Kansei engineering applications in service design evaluation screening regulations

service trade as an example

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Abstract:The development of global economy becomes tangible to intangible, companies are not longer gaining profits by simply providing products, now what consumers really want is the improvement of life brought by product, scholar Moritz(2005) [1] quoted: "consumers never buy product itself, but services it provides", Service Design or New Service Development(NSD) is new, is overall and across of integration field, the goal is "create a useful, available, look-forward, effective and efficient service"(Saco & Goncalves, 2008 [2]Design Council, 2012) [3], the main cause of the rise is based on four conditions: vigorous development of the services economy, saturation of product market, development of technology made services possible and individual human needs (Moritz, 2005).

This research is based on Nagamachi's(1988) [6] Kansei Engineering, currently most of the studies of Kansei Engineering are used on entity Kansei analysis, that is evaluate through entities, now we switch the target to "Service" and make it as an example to understand the main point of service processes through consumer's intuition and establish a criterion, first find the overall structure of service industry in the process through interviews, focus groups and user experience B.J.Pine&J.H.Gilmore(1999) [7] "The Experience Economy", and separately make in-depth interviews to the users and experts, according the contents form a criterion and assign its weight value. Finally fill in the Likert scale survey to proof its module, and take it as the standard of reference for other service design

Key words: NSD, Kansei engineering, Service Design, Likert scale, User experiences

1. Introduction

1.1 Background

Recently the world has been promoted "service industry" and "Manufacturing Services" but how to achieve service value innovation and raise the competitiveness, still is the biggest difficulty. Taiwan's industrial and policy development, since the Second World War, through import substitution, the exportation guidance, the structure adjustment and the liberalized reform, Taiwan created "economical miracle", known as one of the four Asian dragons, after 2000, facing the knowledge economy competition, the government hoped that by the strength of knowledge, put Taiwan as an important part into the international industry supply chain (Taiwan's industrial

development vision and strategy, ITRI, III, 2007), the ministry of economic affairs in 2020 the industrial development strategy (2012) classified “Manufacturing Services and International Services Science and Technology” as one of the three main axis, try to improve the industrial structure adjustment and the optimization of our country through industrial and policy development. (Industrial Development Bureau of the Ministry of Economic Affairs, 2012) [9]

Although “Service science” seems a systematical and logical process with top-bottom logical concept, but the service itself focus in knowledge, feelings…non-operate value, not the non-common and obvious operational resources like the natural source material...etc. Its value also constructs between the provider and the customer their experience and cooperation. Although there is 4D proposed by Design Council (2004). For the main stages of the service design process, but the criterion of content description is still lack of standardization, it’s very difficult to standardize a intangible and emotional thing, so the service design in the 4D process has been divergence and convergence over and over recently, but step still did not judge the value of the standard, it has always been an abstract type of workshop moving forward.

Kansei Engineering is theory raised by Japan, it means that another level of goods of things cannot be measured in the ordinary way, then quantify it through the Kansei Engineering, the word “Kansei” can be explained as the feeling or imagination of man to the goods of the things, or mentally the expectation of it

1.2 Objectives

1. Combine Service Design and Kansei Engineering.
2. Use the way how Kansei Engineering concretizes the intangible, make the invisible part in the process of Service Design visible.
3. Form a criterion, used as mechanism of filtration process.

1.3 Research Limits

This research prepare for the beginning of the combination of Service Design and Kansei Engineering, Kansei Engineering to do experimental module applied in the original’s the 4D process but it’s process has been operated in certain mechanism, now only add the Kansei filtration mechanism and restrict the research in a area of services to reduce the observation target

2. Literature reviews

2.1 What is Service?

淺井慶三郎、清水茲[10]Defined Service as: Produces by human labor, rely on human behavior non-material entity. Japanese Standards Association, JSA committee of the transaction of business service quality management research point of view, he thinks service is directly and indirectly, for a cost to supply consumers, so services is considered as intangible product, but it can be sold with a price. Buell (1984) [12]defined service as once be used to sell or sold with a product, bring all the activities, benefits or satisfactions it brings, is the basic meaning of service.

Table 1. The basic meaning of service

Characteristics	Wrong Service	High quality Service
1. Need a person	Service as cost of products	Service as product, enterprises fight for it
2. Need Consumption occasion	Passive, add-on afterward type Then the rigid service after customer complaints	Service is active, front, continuously supplying Service management provides customers satisfaction.
3. No experience	Service with sacrifice	Honest, quick and smile Vivid and freshness
4. Can't be storaged	Service as cost of products	With value to impress the costumers
5.Standardize difficulties	Passive, add-on afterward type	Communication and cordial hospitality Oriented Standard mechanization and systematization of service

(Source: Buell, 1984; Organized in this research, 2013)

Learned from the above point of view, the performance of service is a person or an organization, to satisfy another person or an organization's activities. Such activities can be considered as a valuable product, additional added value of the commodity can be sold separately or with a physical commodity.

2.1.1 Service characteristics

Service characteristics of services sector has characteristics different from other industries, these features make the marketing services business, resulting in problems different from product marketing (Chenze Yi and Zhang Hongsheng, 2006). Kolter (2000) [14] defined as the service characteristics of intangible, inseparable, variable and easy to fade away things. Regan (1963) [15] and Fitzsimmons (1994) [16] for the view that the basic characteristics of the service.

Table 2. Service characteristics

Basic characteristic	Problems	Management Strategies
Quality variability	The service provides the quality unstable, scarce also not easy to substitute	Service process standardization control
		Personnel training resources management
Invisible (visibility)	Consumers don't trust service providers	Credibility and principles
		Service information transparency
Customer participation	Consumer's loose participation	Stimulate the customer participation, reducing labor costs

Product and consume synchronization	No stock, shortage	Supply chain control
		Costumer's waiting time management
Easy to vanish (cannot store up)	Full of people	Smoothing demand management
	Equipment in idle	Service energy regulation management

(Source: Regan,1963 and Fitzsimmons,1994; Organized in this research, 2013)

2.2 What is Service Design?

The rise of the service in the Economic showing a whole new style of service, although service is different from industry producing real products, but it still needs to be designed and managed (Bill Hollins,2007). [17] The first man who combined words "Design" and "Service" should be Shostack, G. Lynn [18]in 1984 published a paper "Designing Service" in the Harvard Business Review. Word "Service Design", first appeared in the book of Gill and Bill Hollins "Total Design". In the practical aspects, the UK's first Line / Work service design company was established in 2001, the American design company IDEO at the beginning of 2002, imported service design into its design philosophy, to help customers innovation and promotion across products, space and services three major fields of experience design and service design (Tian Jun, 2010) [19].

Bill (2007), explained that service design is processes and system that the designers designed for the users in his personal website of the Service design, it must be consistent, easy-to-use, and build systematically (Ye Mingdong2008).

2.2.1 Service design process and service blueprint

Service design process is a complete set of service system divided into a number of service items, then the every single item are connected as series by time and order, arrange standard operating procedures for each service projects, but there is no standard operating procedures, only concepts and forms. Clark et al. (2000) and Johnston and Clark (2001) [20] defined concept of service as: 1. Service operation, in which way provides service. 2. Service experience, direct experience for the costumers. 3. Service outcomes, effectiveness and performance for customer service. 4. Value of service as an intrinsic measure of consideration for the services to the customer favorability, constitute by 4 parts.

Construction of the following five points: 1) design service organization system 2) service design principles 3) between the customer and the employees influence each other 4) produce a good quality of service 5) to increase the efficiency of the service. (Toshiki Yamaoka,2010) [21]

(1) Service flowchart

Service design process can be applied to a variety of service projects but not necessarily to the services, the first task is to define the desired type of service and the level of interaction between consumers. Considering for the consumers, enterprises and employees to understand overall procedure, and also emphasis on the spirit of

service, establish a clear process order, known as a service procedure chart or service cycle chart. This research is based on Council (2004) summarized 4D procedures, which are Discover, Define, Develop, and Deliver:

A. Discover- The goal and culture of the company identify the real problem.
B. Define- Not avoiding mistakes, but exploring as many as possible mistakes.
C. Develop- Prototype service concepts in reality or circumstances close to reality.
D. Deliver- Employees motivation and engagement is crucial and sustainable service implementation, is important involve them at beginning of a service design process.

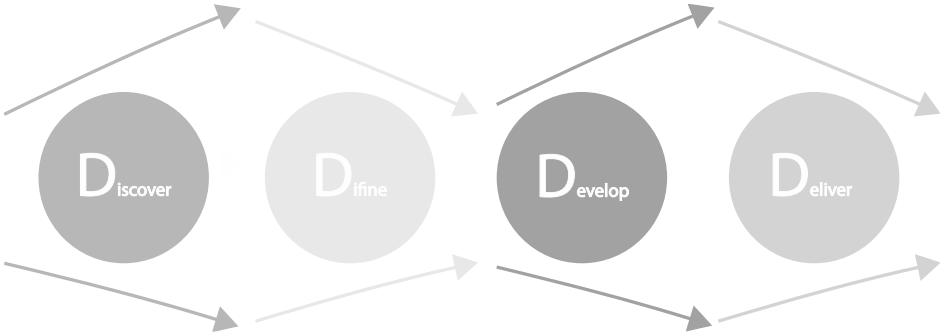

Figure1.4D Process

(2) Service blueprint

Service flow chart and service blueprint biggest difference is that: the common flowchart only present current needs and ideal situation; the blueprint, in addition to the labeling process, also analyze systematically front demand and internal support, and possibly produce contact points to emerge.

The services blueprint is through customer interaction line (line of interaction), line of visibility, internal , and enterprise management line, to inspect service as a whole situation, separated as customer's behavior, personnel service gesture and backcourt service provider's action, Shostack (1985) [22] service delivery system can use visual graphics (blueprints) to render, and as basic of service design, can be used as tool to improve service quality.

With the service blueprint inspect the service delivers the process, first describes brief service process by a simple flow chart, then aims at each contact point, pointed out possible service trouble, prevent it or improve it, eliminate invalid steps of main point of management.

(Shostack, 1992[23];Kingman- Brundage, 1989 [24])

Before drawing a service blueprint must define the service core projects and attached items, list one by one he content of service by sequence. Second, separate service project as frontcourt and backcourt, finally make sure that all the personnel are presented in the blueprint. Service blueprint can give chance to correct, at same time it can explain with details the process and contents, to facilitate enterprises or designer to find out new point of contact or innovative point of contact. To make a service blueprint most notice the followings:

A. Service blueprint focus on the frontcourt the personnel working project.
B. In the service blueprint contact point is the interaction between customers and personnel at frontcourt.
C. Services personnel action in the service blueprint corresponds to customer behavior and the service items, activities of frontcourt/backcourt should be the same.
D. Point of contact in the service blueprint derives to a design plan.

Learned above point, service design poses systematic point, point of contact is the core key of this system, must be clear to control every slight point of contact of service process. Deng Cheng Lian (2010) believes that, analysis of service contact points, in addition to focus on "service" should consider the " before service " and "after service " of all possible contact points, to constitute a complete service processes, and make the people, objects, program and environment with a digital development as contact point analysis, to facilitate the overall design of the service.

2.3 What is Kansei Engineering?

Nagamachi born in the 1970s in Japan, he create a new technology for the development of new products from consumer-oriented concepts, called "Kansei engineering", the word “Kansei” meaning in Japan is “psychological feeling and imagery produced by a product”. The Kansei engineering purpose is make consumers to shift their feeling and imagery into a new product, which is the definition of Kansei Engineering: “Technology that make consumers shift their emotions or imagery produced by product into design elements”. Using this technology, people transform concretely ambiguous emotional needs into design elements. In other words, Kansei Engineering quantifies users feeling and needs; also discover which design corresponds user emotional needs.

2.3.1 Kansei Engineering operation and architecture

In fact, the earliest Kansei Engineering is called emotional engineering, is a design element focuses human psychological perception and transforms their needs and feelings into product design, emerge the image of minds more concrete, Japanese believe that through this technology can change the ambiguous emotional needs and images, not only simple emotion, so changed it as “Kansei Engineering”, but most of all might not understand the system of Kensei Engineering, What does it’s mechanism? In Nagamachi’s paper has deeper systemic planning, is how emotionalize abstract.

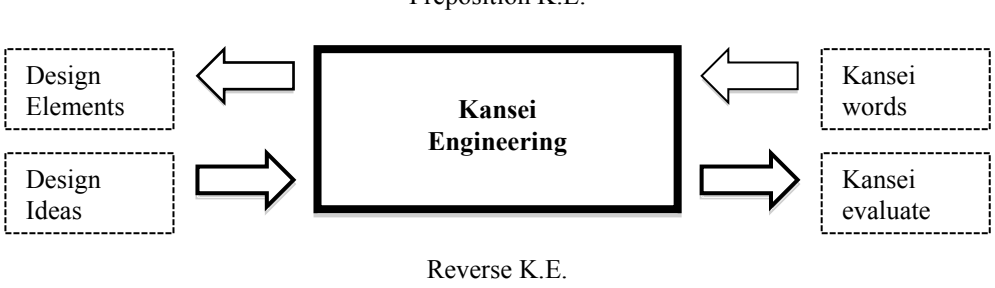

Figure2. Kansei Engineering Operation

Although known the quantification way, but ambiguous unclear can make human difficult to operate, therefore Hers Design Tour in Japan defined deeper the kansei design value of K.E., not only focus on objects, but service or other events:

A. Narrative Value:

1. People, history…etc.
2. Business background: Different region, unique…etc.
3. Evaluate value: Winning award experience, media evaluation ...etc.

B. Philosophical value:

1. Culture element: Subculture, traditional culture, fashion….etc.

2. Aesthetic elements: Japan's ancient aesthetic (Zen...etc.), Modern aesthetics (Functionalism.... etc.).

C. 5senses+αValue:

1. Visual: beautiful, cute.

2. Auditory: Sound-surround ambiance, healing.

3. Test: Delicious, bring memories back.

4. Olfactory: fragrant, linked with memories.

5. Tactile: New touch, soft.

D. Technical Value:

1. Advanced technologies: Robotic. Nanotechnology. Biotechnology...etc.

2. Traditional technologies.

3. Matured technology: Application engineering, CMF technology, special processing technology.

E. Creative Value

1.Self-change:

a. Inspired consciousness, environmental protection and social responsibility….etc.

b. Emotional inspiration: conversation, smile, emotional sonorous.

c. Inspired style: clothing style changes. Lifestyle changes.

2.Social changes: a. De facto standard. b. Create changing concept. c. Derived from the popular forces.

F. Stimulate Value:

1. New proposal: New view of the world. New values. New function. New rules.

2. Thoughts conversion: Minus plus. Use that never exists. Different areas of thoughts. Different areas hybrid.

2.4 What is user experience?

With the advent of the economic times, the concept of experience can be divided into two, one is the market, second is the user face design. In fact, as early in 1990s the United States had already put forward the concept of user experience, but no one has detailed it definition and distinction. Japan Hitachi design team to make this may become products and services trends in the future, they have done a leading work design, so gathered Japan's well-known UX researchers make a distinction and definition for UX, also invited practitioners which practically produce products and do first contact with consumers, at the end the recovered 110Questionnaires, two sides are completely different but the experience are a abstract nouns, which is the reason that we want to concrete it. [26]

3. Methods

The main purpose of this research is not change the original design process, but let all service design process to have a mechanism for screening convergence as the ratings criteria, the service itself is invisible, so the perception to the people is also invisible, for now insert mechanism experiment into process.

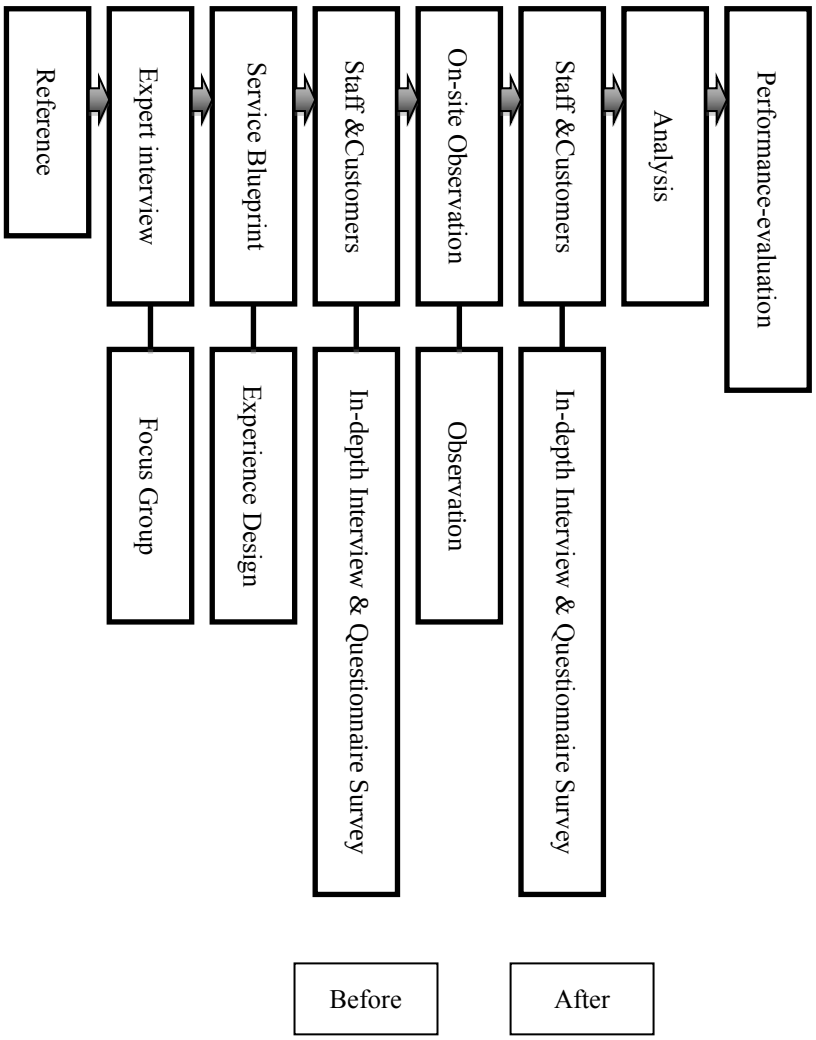

Figure3. Experimental Process

3.1 Process step

1. According to references we extract the service design process (4D) and Kansei Six value dimensions (Figure4), and link them with "Service trend" (this research takes fast-food industry as example).

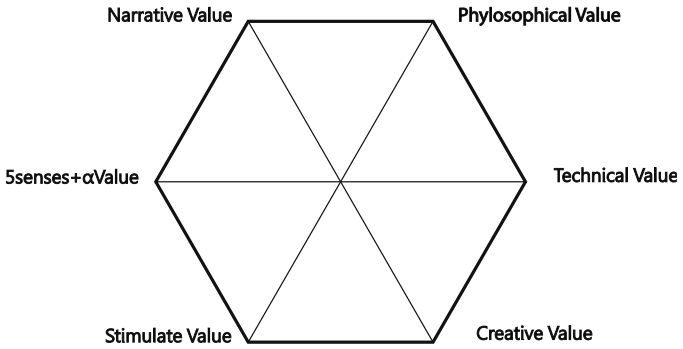

Figure.4 Kasei Six value

Discover	Define	Develop	Deliver
1. Theme Discussion (service industry). 2. Understanding and knowledge of this related industry. 3. Confirm the list of expert interviews and stores. 4. According to the information and documentation built service blueprints and emotional value-oriented.	1. Expert interviews (Operators). 2. Correct the service blueprint model and give 3. Emotional value evaluation weight. 4. Make prototype with service blueprint. 5. Experiments	1. According to the assessment of the data, identify gaps or advantages. 2. Brainstorming related programs. 3. Create the service prototype. 4. Experiment and recycle the prototype, opinion correction.	1. Develop a workable model. 2. Confirm the implementation of the capacity of the design case. 3. Assessment program risk. 4. Planning time. 5. Small-scale correction. 6. Continues establishing learning plan.

Figure.5 4D experimental Process

2. With these six dimensions, according the experts with "experience design" and do the entire front and back service process design is that draw “service blueprint” and with its judgment level of importance then do the calculus. And with “Business origami” make “service blueprint” a type paper prototype.

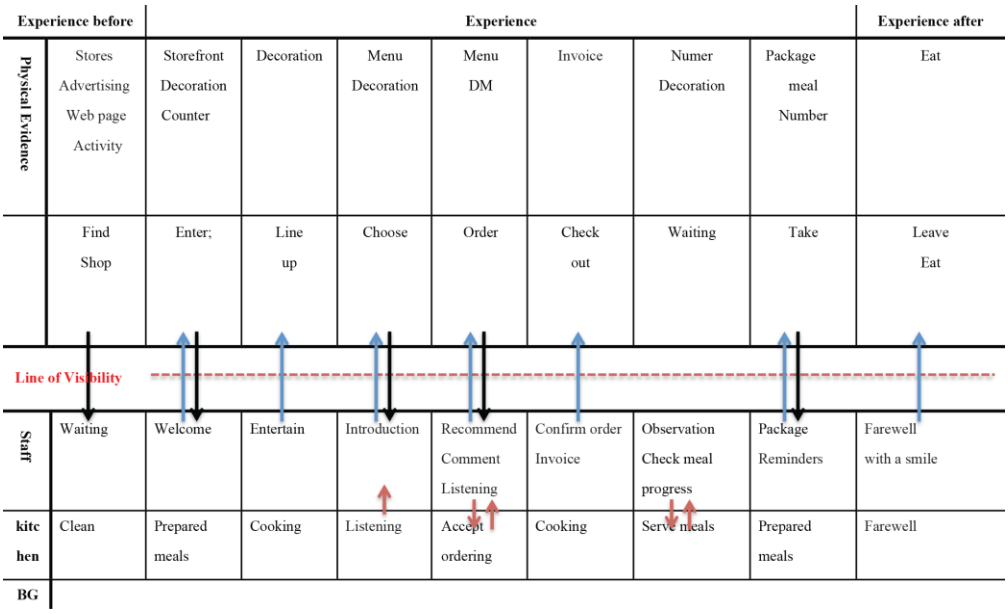

Figure6.Sevrice Blue print

3. 4 experts divided the entire fast-food industry buying process into eight stages: Then with nine stages and six kansei value perceptual level using 1 to 5 Likert scale to calculate its importance. Obtained Table4, the additional translation into percentage to see its importance (Table5):

Table3. Expers 6 Kaisen value at nine stages

Stage	1	2	3	4	5	6	7	8	9	Total
NV	25%	16%	15%	18%	16%	15%	19%	11%	13%	122
PV	20%	18%	23%	16%	12%	13%	10%	10%	13%	113
5sV	27%	23%	26%	20%	23%	19%	28%	21%	24%	171
TV	5%	16%	19%	15%	22%	19%	10%	20%	17%	122
SV	10%	19%	8%	15%	14%	18%	10%	20%	20%	115
CV	13%	8%	9%	16%	13%	16%	23%	18%	13%	110
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	753

Table4.Expers Importance Weight

	NV	PV	5sV	TV	SV	CV	Total
Total	16.2%	15%	22.7%	16.2%	15.3%	14.6%	100%

For example, this would be image that experts think of at first stage:

STAGE1

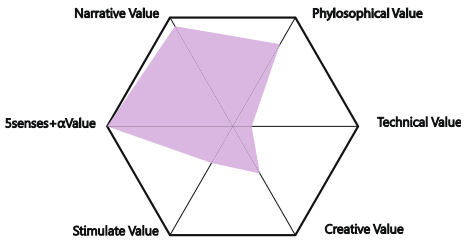

Figure7. Experts Kansei value map

4. Take this as the basic standard values of every stage analyzed by fast-food industry experts Through the weight ratio calculation were obtained NV*16.2、PV*15、5sV*22.7、TV*16.2、SV*15.3、CV*14.6
5. Take the "blueprint" of this fast-food store drawn by experts, build a prototype using “business orikami”, do an in-depth interview with first-line employees, this interview will get what they felt in the process of the opening, then looking for consumers who bought at this fast-food store, discuss what they felt with this prototype every stage of “before entering the store” to “buying food in the store”, then make a Likert scale of 1 to5 scale, 6 areas and 8 stages.

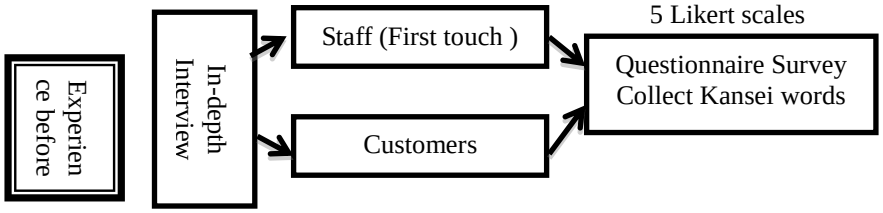

Figure.8In-depth Interview

6. Enter and observer, respectively different dates, but the same time
7. Do in-depth interviews and survey to the employees and consumers that day.
8. Make a 6-dimension pattern with: expert’s data, data and feelings before the experience, observation during the experiment, data and feeling after the experience.

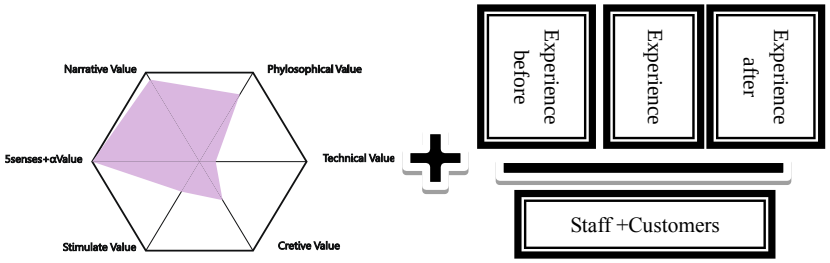

Figure.9 Data obtained

9. With this we can obtain criteria of various stages of employees, consumers and experts, it will be all different, add emotional words into every stages and with these words do increase or decrease in the scores according positive-negative words, then multiply the result with experts importance weight.
10. We can get different point and scores, and see it as a space to improve and innovation, become develop leading indicators. With this score can notice the insufficient part or miss-considered part.

Consumers	Anticipation Joy	Impatient Agitated	Attraction Attention	Judgment	Lost	Boring	Satisfied	Satisfied
	Find store	Enter	Line up	Order	Checkout	Waiting	Take the meal	Leave

Staffs	Waiting	Welcome	Entertain	Introduction	Recommend	Confirm order	Observation	Package
	Insecure Anxiety Nervous	Fatigue	Persuade	Attention	Affinity	Affinity	Alert	Satisfied

Table7. Kansei words

4. Conclusions

This research is still in process of experiment, as we can see the data is not sufficient to react all the market, but we are sure that it established:

1. Its emotional value evaluation mechanism can be standard filtration of innovative service
2. Perceptual value evaluation mechanism can not only identify the gap, also can be as appraisal standards
3. Can extend to all stages and levels
4. Definition needs to be more clearly
5. Unify the numerical benchmark, it still need to confirm.

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