Using an Evaluative Criteria Software of Optimal Solutions for Enterprise Products' Sale

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Abstract

Purpose - This study focuses on the use of evaluative criteria software for imprecise market information, and product mapping relationships between design parameters and customer requirements.

Research design, data, and methodology – This study involved using the product predicted value method, synthesizing design alternatives through a morphological analysis and plan, realizing the synthesis in multi-criteria decision-making (MCDM), and using its searching software capacity to obtain optimal solutions.

Results - The establishment of product designs conforms to the customer demand, and promotes the optimization of several designs. In this study, the construction level analytic method and the simple multi attribute comment, or the quantity analytic method are used.

Conclusions - This study provides a solution for enterprise products' multi-goals decision-making, because the product design lacks determinism, complexity, risk, conflict, and so on. In addition, the changeable factor renders the entire decision-making process more difficult. It uses Fuzzy deduction and the correlation technology for appraising the feasible method and multi-goals decision-making, to solve situations of the products' multi-goals and limited resources, and assigns resources for the best product design.

Keywords: Multi-Criterion Decision-Making (MCDM), Evaluative Criteria Software, Product Design, Synthesizing Design Alternative, Products Sale.

JEL Classifications: F31, F47, L83, L88.

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1. Introduction

The product design value aim is builds up the innovative policy, causes the product or the maximization service value, lets the product innovation the method from the user demand, solve ideological modes and so on question, difference, benefit to know, stressed only has understands clearly the user or consumer's demand, only then possibly proposed that the correct solution, creates provides 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 (Stefan & Mann, 2010).

Innovation happens everywhere, and organizations need to continue to create innovation in order to survive (Jason, 2009). Then, this article studies the application standard appraisal evaluative criteria model, from the material mining material collection and the research, uses the multi-criterion decision system optimization deduction process, the creation product innovation design, establishes the user logarithm position design study demand, grasps the product innovation opportunity, stimulates several design product design ability.

In this study planning, due to product practice is in environmental uncertainty and enterprise investment, which offers an explanation to the police in product design. we will study several design products is future designs the subject, will advance to the information, the automated state to increase day after day gradually, the present student in the digital product design values, will make several design product evaluation system, and will conform to the kinesiology structure to design.

In this paper, when the enterprise carries on the multi-criterion decision-making principle, mainly by product various several designs and the study achievements primarily, causes the new product business planning with to schedule the product specification, has system's transformation product characteristic according to 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 (Narelle, 2007). as well as the plan study flow, grasps various flows the product

several designs key, then establishment of because of the pattern, approaches facing the globalized product competition time, only then the unceasing product innovation, can promote the enterprise value, designs conforms to the customer demand product, with promotion product innovation design, also brings the best study efficiency for the learner, is current studies several design products the important topic.

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-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 evaluative criteria software conceptual development of product design values 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 multi-criteria decision making (MCDM) problem are derived in the subsequent , applying the evaluative criteria methods for aquatic products processors, after which we discuss and show the MCDM methods in this paper are effective.

The rest of this paper is organized as follows: Literature review in section 2. Methodology in section 3. Results in section 4. Discussion in section 5 and Conclusions in the last section in section 6.

2. Literature review

Changes are often initiated by innovations. Planning, coordinating and controlling change processes is understood as change management in this paper. Those innovations start with an idea that seeks to be implemented (Rogers, 1995). Recently, research nowadays innovation product several designs, what facing is the globalized subject, the creation product and the customer value, links the key method which the enterprise grows. If the enterprise toward the internationalization development product, the creation value is the successful essential condition, legacy product's design many take the technology as a starting point, solves the customer demand is the starting point, the creation product and the customer value, contains four steps: excavates customer demand, development solution, creation and competitor difference, pursues the customer biggest benefit, lets the product which and the service the company provides can solve the customer problem, and has the distinctive quality, pursues an unevenness growth, found the product creation value the turning point.

The main approaches can be classified based on the type of decision model they used, although uncertainty and vagueness usually exist in the real world problems, the degree of uncertainty can be reduced when we have some useful information. This information can be obtained from expert's com-

mon ground and used for knowledge discovery.

2.1. Using evaluative criteria software technology for customer requirements

These propose the Fuzzy criteria competence set analysis. In order to obtain Pareto solutions, multi-objective evolutionary algorithm is employed here. A numerical example with two Fuzzy criteria is also used to illustrate the proposed method (Huanget al., 2006). In real problems, research excavate the customer demand the method to carry on construct several design products, just started to be in the Fuzzy stage, causes the new product business planning with to schedule the product specification, by the customer demand, has the system conversion product characteristic first, then has the system to launch, to each organization, the components, as well as the plan manufacture flow, grasps various stages the management key.
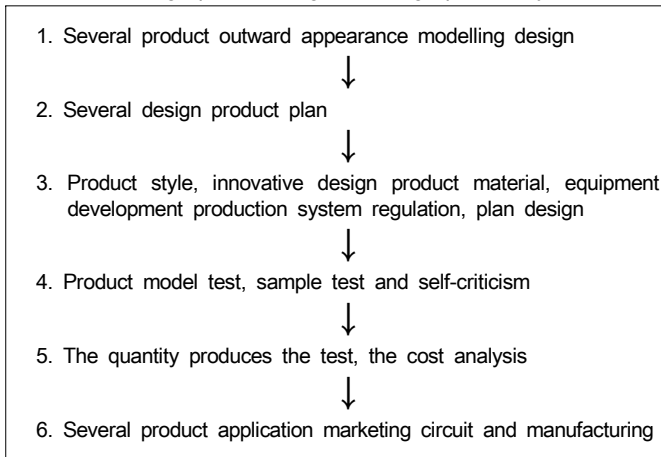
For example, product several design methods, because should improve the traditional classroom to set up in the past, now by several design product's method, has been able to provide the student the omni-directional several learning process. A several design product study, has the reasonable plan and the layout and so on item, its method is:

1. Analyzes several design products correctly the quality, enables to meet the curriculum demand fast.
2. Acts according to several design products, because establishes take the business planning quality and the human as the project objective.
3. Will design the conception, transmits truly to the manufacture unit, reduces several product designs the quality question.
4. The comparative analysis competitive product, reduces the engineering design change number of times, reduces the product development time.
5. Penetrates several product designs the operation pattern, establishes the complete system, the prevention defeat with reduces the cost.
6. Guaranteed that several product designs, can meet the customer demand, enhances the customer degree of satisfaction.

2.2. Constructs design product integrated 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 (John, 2007). By several design product information methods, carries on the customer modeling design, namely participates in the project work, has the following several main abilities, including product detail conception, composition order, design conception, basic plan, design confirmation and so on, in Table 1, several design product integrated design and the plan show:

<Table 1> A design product integrated design practice systems

1. Several product outward appearance modelling design

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2. Several design product plan

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3. Product style, innovative design product material, equipment development production system regulation, plan design

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4. Product model test, sample test and self-criticism

↓

5. The quantity produces the test, the cost analysis

↓

6. Several product application marketing circuit and manufacturing

2.3. Analytic process and evaluation model for industrial revolution

Since the industrial revolution, innovation has generally been perceived as desirable, nearly synonymous with 'progress (Judith, 2008). Thus, studies several design products, like the type, the function, the outlook, the user, the market area separate and the price not same level community opinion method, will occur has the multi-objective questions, because in each question, will be having many uncertainty, the complexity, the
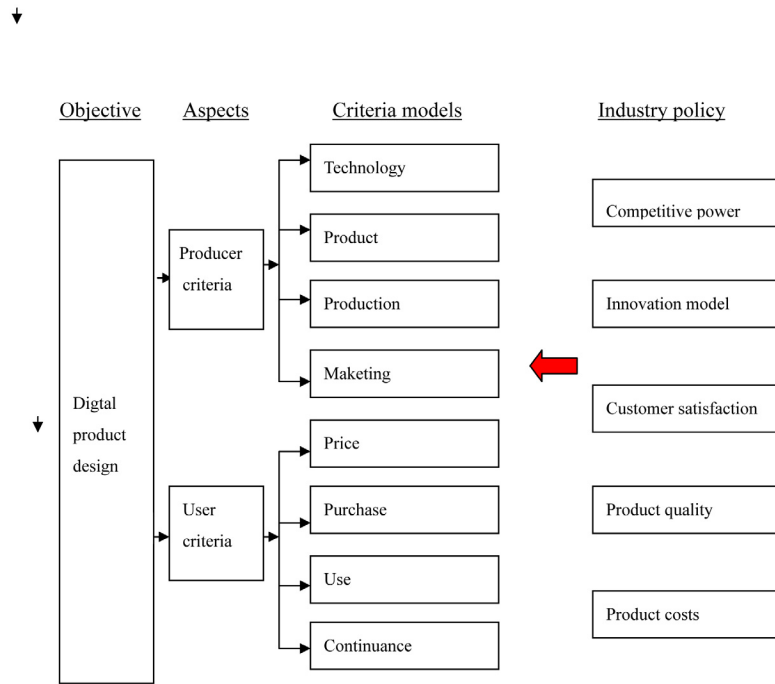
risk conflictingly, and so on, in addition the changeable variable, will let the entire decision-making process, will be very difficult, will use several design product development flow, will provide the elastic appraisal research technique, the improvement product design structure question, will deduce and the system technology using logic, will solve the user to face the question, and under the limited resources, will make the best resources utilization, its research development flow, as in Figure 1.

2.4. Building a product evaluative criteria software for digital product design

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 (John, 2007). Take several design product's appraisal criterion as the example, the use appraisal standard and the union standard state, divides into producer projects and so on standard marketing, production, product, technology, condition, purchase, use, period, each project selects most suits the ownership, from Producer criteria (X1) and User criteria (X2) numbers disparity, evaluation system product shows, in Table 2.

2.5. Determination of evaluative criteria software parameters

Determination of evaluative criteria software parameters, the selection of method depends on the product of the problems; we use product predicted value method to determine the criteria

<Figure 1> Analytic process and evaluation model for industrial revolution

parameters in this paper.

For example, The student according to the condition grouping, chooses the student to study the preferred plan, groups the report, the user to report that appraisal criterion ways and so on report of proceedings, make the important degree order of rank.

<Table 2> a product evaluative criteria software for product design

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. E1.Stick to a strict specification	F2.New process(to be purchased) 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	L. USE STATUS
K5.No adaptation/learning	L5.New functions + new applications
K4.Minor to auxiliary operations	L4.Improved functions + new appli.
K3.Medium chang	L3.New functions mainly
K2.Major to critical operations	L2.Improved functions only
K1.Complete adaptation/learning	L1.No major contributions

CONTINUANCE

M. PRODUCT WHOLENESS	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

2.6. Obtaining synthetic utility for product value

The first consists of policy measures which focus on the creation, transfer and commercialization of knowledge, most notably through the introduction of measures to ensure that there is a flow from centers of knowledge creation (Paul et al., 2008), such as the product in the competition, the utilization Fuzzy theory and the multi-objective decision making theory, the creation product, the service, transport business and so on, with competitor's difference value, applies in individual, innovative designs and so on organization, management, establishes the user to use the tendency, to see clearly the user demand, grasps the product innovation opportunity, stimulation innovation product design ability, finally, achieves the user to goal of the product degree of satisfaction.

In the product design, pursues the customer biggest benefit, from has the new thought that the promotion work efficiency, increases internal communicates with the exterior cooperation, and the application information design enhances the achievements, is designs the innovation the strategy, the affiliation conformity product and the science and technology, defines 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, finally, achieves product crucial goal.

2.7. Multi-objective decision making system

The multi-objective decision making system, by angle in every way pondered that the explanation product question, deduces satisfies consumer's good plan, belongs to the long time interval, the gradation, and under the uncertainty high working conditions, applies the multi-objective decision making method, satisfies grade of fit in each criterion, may evaluate the best technical program, provides the policy-maker the best pattern.

The multi attribute comments and so on technical law, applies using the quantitative method in the product design development, takes the question which, the design preferred plan, the creation and competitor's product differences the customer demand, the solution product occurs, pursue the user biggest product benefit and so on, overcomes in the use the question, the creation product innovation value, and relieves the stagnant difficult position, impels strategy which the new enterprise develops, by wisdom managing finances, the guest makes the management, the innovative design and so on, becomes the product core value.

2.8. Hypothesis linear programming model

The satisfactory solution and the goal plan in the multi- goals decision-making model, applies the most widespread one method, in the product goal precedence factor, introduction the goal plan is possibly dependent on the goal order of priority computation, when target value for transforms the goal plan standard form to goal plan equation. As example, traditional iron cabinet company, product production case, 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	10
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 $X1+X2 \leqq 6$
When $X1+2X2 \leqq 10$
$X1 \geqq 1$　　　$X1, X2 \geqq 0$

The multi- goals plan asks suitable vector, max = [Z1, Z2, Z3 - - -, ZP], usually is a one group gathering but a nonspot. 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 $X1+X2 \leqq 6$
When $X1+2X2 \leqq 10$
$X1 \leqq 4$
$3X1+5X2+d1^{-} - d1=15$
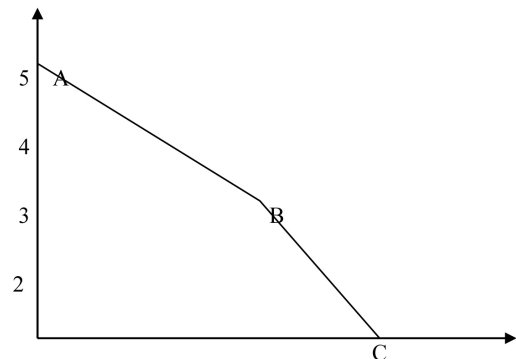
$2X1-3X2+ d2^{-} - d2=5$
$di, di^{-}, Xi \geqq 0$

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 the plan industrial 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 best policy-making solution, causes the work assignment and specialist's work row of regulation, can have the best product decision-making, and obtains the best work to satisfy the degree.

2.9. Plan analysis and evaluative goal for product 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 (Paul et al., 2008), thus, solution customs satisfaction, represents the goal, simultaneously arrives sought with the ideal recently feasible explanation, provided goal of the each unit, until user to product satisfaction (0ABC), as Figure 2.

<Figure 2> plan analysis and evaluative for goal values (0ABC)

3. Methodology

Practice evaluative criterion work, into a enterprise has 1~6 different products department of sale establishes several design product appraisal criterion and applies in different item, as example, has30 enterprises attending to test.

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

3.1. Problem description

Inspected a enterprise has 1~6 different products department of sale modeling, whether to conform to the user to request the condition, 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 confirmed that product official modeling and style, carries on the product construction model. Widely collects the user demand, classification of the screening of demand item, the demand item and so on, by the technological innovation and the creation strategically competitive advantage, the success creation product design value, urges the whole staff to see clearly the customer demand, proposes the solution, and using the variance analysis, creates the benefit and the value for the customer and the organization, lets the design the value display, creates the biggest benefit.

However, the market dynamic fast vicissitude, the product life cycle reduces gradually, to the new product design development, from grasps customer's demand start, establishes the kinesiology and the multi-objective programming pattern, the design product best manufacture procedure. How to strengthen the product business planning specialized design, the product innovation and the internationalization, by the high quality and the creativity energy, leads the enterprise integral development.

3.2. Evaluating criteria parameters for digital product design

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> products 1~6 different department of sale evaluative criteria parameters

Products 1~6 different parameters						
Evaluative criteria	Product1 (Handset)	Product2 (Bicycle)	Product3 (Computer)	Product4 (Furniture)	Product5 (Language machine)	Product6 (Teacup)
H.Compe-ttition status	3	2	4	1	3	2
P[H(IP)] parameter	1	2	0.5	3	1	3

3.3. Performance matrix

The multi-criterion decision-making perfect matrix nowadays, is in a high competitive power time, the product policy-maker by the multi-criterion decision-making analytic method, improves the internal potency, moreover each enterprise organizes internal various units, basically, still had the space which many need to improve, how the question was must internal various units, in order to produce high energy, from the union all material analysis, calculates an integrity, uses result which many input factors and many items deliver, improves various units' potency, its implementation step.

The overall product design route carries on the appraisal route plan, considering the multi-objectives the essences and the Fuzzy characteristic, causing the product design decision model, conforming to the actual problem condition, and the use value.

Step 1

The choice tradition cabinet factory product design procedure, and establishes the related and so on 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 in the policy-making route the most suitable project approach, proposed that Fuzzy plans the law gradually.

Step 2

Ownership of function and Fuzzy set definition and ownership of function product Fuzzy theory establishment 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 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 the user, if supposing the young people have the faith to be highest. Therefore the design develops the new product should aim at the young people most to have the 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 a product evaluative criteria software of results

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

<Table 5> Using a product department of sale evaluative criteria software of results

Products 1~6 different department of sale result						
Evaluative criteria	Product1 (Handset)	Product2 (Bicycle)	Product3 (Computer)	Product4 (Furniture)	Product5 (Language machine)	Product6 (Teacup)
Producer criteria(X1)						
Technology	A2	A1	A4	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
Purchase	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 regard as by the customer is 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> Product evaluative criteria results number

Products 1~6 different department of sale						
Evaluative criteria	Product1 (Handset)	Product2 (Bicycle)	Product3 (Computer)	Product4 (Furniture)	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	2	1	3	3	3
	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
Purchase	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 rank

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 models identified in the rank

3.6. Calculating the digital product design synthetic utilities

In 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 products 1~6 different department of sale result

Calculating products 1~6 different 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	0.04	0.07	-0.02	-0.06	-0.01
r parameter	1.03	0.68	0.82	0.69	1.08	0.73
T[IP] parameter	0.75	0.5	1.33	0.5	2	0.5
Innovation diffusion index	0.07	0.09	0.05	-0.03	-0.02	-0.02
Innovation uses the index	1.04	0.86	0.85	0.6	0.99	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. A multi-objective decision making system

At the same time, the product multi-objective decision-making system essence helps the policy-maker in the limited feasible plan, according to each plan attribute characteristic. 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> A multi-objective decision making system

PRoducts 1~6 different department of sale decision making system						
	Product1	Product2	Product3	Product4	Product5	Product6
	(Handset)	(Bicycle)	(Computer)	(Furniture)	(Language machine)	(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	0.07	0.09	0.05	-0.03	-0.02	-0.02

index						
Innovation uses the index	1.04	0.86	0.85	0.6	0.99	0.68
Producer criteria benefit and User criteria benefit	10	6	9	5	5	2

3.8. Product objective function of optimal solution

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

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

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

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

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(4) Product4: Furniture department of sale
$Z =3X1+2X2$
$3.29X1+3.45X2 \geqq 48$

$-0.03\ X1+0.6X2\geqq5$

$X1>1$

$X1,X2>0$

So, Z= Product max profit (optimal solution)

$X1=12.5,\ X2=5.8$

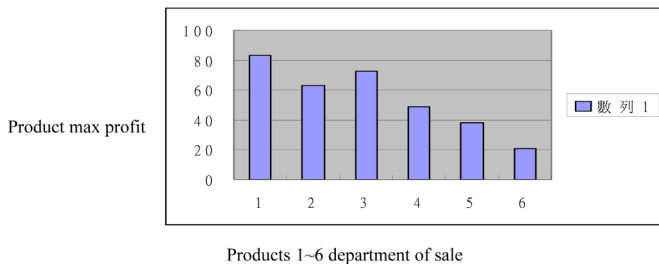$Z=X1+X2=3X12.5+2X5.8=49.1(0ABC)$

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(5) Product5: Language machine department of sale

$Z\ =2X1+3X2$

$2.43X1+2.7X2\geqq42$

$-0.02\ X1+0.99X2\geqq5$

$X1>1$

$X1,X2>0$

So, Z=Product max profit (optimal solution)

$X1=15,\ X2=2.7$

$Z=2X1+3X2=2X15+3X2.7=38.1(0ABC)$

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(6) Product6: Teacup department of sale

$Z\ =X1+X2$

$2.14X1+2.6X2\geqq40$

$-0.02X1+0.68X2\geqq2$

$X1>1$

$X1,X2>0$

So, Z= Product max profit (optimal solution)

$X1=17,\ X2=4$

$Z=X1+X2=17+4=21(0ABC)$

Followings are Products 1~6 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

Products 1~6 department of sale

<**Figure 4**> Products 1~6 department of sale of practice comparison table

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).

4. Results

In this study, the construction level analytic method and the simple multiattribute comment the quantity analytic method. To use the level analytic method and the simple multiattribute comment the quantity analytic method.

4.1. The key elements found and improvement alternatives illustrated

In Figure 4, the customer feeding, using the products 1~6 different department of sale evaluative criteria model to response feeling 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, is the policy-maker when the choice product preferred plan, must consider product many kinds of different attributes, for the policy-maker mind in the product value, when appraises the weight, first gives by the product importance arrangement, then aims at this importance to give by chance the value, obtains the policy maker product value function and the relative parameters.

The multi-objective decision making analysis the simple multiattribute 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, the first plan supposes is 100, the second plan supposes is 80, the third plan supposes 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. Helps the user model building makes the best product decision-making

In Table 1, 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 a properly, is also the best product decision scheme.

4.2. The Fuzziness in effectiveness perception considered

Processes the multi-objective variables choose the biggest product effectiveness the decision-making. Fuzzy logic deduction, by computer auxiliary computation, if system's membership function, the rule designs are good, then may simulate the biggest product effectiveness.

The following provides each kind of product analysis report form and plan sorting. In Table 2, Assists 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 different probability. The description provides the diverse analysis report form and sorting, the confirmation 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, causing its project evaluation result, can conform to the actual condition, by the Fuzzy deduction system, carries on the case test, inspected obtaining the better product decision-making.

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

4.3. The result of hybrid a practice multi-criteria decision system

In Figure 4, When inscription auspicious company digital product design procedure, mainly considers the product design modeling, the product cost, and the productive time and so on three goals, as a result of product system regulation work planning, consideration of overall corporate goal achievements value, therefore, the project approach is very numerous and diverse, the policy-maker faces the choice, that one kind of good policy-making question.

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).

5. Discussion

In Table 1,accordance to the market environment fast change, the product market life cycle gradually reduces to the new product design development and should grasp customer demand, establishes the Fuzzy multi-goals plan pattern and obtains the product plans, best product most suitable solution. Facing the globalization competition and meager profit time approaching, only the design product most suitable solution, can promote the

enterprise product innovation value, design conforms to the customer demand product and the promotion product competitive ability, brings the best production efficiency for the enterprise and a bigger earning, and is the current enterprise manages the urgent topic.

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, this lets the customer rapidly obtain the product the information, and in the product packing design in view of each customer, differently presents the unique style of the product service which measures the body for the customer.

The product software 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, relates the management with the customer and so on to the link, uses the cross organization of the conformity synthesis effect, and by comparison the system product which rapidly provides the customer.

Using decision making method for management and appraisal technology is widespread application. From the product design feasible plan, penetrate sing the set of choice procedures to appraise that various attribute relative importance, limit each feasible plan and center preferred plan.

When the product type is many, each method resting on the theory is not the same, in using different methods, applying the identical question, often can have different result, for multi- attribute policy-making method. For the policy-maker in many products electron particle materialization or under the quantification appraisal criterion, this carries on the appraisal to the feasible alternative scheme, and decides fit and unfit quality of or the execution of each alternative scheme in the order of priority.

In Table 7 and 8, products 1~6 different 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 day by day complex, simultaneously, often facing many conflicts goals.

6. Conclusions

The traditional enterprise product design makes the flow, decision-making of time choosing better achievements. In fact, frequently can face many criteria, the multi- people multi- questions, when the decision-making enters the complex environment, also some special factors, often affect policy-maker's judgment, another item is a weight often receiving the environment variation to change. Therefore, managing policy making product

question itself to fill Fuzziness. The use tradition statistics are stochastic, and carry on the appraisal in the process, often is unable to sufficiently share and express it, using the Fuzzy theory with the multi- attribute policy-making law; this solves the product design choice problem.

In this study, solution enterprise product multi- goals decision-making question, because the product designs middle, exists because it usually does not have the determinism, the complexity, the risk, and the conflict and so on. In addition the changeable factor causes the entire decision-making process to be more difficult. If uses the Fuzzy deduction and the correlation technology, appraising the feasible method and the multi-goals decision-making, solves in facing the product multi-goals and the resources limited situation, and makes the best product design resources assignment.

Generally, the enterprise must in the conformity product design resource distribution, develop a set of product competition strategies from top to bottom, to the enterprise's product improvement whether achieved consumer's approval. Or not the product design stage has conformed to project and so on laws and regulations, authentication, included when the product designers considered.

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

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