

Creating Optimal Product Design of Educational Management for Social and Economical Development

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Abstract

Current product design of educational management focus has been shifted to the innovation application to really catch and meet the customers' consumption changes in time. Thus, in this paper, taking innovative design on telephone as an experimental case, it is possible to investigate how to lead the product to market oriented and customized management concepts which creative design ability is utilized for a product. Accompanied with an innovative product value chain, the product can animate the progress of the development of the enterprise management, which has become the main issue of the social and economical development in every developed country.

Keywords: Enterprise development, Educational management, Product design, Multi criteria decision making (MCDM), Innovative design.

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1. Introduction

When facing this competitive era on product and globalization, it is important to create new designs. The new designs may break the stereotype of traditional designs. This situation leads the designing team into innovation competition. On the other hand, the enterprises now face many management dilemmas and must take the team into internationalization, which means the enterprises must apply the creative product design to produce the varieties, functions, appearance, user, market compartment, price diversity,

etc. in order to satisfy the consumers' needs. Basically, the process from taking the mode into practice to reveal the good fortune and convenience can precisely predict the technique development in the future, demand, and service time (Tseng 2002).

In order to help enterprises today dealing with multi purposes in the market, the modification of organization in product strategy is needed. The product design not only requires expansion on dimensions, but also the extent in different development levels. Pursuit of high productivity is a crucial step for an enterprise. Companies are sharpening their focus and looking for greater value, for example by investing in start-ups later when they have a stronger track record rather than simply based on acceptable business plan. In the developing world, solutions to local or national problems are increasingly relevant to international markets (Collins 2010).

The research model on traditional product design process is based on an optimization mechanism of choice. In substance, the calculation is based on a sequence of product design establishment. However, the strategy makers cannot understand the essence of the problem while facing a structural strategy problem, whether or not the optimization could calculate the result of product design. Whereas multi criteria decision making (MCDM) analyses tend to focus on the arrangement and distribution of purposes, especially under the situation that few coherent strategies were made (Carlos 2004).

Previous researchers have developed various approaches to address this problem. For example, in the recent years, self learning and material exploring have become two of effective studying tools. While research in innovation management has provided many insights into specific aspects of innovation, the encompassing problems confronting general managers, especially managers of small and medium-size firms, have been overlooked in the development of innovation management tools (Igartua et al., 2010).

Next, according to analytical hierarchy process, this study set up a product decision making expert system, Fuzzy set theory, and the multi criteria decision making analysis in order to produce the best quality and best service for consumers, to establish the marketing predominance in the market, and to create the best benefit in product, for detail in Figure 1.

[Fig.1 A decision making for educational management]

The rest of this paper is organized as follows. The review of strategic proposed method is discussed in section 2. Case studies 1: Data analysis and results in section 3. Case studies 2: Product decision

making expert system in section 4. Section 5 presents a discussion of implementation and conclusions.

2. Proposed method

This research obtains valid questionnaires to be the research target samples. The researchers mainly focus on evaluating the preference of values among users. So the goal is to create a feasible progress chart in the shortest time to deal with problems encountered.

Because the model of innovative product design is a totally new challenge for enterprises, the difficulty and risk of failure are much higher than those long period routine tasks. Learning the research method of creative product designing can be beneficial to the design control of new products to complete goals successfully. This article divides the research methods into four stages as shown in Figure 2.

[Fig.2 Create product design stages for educational management]

2.1 Concept development of product design and Fuzzy theory

Adequate information and data are needed while strategy maker's face the problems during the procedure of product design. However, the data or information may contain multi-uncertainty or Fuzzy situations; hence, they have to be adapted by Fuzzy theory and MCDM theory analysis which are programs and techniques of designing plan to solve the problems in product designing. Therefore, the enterprise can be recreated in the future.

The main point of the research of Fuzzy theory is that we can possibly obtain intelligent brief system within access and set a matrix. By the result, the model can apply the linear and non-linear recursive methods during the period. In fact, the problems can be solved with using the well-formed concept, knowledge, information, and technique in designing. These methods depend on good knowledge models and expansion ability, which focus on limited, but effective sustainable learning (Hu et al., 2003).

2.2 Fuzzy measure and aggregation

The purpose of Fuzzy theory is to assist strategy makers in realizing the product quality for consumers' demands including safety, usability, price, function, material, main faculty, and etc., and also in simplifying the product. In addition, the product designers can know the demand model of consumers with using various design techniques and methodologies to complete the synthetic drill by analyzing the appearance and color in nowadays in various products. Therefore the designers can solve the existing

problems for product users; moreover, these processes can promote the design of product creation.

For example, several well-known models regarding competence set expansion have focused on the development of effective methods for generating learning sequences with minimum learning. For each decision problem, a competence set is necessary and consists of ideas, knowledge, information, and skills for successfully solving the problem (Hu et al., 2003). Evaluation methods not only are taken as a solution to the traditional product design, but also to modify the efficiency of the design itself. Therefore, strategy makers can get the division by dividing the available questionnaire replies according to their features, as like Figure 3.

[**Fig.3 Building product design for educational management**]

The application of innovative design can stimulate the product design. Therefore, how to efficiently apply the innovative interface, to explore new usages, and to facilitate the users to use the interface intuitively have become the mainstream of design. An empirical case of R&D innovation performance will be illustrated to show that the rough sets model and the flow network graph are useful and efficient tools for building R&D innovation decision rules and providing predictions (Wang et al., 2010).

This study shows that the results are identical. It also shows that the satisfaction of human computer interaction is the highest after the measurement, representing human computer interaction is more beneficial than others. For example, goal programming is an analytical approach devised to address decision making problems where targets have been assigned to all the attributes and where the decision maker is interested in minimizing the non-achievement of the corresponding goals (Carlos 2004).

2.3 Improve product design process, and to create optimal efficiency

Techniques for machine learning have been extensively studied in recent years as effective tools in data mining. Although there have been several approaches to machine learning, we focus on the mathematical programming approaches in this paper. The environment of decision making changes over time.

3. Case studies 1: data analysis and result

1. Problem description

Analyze the demand of telephones according to Fuzzy situation. With the technological design, the

product must be friendly designed in its human computer interaction. It will be more popular in the screen of analysis. Innovative design telephone products can strongly accelerate the product design to new trend.

The esthetic value is highly praised in the innovative design. With the combination of wisdom, fashion, and various materials, it can definitely get out of the stereotype of traditional ones to create a classic one made in high quality and humanized. By forming the inferring for the innovative designed phone, we can list the rankings as Intelligence, Brand, Vogue, Touches controls, Price, Texture, Function, Pixel, Weight, Style, Esthetics, Interface etc.

2. Analysis on survey on customer in four stages objective situation

According to Figure 2, the analysis task comprised of four stages:

- (1) Analysis on survey on customer in Fuzzy situation.
- (2) Multi criteria decision making core evaluation system.
- (3) Innovative strategy management.
- (4) Create product design management.

Stage 1: analysis on survey on customer in Fuzzy situation

1. Concept development of product design

It is observed that the least number of descriptions being used is 60. The majority of the subjects were utilized within 60 descriptions. In usage of 60 descriptions, the choice of purchasing telephones was made most frequently for telephone ages/3 years, as Figure 4.

[**Fig.4 Frequency distribution and purchase telephone ages/3 years**]

2. Expression in telephone activity modes

Regarding to 60 descriptions, Figure 4 displays that the frequency distribution of descriptions are listed as purchases telephone brands, features in Market activities, Users' customs, Product developments, and expression support numbers. For example, innovative designed telephone screen and the features of innovative designed telephone play two of critical factors in the experimental outcome. This shows that the solution lies in the combination of feature design brand, A, B, C, and D in Figure 5.

[**Fig.5 Expression in telephone activity brands**]

The outstanding performance of innovative designed telephone brand in the competitive market is accomplished within the promising R&D and design according to the market.

3. Telephone brand

The outstanding performance of innovative designed telephone brand in the competitive market is accomplished within the promising R&D and design according to the market and customer demands. Therefore, it is important to specifically realize the demand of customers according to their various demands, and to satisfy individual demands among all sorts of consumers. The 60 descriptions were mingled randomly and then provided to each expert.

The combination of designed in innovative designed telephone brand (A) gets the optimal efficiency in product design. It contains a completely profound function and system.

4. Determining of evaluating criteria of designed telephone

The researchers set up telephone brand decision system by decomposing the problem into a hierarchy of interrelated elements Table1.

[**Table 1 Telephone brand and feature**]

These 60 descriptions were evaluating criteria of designed telephone provided to each element, as Table 2.

[**Table 2 Innovative designed telephone for evaluating criteria**]

To combine the designed feature in innovative designed telephone for evaluating criteria Product development, 46% of the 60 descriptions reach the optimal evaluating criteria frequency in product design.

Stage 2: multi criteria decision making core evaluation system

1. Evaluating criteria of designed telephone

This stage generates input telephone data consisting of pairwise comparative judge of decision elements. The plan tested individually on Mode 1 Market activities: Intelligence A(11), Brand A(12), Vogue A(13), Touches controls A(14), Mode 2 Users customer: Price B(11), Texture B(12), Function B(13), Pixel B(14), Mode 3 product development: Weight C(11), Style C(12), Esthetics C(13), Interface C(14) etc, as Table3.

[**Table 3 Evaluating criteria of designed telephone**]

To combine the designed feature in evaluating criteria of designed telephone for evaluating

criteria 30~40 ages, 9.8 from all descriptions get the optimal evaluating criteria of users customer in product design.

2. Calculating synthetic utilities

- (1) Determine the aggregating of the decision elements to arrive at a set of ratings for the alternatives and strategies.
- (2) Show the overall number of descriptions supplied in each modes and customs like depending on mode product innovative development and get the optimal purchase in product design.
- (3) The purchase telephone design of interface and elements

First of all, horizontal line represents that the battery is full of electronic energy, and the user hasn't made a call. Second, as the communication frequency grows, the curve of drop down expresses the consumption of the battery. This represents that under the consumption, the innovative designed telephone mode product developments can extend its using time.

Due to the variety of telephones, the designer adapts the innovative design process to get the overall information through the interface and elements. This will be used to construct the function structure model, and to study the virtual construction to make it into practice.

- (4) The decision system of more than targets in purchase product

Depending on 60 descriptions, the discrimination is 6 customer groups, and 4 mode-4 product developments: Machine weight, Style quality, Esthetics, and Interface. Using the decision system of more than targets decides the preference of product. The first group emphasizes interactive benefit; the second emphasizes quality, and the third emphasizes functions. Their preferences are style quality and esthetics. So a chart is made to show the group preferences in Table 4.

[Table 4 Consumers preference of products]

- (5) Create product optimal technology management

Calculating data from 60 descriptions, 6 customer groups demonstrate five main means which are 0.06, 0.15, 0.21, and 0.58 as their preference values. In addition, Machine weight is 0.06, Style quality 0.15, Price 0.21, and Function 0.58 in Table 5.

[Table 5 Number of descriptions supplied in each customer group]

In Table 5, in order to get the final question point and then to solve the problem in Function, the researchers design the research method to achieve customer purchase product satisfaction.

Stage 3: innovative product design for educational management

According to Table 5, using data from 60 descriptions, this analysis discloses on the elements of innovative designed telephones: Mode 1 Market activities: Intelligence A(11), Brand A(12), Vogue A(13), Touches controls A(14), Mode 2 User's custom: Price B(11), Texture B(12), Function B(13), Pixel B(14), Mode 3 Product innovative development: Weight C(11), Style C(12), Esthetics C(13), and Interface C(14).

Depending on the development of telephone industry, the necessity of low cost, high flexibility in the superiority of production, and the demand of humanized product should be controlled to influence the concept of design and the development of crucial modules enormously, as Table 6.

[Table 6 Establish the user's telephone of performance matrix]

The results in Table 6 establish the user's telephone of performance matrix. Fuzzy sets are adapted in the strategy of business administration. Take telephones for an example, there are creative designs to choose in the establishment of production, all of which point to the division in humanized interface, user standpoint, model change, instinct manipulation, control combination, material change.

Hence, according to the criteria quantification, it chooses the innovative plan as the optimal plan. It is optimal production. Considering the elements of price, benefit, and usage, it has more chances to choose the most appropriate plan. Therefore, in the actual design process, this study adapts the membership functions in Fuzzy Theory for searching the relevance between each feature and obtains the best result in quantification, as Table7.

[Table 7 Calculating telephone of synthetic utilities]

In Table7, in order to calculate telephone of synthetic utilities and then solve the problem in evaluation strategy, the researchers design to achieve telephone values of criteria.

Stage 4: create optimal product design for educational management

According to Table 7, calculating telephone synthetic utilities results, Fuzzy synthetic utilities to innovative product design, and telephone values strategies, the strategy establishes good collecting

telephone values of criteria. This is the best strategy when telephone customer and enterprise would like to engage in Mode 1 Market activities: Intelligence A (11)4.6, Brand A (12)5, Mode 2 User's custom: Price B (11)5.4, Function B (13)5.4, and Mode 3 Product innovative development: Style C (12)5.5 and Esthetics C (13)4.6, if the criteria are substitutive and independent, as Figure 6.

[**Fig.6 Result of creative optimal product design for educational management**]

4. Case studie 2: building a optimal product design for educational management

1. Product objective

According to Figure 3, the product design model is adapted for stimulating the proper solution to satisfy consumers with various points of views. However, multi decision making theory would be widely adapted in the long term, uncertain environment. With this strategy, the decision maker can realize the optimal mode of the solutions to problems.

So the designer must realize and analyze the features of product before making design drawing, including striking a balance between the relationship of cost and user satisfaction, which is highly emphasized in this research.

2. Activity modes

According to the telephone industry market and the coming Innovative management trend, the competition in the innovative telephone market will be for sure in the future. This activity mode include product design position and market strategy, product management, creation of R&D value, design of organization structure of R&D, performance management and development mechanism. So the decision maker must set the industry goal and strategy to reflecr market competition.

3. Evaluative system

Through using 60 descriptions and data from the user questionnaire survey form, in order to analyze innovative designed telephone, the product market can be divided into Market activities: value chain (A1), wise management (A2), product quality (A3), and research & development (A4); for User's custom: product management (B1), customized service (B2), marketing (B3); and for Product innovative development: R&D structure technique (C1), service quality (C2), management model (C3), and market environment (C4). Telephone enterprise management ranks into 5 points. Which include: product scarce for 1 point, product difficulty in imitation for 2 points, product not substitution for 3 points, and product

value for 4 points, And the result reveals that product not substitution and product value are optimal in innovative designed telephone, as Table 8.

The combination of Innovative expect system and management of designed telephone for Market activities: wise management (A2), User's custom: Product management (B1) and Product innovative development: Service quality (C2) gets the optimal innovative product designed management in design.

In Table 8 Innovative product designed expect system product not substitution and product value get the highest grades in the sum up. The result can be applied to realize the category of innovative management.

[Table 8 Results of innovative product designs for educational management]

4. Result of create optimal product design for educational management

Create optimal product design for expect management, according to Table 7 and 8, the evaluation of products requires the intent combination of design techniques and user's demand, complete understanding of industry dynamics, application of management of innovative designed telephone management to users, integration of the interior and exterior resource, and establishment of organization construction. Therefore, it is necessary to create optimal product and customer value during enterprise transformation, as Figure7.

[Fig.7 Results of create optimal product design for educational management]

5. Educational management is a successful application in the Taiwan industry

In Taiwan industries, it is constantly broadening the range of devices it offers- introducing devices to support specific applications and new form factors that meet the increasingly diverse needs of its customers and partners. Besides, product portfolio offers easy-to-use solutions that embrace the full range of mobile multimedia resources, wireless anytime and Internet on the go.

It has invested in a strong R&D team accounting for 25% of the total headcount and a World-class high-volume manufacturing facility, both based in Taiwan industries.

In Taiwan, according to 2006 industry and commercial statistical reports, Used expect system, and its successful application in specialized design are shown as Figure8 and Table 9.

[Fig.8 Educational management is a successful application in the Taiwan industry]

{ Table 9 Educational management is a successful application in the Taiwan industry }**5. Discussion**

As discussed, with the change of consumer's usage, the design trend of innovative designed telephones changes as well. Hence, the new touch screen technologies have shown up. In the present study, we wish to improve the human-computer interaction benefit from the innovative screen. Therefore, how to explore the potential function demand of consumers providing innovative solutions and integrating the systems has become the challenge of designers.

In Figure 3, strategical system in innovative designed telephone, discusses the confirmation of demand items first by the method of evolution of innovative designed telephone, including making the demand items of users, collecting the demand widely, selecting the demand items, categorizing the demand item etc. Depending on these procedures, this study successfully creates the design value of production through technological innovation and creation of competitive advantages in strategy. And then the researchers observed the customer demands and proposed the solution. Meanwhile, this study also applied diversity analysis to provide optimized expect system by initiation of product expect management and value.

In Figure 5, innovative telephone synthetic innovative measurements had shown telephone values of Fuzzy performance score with respect to criteria. This study explains that why the evolution of innovative designed telephone becomes the highest amongst the satisfaction of consumers, knowing that the top priority is the price and the second one is the function.

In Table 4, at least four expression modes for the preference of product which consumers has shown are used for thorough analysis to understand the crucial customer demand of innovative telephone. Then with the relative analysis of combination of exterior demand and interior quality production, the key and the implicative variables were controlled to improve the quality to these crucial points, like web phone, which has been highly emphasized in its vocal quality and delicate simple style.

Therefore, in Figure 6 and 7, the research of innovative design telephone is in Fuzzy field in the beginning. MCDM system is mainly applied in using strategy to make product design and in setting the product standard. First, we systematically transform customer demand into product feature, and then

expand to every part, and to plan the production process, controlling the manage points in each stage.

6. Conclusion

Due to the competitive product market, designers should consider the factors like function, appearance, market compartment, and price diversity, etc. to create diverse products that make various consumers satisfy. Accordingly, it is a great challenge for designers in this competitive environment. It is significant that how they analyze the market status and performance to draw up the product positioning and strategy for creating new product value. The designers also need to understand costumers' requirements. With the change of consumer's usage, the design trend for innovative designed telephones changes as well. Hence, the new technology has shown up. This present study expects to improve the telephone interaction benefit from the product innovation. Therefore, how to explore the potential function demand of consumers, that is, providing innovative solutions and integrating different systems, has become the challenge for designers.

A decision making expert system for industries management, uses product innovation technology, promotes the diversification, implements the phases of the proposed methods, builds a hierarchical system in innovative designed telephones, innovative telephone synthetic innovative measurements, product strategy, and rich product creation for customer needs, and raises production efficiency and elastic delivery opportunity. In digital product design industries development and in accordance with adapting environment vicissitude, the industry promotes the new plans from improving organization constructions and adopts the authority of labor division and the effectiveness of research results in order to accelerate to achieve the industrial pursuing operation objectives. Taking the case study of innovative designed telephones, this study has adapted the quantification solution like Fuzzy theory, product optimal expert management, and product competition. Also, this study emphasizes customers' needs to solve the problems, to design the optimal solution, to create the diversity to competitors, and to pursue the maximum sum.

Hence, in the competition, it becomes significant to apply fashion aesthetics as technological innovation for successfully achieving the goal of the delicate and creative design. So, this study establishes the trend in product innovative design, observes customer needs, controls the innovation, and stimulates the design ability. Lastly, it achieves the goal of users'

satisfaction toward the products.

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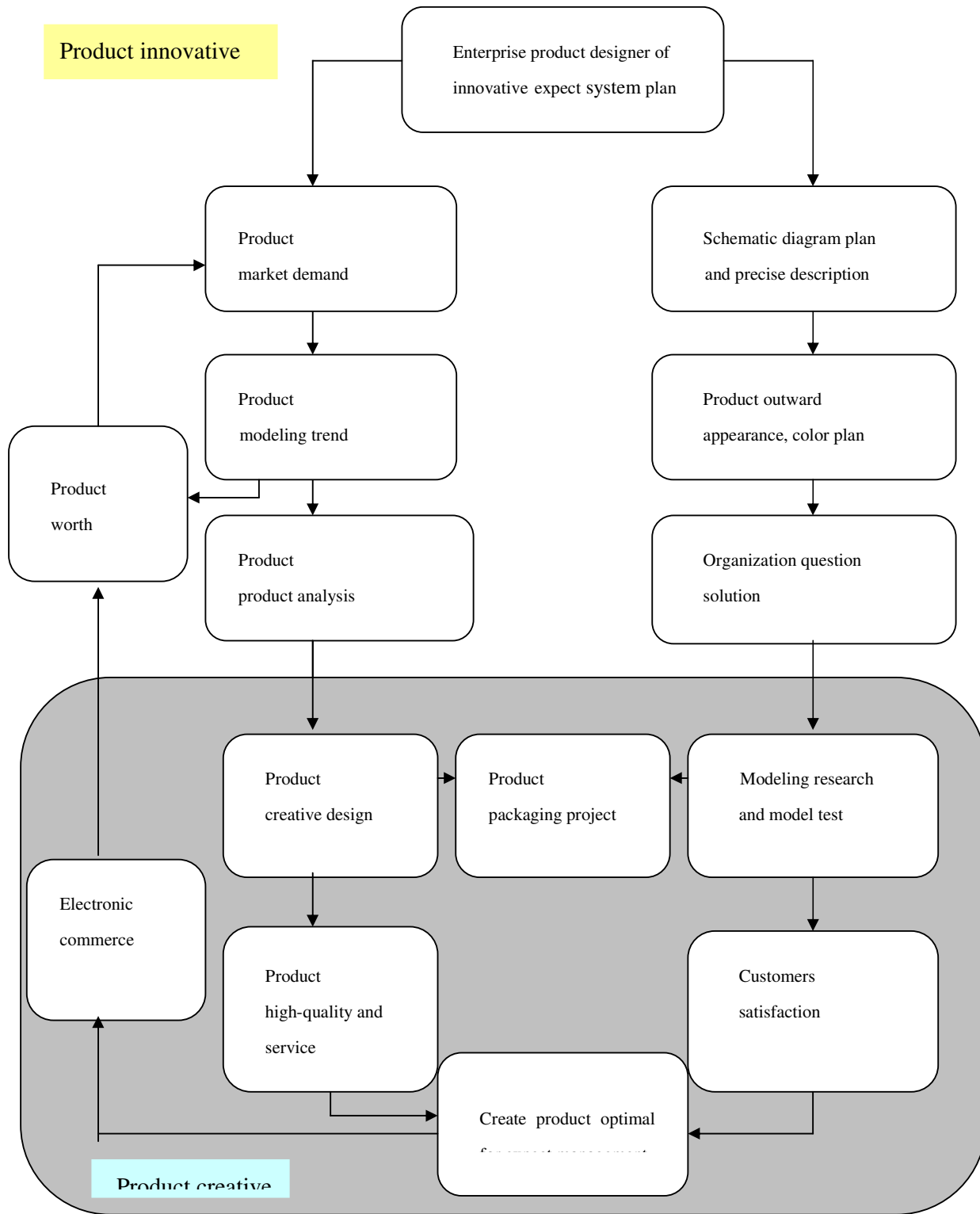


Fig.1 A decision making for educational management

Stage I
Analysis on survey on customer in Fuzzy situation

Stage II
Multi criteria decision making core evaluation for expect system

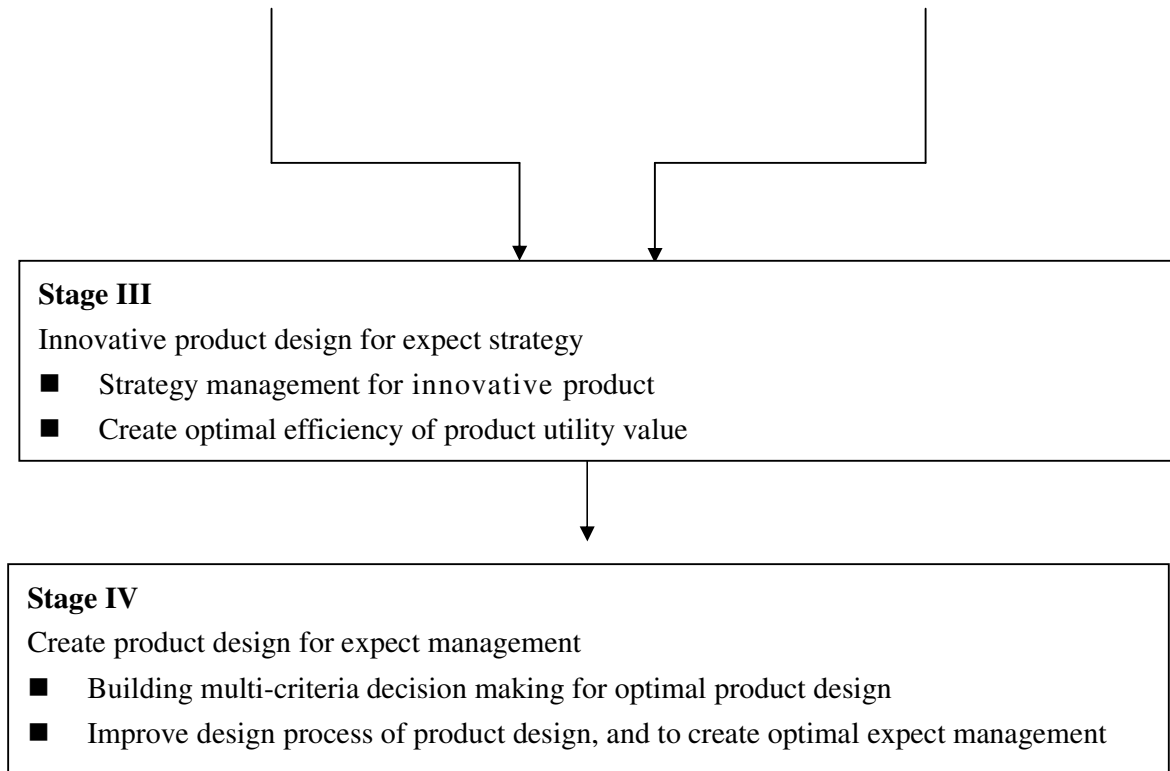
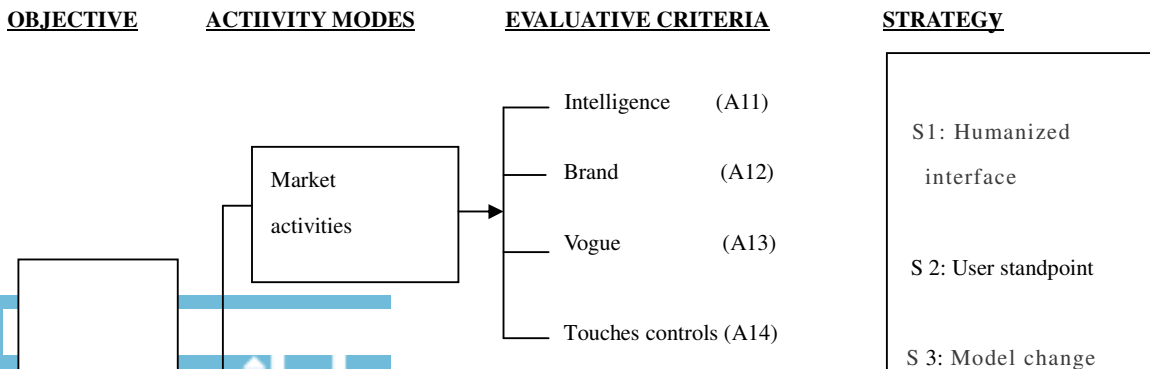


Fig.2 Create product design stages for educational management



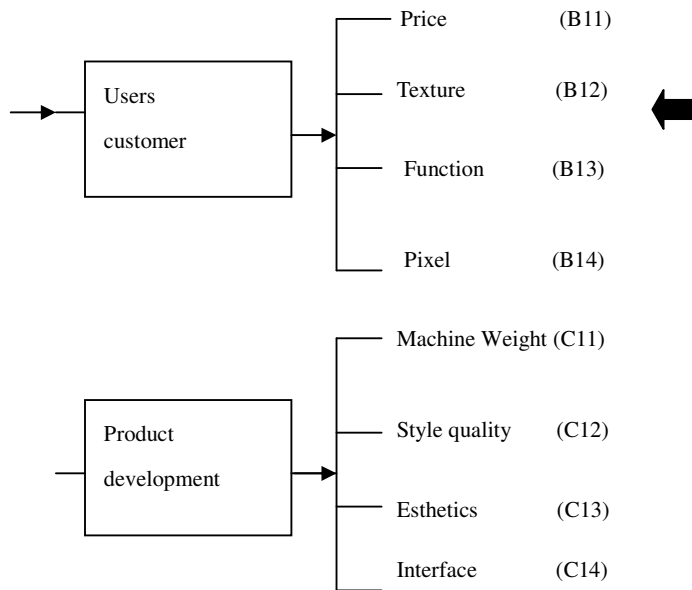


Fig.3 Building product design for educational management

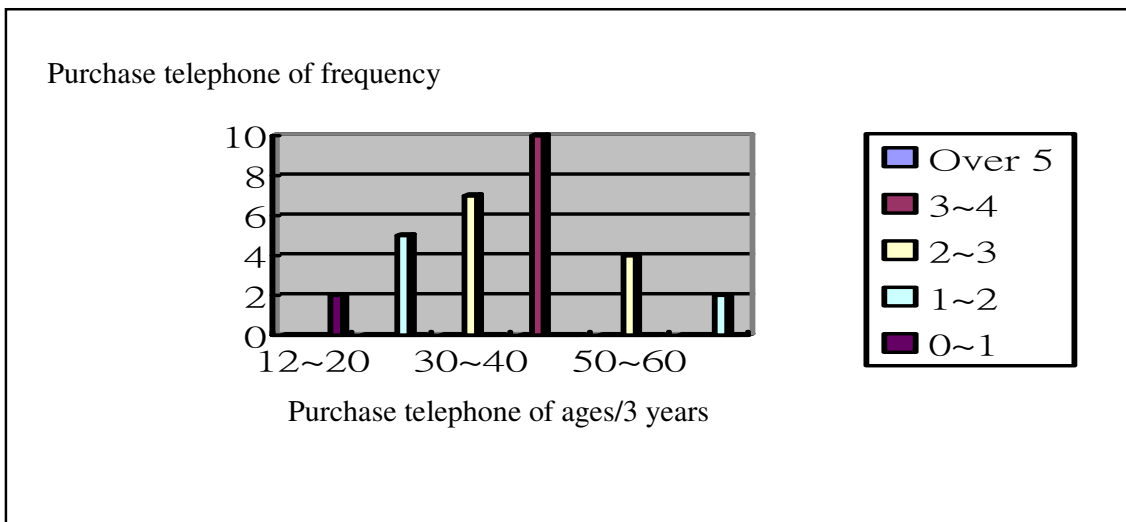


Fig.4 Frequency distribution and purchase telephone ages/3 years

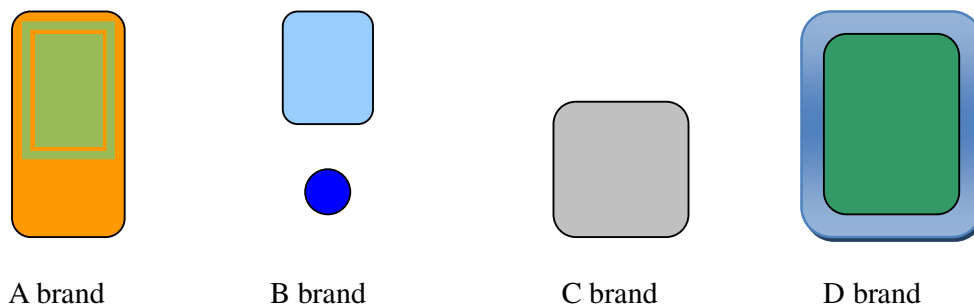


Fig.5 Expression in telephone activity brands

Telephone factor analysis

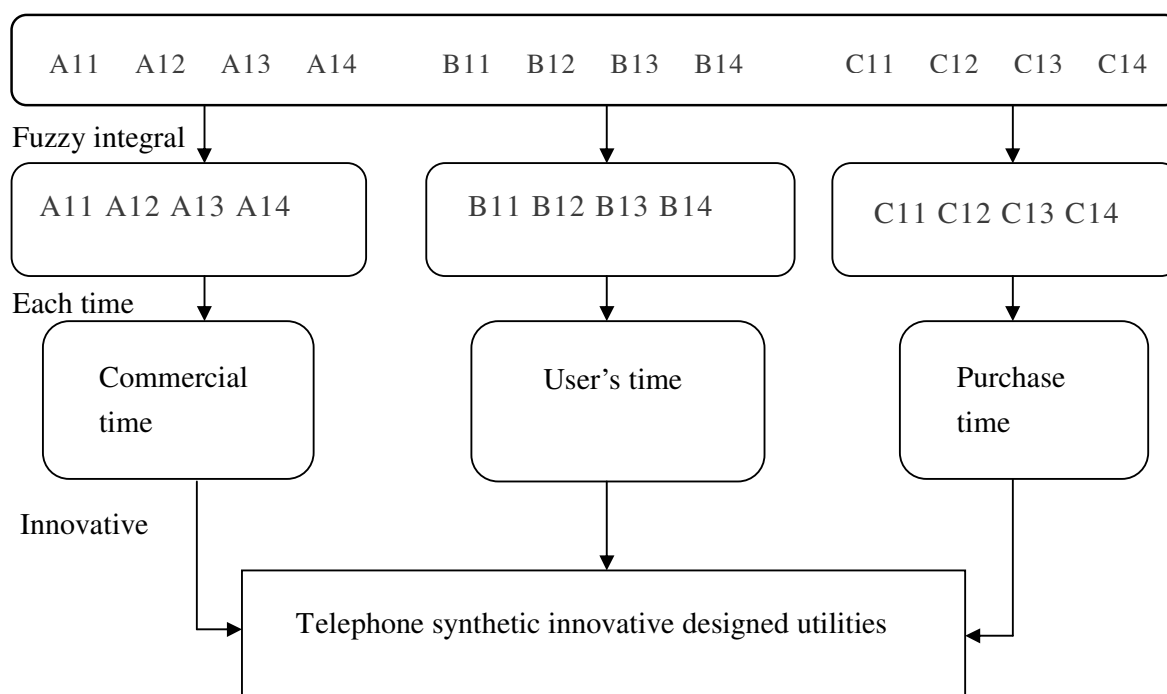
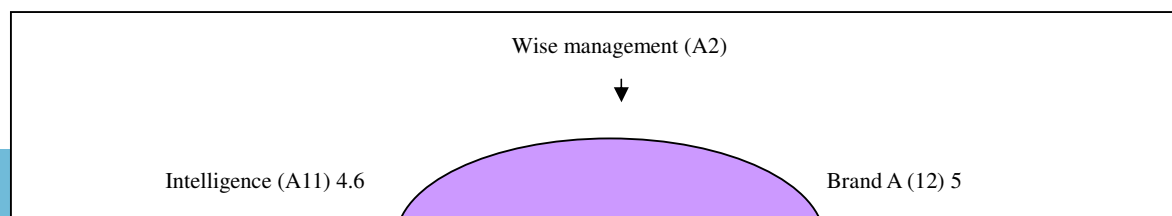


Fig.6 Result of creative optimal product design for educational management



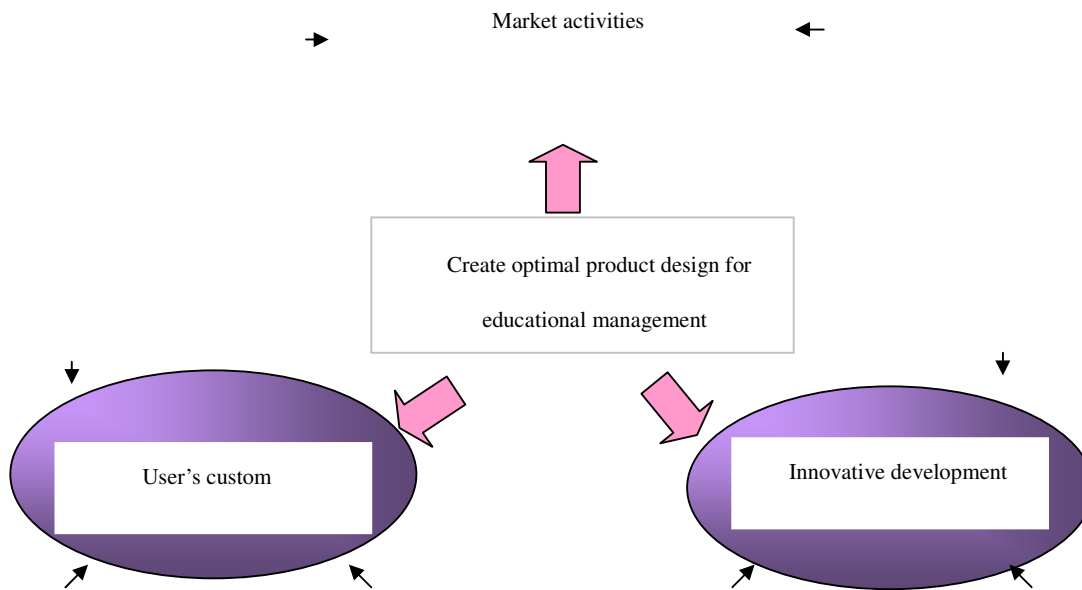


Fig.7 Results of create optimal product design for educational management

(Unit: new Taiwan dollar and hundred million yuan)

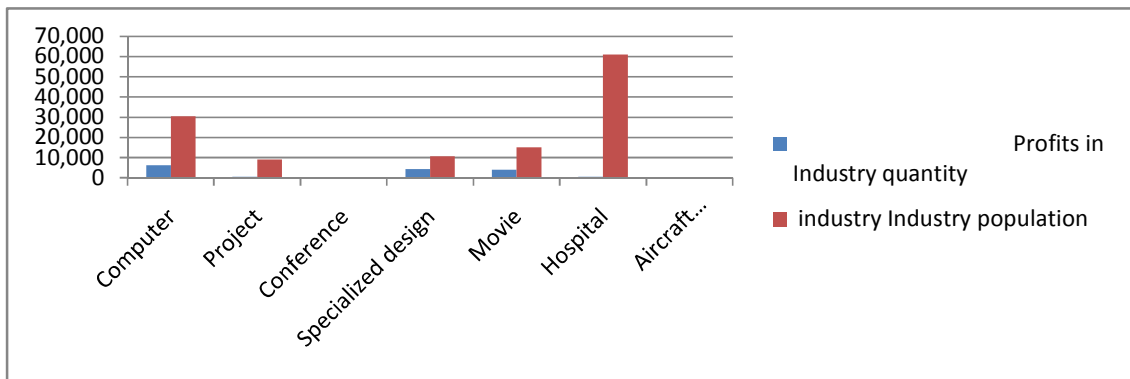


Fig.8 Educational management is success application in the Taiwan industry

Table 1 Telephone brand and feature

Telephone brand and feature

Brand	Market activities	Users customer	Product development
A	34	32	30
B	13	10	11
C	2	1	1
E	6	6	7

Table 2 Innovative designed telephone for evaluating criteria

Innovative designed telephone for evaluating criteria		
Elements	Frequency	Percentage
Market activities	6	10%
Users customer	23	44%
Product development	24	46%

Table 3 Evaluating criteria of designed telephone

Evaluating criteria of users customer				
Evaluating criteria elements	20~30Ages	30~40Ages	40~50 Ages	Mean
1. Market activities				
Intelligence	0.8	0.7	1.0	0.83
	0.9	0.9	0.7	0.83

- Brand
- Vogue
- Touches controls
- 2. Users customer
 - Price
 - Texture
 - Animation Function
 - Pixel
- 3. Productdevelopment
 - Machine Weight
 - Style quality
 - Interface
 - Total

Table 4 Consumers preference of products

Group user hobby	User values
First group mode	Machine weight
Second group mode	Style quality
Third group mode	Price
Four group mode	Function

Table 5 Number of descriptions supplied in each customer group

	Customer groups						Mean
	1	2	3	4	5	6	
Third group mode							
Machine weight	0.08	0.05	0.07	0.05	0.05	0.06	0.06
Style quality	0.16	0.14	0.15	0.14	0.15	0.14	0.15
Price	0.21	0.18	0.24	0.21	0.19	0.23	0.21
Function	0.54	0.59	0.63	0.58	0.57	0.57	0.58

Table 6 Establish the user's telephone of performance matrix

Evaluation Strategy	Use's telephone of performance matrix											
	A11	A12	A13	A14	B11	B12	B13	B14	C11	C12	C13	C14
S1: Humanized												
Interface	(0.8,0.6)	(0.8,0.7)	(0.7,0.7)	(0.8,0.8)	(0.9,0.9)	(0.6,0.6)	(0.9,0.9)	(0.6,0.6)	(0.5,0.5)	(0.9,0.9)	(0.8,0.8)	(0.7,0.7)
S 2: User												
standpoint	(0.8,0.8)	(0.7,0.9)	(0.8,0.8)	(0.8,0.8)	(1,0.9)	(0.5,0.6)	(0.8,0.8)	(0.7,0.7)	(0.6,0.7)	(0.9, 0.9)	(0.7,0.7)	(0.8,0.8)
S 3: Model												
change	(0.6,0.6)	(0.6,0.9)	(0.8,0.8)	(0.7,0.7)	(0.9,0.9)	(0.7,0.8)	(0.9,1)	(0.6,0.6)	(0.7,0.7)	(1,1)	(0.8,0.8)	(0.6,0.6)
S 4: Instinct												
Manipulation	(0.8,0.7)	(0.8,0.7)	(0.6,0.7)	(0.7,0.7)	(0.8,0.8)	(0.8,0.7)	(0.8,0.9)	(0.8,0.7)	(0.7,0.7)	(0.9,0.8)	(0.7,0.7)	(0.7,0.7)
S 5: Control												
combination	(0.8 0.5)	(0.7 0.8)	(0.5 0.6)	(0.8 0.7)	(0.9 0.9)	(0.7 0.7)	(1 0.9)	(0.7 0.7)	(0.7 0.8)	(0.9 0.9)	(0.8 0.9)	(0.7 0.6)

Table 7 Calculating telephone of synthetic utilities

Evaluation Strategy	Telephone values of criteria												
	A11	A12	A13	A14	B11	B12	B13	B14	C11	C12	C13	C14	Mean
S1: Humanized													
Interface	0.8	0.8	0.7	0.8	0.9	0.6	0.9	0.6	0.5	0.9	0.8	0.7	0.7
S 2: User													
standpoint	0.8	0.9	0.8	0.8	1	0.6	0.8	0.7	0.6	0.9	0.7	0.8	0.8
S 3: Model													
change	0.6	0.9	0.8	0.7	0.9	0.8	0.9	0.6	0.7	1	0.8	0.6	0.77
S 4: Instinct													
manipulation	0.8	0.8	0.7	0.7	0.8	0.8	0.9	0.8	0.7	0.9	0.7	0.7	0.78

Table 9 Educational management is success application in the Taiwan industry table

(Unit: Taiwan dollar and hundred million yuan)

Profits in industry		
	Industry quantity	Industry population
Service	4,050	15,093
Computer	6,288	30,476
Project	645	9,030
Conference	104	353
Specialized design	4,385	10,792
Movie	4,119	14,985
Hospital	535	61,061
Aircraft maintenance	40	-
Total	20,165	141,790

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