because during the product designs it usually does not have the mechanism to solve the complexity, the risk, the conflict, and so on. In addition, the changeable factor causes the entire decision making process to be more difficult. If we use the Fuzzy deduction and the correlation technology, appraising the feasible method and the multi goals decision making, the problems of facing the product multi goals and the limited resources situation will be solved, and the best product design resources assignment can be made.

Generally, the enterprise must be in the conformity product design resource distribution, develop a set of product competition strategies from top to bottom, and strive to the enterprise's product improvement with consumer's approval. In addition, the product designer has to consider the product design to conform to project, laws and regulations, authentication, from the product design stage.

Therefore, after the enterprise product design project analysis, effectiveness and the customer degree of satisfaction must be appraised to obtain the maximum value for the benefit on behalf of the implementation goals, the promotion product level and market competition strength, Therefore, the use of Fuzzy set with the multi attribute policy making method will cause the achievements appraisal system, and can achieve the anticipated strategy goal of the product design. When the hypothesis achievements standard produce the market goal, the best product choice design can be the foundation of the policy making, and may maintain the product competitive advantage for the product development.

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