

# THE INTERNATIONAL JOURNAL OF ORGANIZATIONAL INNOVATION

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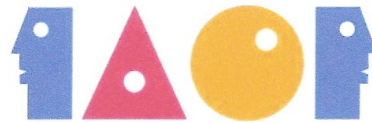
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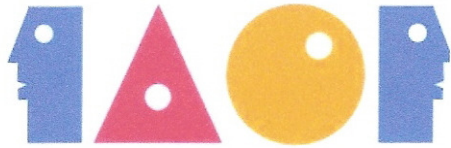
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CREATIVITY TO INNOVATION IN THE APL OF INFORMATION  
TECHNOLOGY IN THE SOUTHWEST REGION OF PARANÁ-PR

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Abstract

The Regional Development is intensified by actions and mechanisms which stimulate the generation of ideas. Creativity is a way of stimulating the innovative capacity. It boosts dynamic and innovative work, ideas and the products as well as process improvements. Thus, this paper had a goal to map creativity techniques used in the APL (Arranjo Produtivo Local) of Information Technology in the Southwest of Paraná - Brazil, to analyze the advantages of stimulating ideas that help the participating companies face changes and requirements in today's market environment. It also seeks to analyze the views of managers regarding the application of creativity techniques, and the relationship of companies, which use these techniques along with the successfully placement of innovative products in the market. Techniques of creativity, if utilized within an organization contribute to the creation of ideas and ultimately to the launch of innovative products in the market, which is paramount for Regional Development.

Keywords: regional development, creativity, innovation

## Introduction

Business knowledge can be stimulated and expanded by creativity. Learning new creative techniques is a continual process within an organization and will result in new and improved processes, product and methods.

A large number of professionals and managers from several areas have gradually showed interest in this field. It leads to organizational and professional success as it stimulates the ideas and solutions from within a company, increasing its productivity and innovation. Team development and involvement through creative and innovative work joins the procedural cycle to the creative cycle, creating a propitious environment to stimulate creativity and consequently abilities are developed and improvement in the problems solving process. Everyone involved will develop and improve their creative capacity which will be highly beneficial in the long run of a company.

Searching for new and innovative mechanisms developed in the work environment stimulates the emergence of creativity and intensifies regional development, this article aims to map creativity techniques which are used by the companies in the APL (Arranjo Produtivo Local) in Information Technology in the Southwest Region of Paraná – Brazil, as well as analyzing what the relationship between companies that use creativity techniques have with the release of innovative products in the market.



The objective was also to analyze the pros of idea generation that support or boost the company's growth and the necessary changes to cope the deep transformations and challenges in the competitive environment that surrounds them. This requires flexibility and innovation. Focusing the following questions: Can creativity be used as a tool to face these new market challenges? Do managers see creativity as a competitive advantage?

This research becomes important as the creativity techniques and the managers' vision of this tool are laid out. This allows them to create effective policies that stimulate the creation of ideas and knowledge, and therefore the Innovation, essential to local development.

### Creativity Management

Creativity according to Loures and Schlemm (2006, p.41), was seen "as the solution search to a problem, answer to a conflict in the unconscious or in the preconscious and the individual's ability to remain open to the world." However, it's been realized that it's much more the result of groups and communities than from individuality.

That is, the concept that creativity was few people characteristic is already a myth, because it can be build, depending on factors of social and cultural nature. TORRE (2008, p.21) notes that:

If in past centuries it was believed that the creator potential was a gift given to a small group of people, nowadays there is a widespread perception that we all have

a creator potential, similar to intelligence, capable of being developed. It is noteworthy then, that creativity can and must be resolved (NOVAES, 1973).

Modern society has given value to creative potential stimulus, because it's the key to holistically develop and fully train an individual. The educational environment is one of the mainly creativity stimulants, so the teacher must be creative to introduce this way a propitious environment to creativity, promoting the discovery, stimulating the creative intellectual processes, diversifying opinions, promoting the intellectual capacity, introducing the self-evaluation. Helping the student to be more sensitive, to overcome failures and to have a more democratic than authoritarian attitude (TORRE, 2008).

Thus, Melo (2002) points out: It is therefore fundamental that the school, far more than accumulating knowledge, teaches the student to reason, to develop creativity, imagination and the initiative spirit, exciting him to knowledge acquisition and enabling him to understand what the new world, that is taking shape to the professional life, will be. Because, the globalization fast changes required and the technological advances revealed an incredible capacity to creativity. The industrial park modernized itself, the relationships capital-labor are thinning and crystallizing in a much more professional relationship.

This context allows us to evaluate that creativity will only be valued from the moment when the most part of teachers, students, politicians, businessmen and managers create an

environment to teach learning methods in a creative way, with larger independence and self-organization to increase the creativity stimulus (TORRE, 2008). This educational characteristic requires the current education to contribute to the creativity stimulus, focusing its work beyond the traditional knowledge field, emphasizing what is stated by TORRE (2008, p.27):

In education, it's not allowed a lesson being given by someone who isn't qualified or without adequate knowledge about the subjects, neither we can walk blindly in a so undefined field as the creative.

However, that is also observed that, although there are already a large number of projects in the creativity field in the organizations, many questions must still be explored, mainly with reference to the influencing factors of the employee creative potential and the companies innovation process (FARIA; ALENCAR, 1996).

Among the highlight mental factors attributed to creativity, Torre (2008) cites the fluency and productivity, focusing the active education, in which the students not only listen, they also answer, participate and practice. Other factor is the flexibility, trying to require from the student besides ideas, different answers and solutions, proposing originality, with the production of unusual and ingenious answers. Cites as a creativity factor the details elaboration that contribute to the ideas development and the invention education, or the attitudinal factors and the sensitivity

to problems, as characteristic factor to a creative person. Other factor is the formation in the independence and freedom, and the creativity stimulus.

These factors that lead to creativity, can be stimulated or blocked. According to Torre (2008) the creativity stimulus factors, can be influenced by the creative climate in the classroom, and different approaches, because the question is the hook to creativity. Another stimulus factor is the use of creative techniques, besides several resources, abolish judging, and the use of praising.

In relation to the creativity blockade, Torre (2008) cites perspective and mental blockade, as the difficulty to isolate the problem, the limitation to the problem, and the difficulty to realize remote relationships. Another kind of blockade is the emotional or psychological including the insecurity, the terror of making mistakes and being embarrassed, the desire to succeed quickly. Other blockade is the social-cultural, with conduct practices, the intelligence and cooperation overvaluation, excessive importance to gender role. Still, the blockade generated at schools, with pressures, authoritarianism, bullying, overvaluation of rewards or punishment and insecurity with playful activities.

These factors are also addressed by Faria and Alencar (1996) in which they state that mainly creativity stimulus, in different companies, are the organizational, managers, and coworkers support; organizational structure; freedom and autonomy; salary and benefits;

participation; physical environment; and communication. And the obstacles: organizational structure, manager characteristics, interpersonal relationships, organizational culture, communication, lack of technological and material resources, physical environment, chores characteristics, political and administrative influences, the service amount, lack of training, salary and benefits.

Based on this context encompassing factors that affect the creativity, Torre (2008) describes the creative cube, which includes: methods, techniques and the application field, to influence creativity. This method consists in a general way to proceed, the technique with a series of steps to follow and the application field, the strategies.

With respect to the techniques and mental operations of the creative cube Torre (2008) characterizes the invention as a way to act of our minds, the analytic techniques, as an element analysis, the structural, the association, to establish links between the ideas, the metamorphic, to address redefinition skills, and mixed that joins three or more operations.

Among the creativity methods to stimulate the mind, Torre (2008) highlights the analogical method, basing on similarities to solve a new problem, the antithetical method, relying on the critical and revisionist attitude and the random method, including the concepts and relationship combinations.

Thus, Torre (2008) classifies the practice fields as figurative, that are individual, symbolic, meaningful for themselves, semantic, by its design, behavioral considering the personal planes and mixed for developing three or more fields.

### Creativity Techniques

The creativity techniques contribute to the ideas generation and therefore to the creation of innovation. Among these techniques Brainstorming is highlighted, it helps and motivates the creation of ideas, being applied in team. This technique makes the verbalization of ideas free (RODRIGUES, 2004).

That way the Brainstorming consists in a gather of a team of 4 to 12 members under the coordination of a leader, with a specific period of time, indicating ideas that arise about a defined subject. The general rule is not to criticize any idea (RODRIGUES, 2004).

Another important technique in this research is the 5W1H, being used from a checklist, which has English words applied: What, Why, When, Where, Who and How. Which means those are questions applied front a significant change.

The PNI, meaning positive, neutral and interesting technique, explores an idea by its positive, neutral or interesting points, getting beyond simple answers as yes or no (SIQUEIRA, 2009).

The Nominal Group Technique has as objective to reduce the large number of ideas generated by the Brainstorming, in which every participant will individually give a score to each idea. The selection of idea will be prioritized by the score sum.

Each technique is used or chosen as the organization deems interesting or necessary, that's why the manager knowing the importance of these techniques to generate ideas creates competitive advantage in the market.

#### APL of Information Technology in the Southwest Region of Paraná

The *NTI* or *Information Technology Center* which compose the APL, is a nonprofit association that aims to help the economic and technological development of its members and the local community involved, with a proposal of disclosure of all technical and marketing information of the region, promoting the experience exchange between professionals and associated companies and business actions that will create jobs and income.

The Arranjo produtivo Local or APL, according to Lemos (1997) can be considered as a group of companies geographically near that act around a predominant productive capacity, and share ways of cooperation.

The APL Project in the Parana Southwest Region started through a political proposition in one of the city member of the APL, but after some time it started to have autonomy, acting independently from local political support.

The NTI summarize itself in a Arranjo Produtivo Local – APL in the technological IT area. This center, is the result of business leaders efforts, and includes companies, public organs, entities and IT professionals, that is, the local community interested in develop the IT field. Nowadays there is already the State and National recognition of this entity as one of the mainly actors in the technological development process in the software field. It's mission is “Provide organization and improvement in the IT field, looking for new opportunities, partnerships and policies to achieve international reference”.

### Methodology

This research is classified as exploratory and descriptive. Exploratory because it explores a reality and descriptive by description of involved factors. It's also classified as quantitative and qualitative. Quantitative by seeking to measure in numeric data the creativity techniques used and qualitative by phenomenon interpretation.

A questionnaire was answered by managers from the 45 companies that are members in the APL in Information Technology in the Southwest Region in Paraná – Brazil, it had 67 creativity techniques, each one with a short explanation about its concepts. The manager made a mark on the side of every technique used by its company, helping in the analysis of positive points to stimulate the creation of ideas that improve the innovations, favoring companies to changes and competitiveness in the market environment. That is, a 100% of the companies where



surveyed.

These 67 creativity techniques come from a study performed by Fonseca (2009) that a survey containing more than 200 creativity techniques, concluded that the most well known are these 67 used in this research.

The companies were also questioned about the amount of innovation presented in the last 3 years, in order to relate the amount of creativity techniques used with the quantity of presented innovations.

The 67 techniques researched were the following: Advantage, Limitations and Unique Qualities, Analogies Technique, Brainstorming Technique, Individual Brainstorming Technique, Imaginary Brainstorming Technique, Brain Writing Technique, Navigation Technique, Defect Listing Technique, Random Stimulus Technique, Bullet Proof Technique, Bunches of Bananas Technique, Causal Mapping Technique, Tables Comparison Technique, Concept Fan Technique, Contradiction Analysis Technique, CPS - Creative Problem Solving Technique, Critical Path Diagram Technique, Do it Technique, Do Nothing Technique, Design Techniques, Essay Writing Technique, Evaluation – Discussion – Evaluation Technique, Fish bone Diagram Technique, 5W1H Technique, Focus Group Technique, New Look Technique, Heuristic Ideation Technique, Mark – Highlight Technique, Ideas Defender Technique, Ideal Final Result Technique, Imagination to Answer Questions Technique, Lateral Thinking Technique, Mind

Maps Technique, Morphological Analysis Technique, Negative Brainstorming Technique, NOTEBOOK Technique, Other People Definition Techniques, PDCA Technique, Preliminary Questions Technique, Productive Thinking Model Technique, Progressive Revelation Technique, Provocation Technique, Quality Circles Technique, Random Stimulation Technique, Ideas Responsiveness Technique, Relaxation Technique, Systematized Direct Induction Technique, Slice and Dice Technique, Nominal Group Technique, Technology Surveillance Technique, Reflection Group Technique, Trigger Method Technique, Using Experts Technique, Value Brainstorming Technique, Value Engineering Technique, Visual Brainstorming Technique, Goal Visualization Technique, Why? Why? Why? Technique, Creativity 7x7 Technique, Discontinuity Technique, External Opinions Technique, Comparisons and Metaphors Technique, Reverse Assumption Technique, Conscious Intuition Technique, Attribute Listing Technique, PNI – Positive, Neutral, Interesting Technique, Assumption Questioning Technique.

#### Data Discussion and Analysis

Based on the questionnaire applied containing the 67 creativity techniques, it has been noticed that from 45 company members of APL of Information Technology (NTI), only 25 use some creativity technique. At table 1, it is possible to see what are the used techniques.

Table 1. Relation of quantity of companies by used technique

Used Techniques	Company Amount
Brainstorming	25
5W1H	2
PNI	2
Nominal Group Technique	1

Source: Author

It is noticeable the lack of knowledge about the creativity potential to increase the organization innovative capacity. Only 55.5% of the organizations in the Information Technology Center use some of the creativity practice surveyed.

The companies that introduce the management creativity techniques are the larger ones, with greater market share and with the greater number of employees with specific training to the field, as curses or graduation.

Brainstorming technique was the most indicated within the organizations, being used in every company that is open to these techniques. The other creativity techniques were cited in only 5 companies.

Among the companies that use creativity techniques, occurred a greater incidence of successful innovation product placement in the market. The other 20 companies that don't use any of the creativity techniques, the average was the placement of 2 innovation products per company - being that Information Technology is a field with extreme need of innovation to be competitive in the market. Bono (2000) confirms the result in table 2, determining that the creativity stimulus is a key differentiator to companies, because it stimulates the creation of ideas to solve problems, to new methods and processes, that is, to innovation, which is the achievement of a good idea.

Table 2. Average of innovation products among NTI companies that use and don't use creativity techniques

Companies	Average of innovation products placements in the last three years
Companies that don't use creativity techniques	2
Companies that use the creativity techniques	5

Source: Author

In relation to companies that use creativity techniques it is also possible to observe, as table 3, that the greater number of creativity techniques used the greater is the amount of innovation products being placed in the market. In this sense Gurgel (2006) states that to have more opportunities, it is necessary to stimulate creativity.

Companies that showed greater creativity techniques quantity being used were the ones that had the greater number of employees with specific courses or graduation in the field.

With this survey the creativity techniques showed its importance to the creation of ideas and innovation products, that is, the relation of used techniques quantity and the quantity of innovation products being placed in the market were listed as directly proportional. According to Stoner & Freeman (1999) creativity and innovation are directly linked, since while one creates the ideas the other puts it in practice.

Company 1 proved to be the unique to use 3 different creativity techniques.

Table 3. Innovation products relation among companies that use Creativity Techniques

Company	Creativity Technique used	Innovation Products placed in the market
Company 1	Brainstorming, 5w1h, PNI	7
Company 2	Brainstorming, Nominal Group Technique	6
Company 3	Brainstorming, 5w1h	6
Company 4	Brainstorming, PNI	6
Company 5	Brainstorming	5
Company 6	Brainstorming	5
Company 7	Brainstorming	5
Company 8	Brainstorming	5
Company 9	Brainstorming	4
Company 10	Brainstorming	5
Company 11	Brainstorming	4
Company 12	Brainstorming	4
Company 13	Brainstorming	4
Company 14	Brainstorming	4
Company 15	Brainstorming	4
Company 16	Brainstorming	5
Company 17	Brainstorming	5
Company 18	Brainstorming	5
Company 19	Brainstorming	4
Company 20	Brainstorming	4
Company 21	Brainstorming	4
Company 22	Brainstorming	4
Company 23	Brainstorming	5
Company 24	Brainstorming	5
Company 25	Brainstorming	4

Source: Author

Brainstorming, 5W2H and PNI, and consequently was the company that placed more innovative products in the market. It then includes Reis (2004) ideas which states that innovation is the placement of ideas into practice, successfully. Then focuses the creativity importance to managers, in a way to create an environment that stimulates the creation, generating innovation, and contributing to the organization competitiveness this way, with increasingly need to differentiate from its competitors for its own survival.

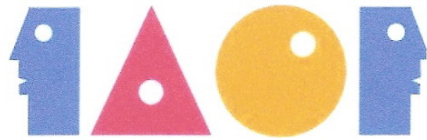
### Conclusion

Creativity as shown through this study has shown the influence it has within organizations that utilize it. New and innovative techniques may be the edge that many companies are looking for in today's competitive market. Openness to new ideas and innovative product placement is one of the most important factors in business today.

Mapping these creativity techniques demonstrates the managers' vision in relation to this theory. Competitive advantage is not being utilized by today's companies. Creativity management is not being used by managers of the associated companies of APL of Information Technology in the Southwest of Paraná. It is suggested then, to the NTI coordinators, spreading this positive relationship between the creativity techniques and innovative product placement will be important in regional development.

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A STUDY ON THE EFFECT OF ENTERPRISE BRAND STRATEGY  
ON PURCHASE INTENTION

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Abstract

Aiming at discussing the effect of Brand Strategy on Purchase Intention, this study tends to 1. understand the present situation of Brand Strategy in Taiwanese enterprises, 2. discuss the differences between Brand Strategy and Purchase Intention with various demographic variables, and 3. discuss the correlations between Brand Strategy and Purchase Intention. In such a competitive and changeable environment, it is expected that enterprises could enhance the brand and the competitiveness in various emerging marketing strategies and tactics and further promote the market status. With questionnaire survey, the executives and the employees in 2011 top ten benchmark corporations were selected as the research subjects. Total 500 questionnaires were distributed and 275 cases were retrieved. Having deleted 36 invalid ones, total 239 valid cases were retrieved, with the retrieval rate 48%. The research outcomes show the significant effect of



Brand Strategy on Purchase Intention, and the correlations between Brand Strategy and Purchase Intention appear remarkable differences on some demographic variables. Research suggestions are further proposed for the reference of enterprises and follow-up researchers.

Key words: Brand Strategy, Purchase Intention, Brand Image

## Introduction

Brand has been considered as the most valuable asset for enterprises in recent years. In such a competitive and changeable environment, enterprises therefore have to look for various emerging marketing strategies or tactics, expecting to enhance the brand and the competitiveness as well as to promote the market status. Nevertheless, these ways seem to make the marketing activity be too complicated with too much terminology. How to coordinate and integrate activities, such as advertisement, product R&D and design, customer service, business promotion, and public relationship, has become a primary issue. How do the wide marketing functions be cohered? And, what is the key single objective in the marketing process? A lot of researchers believe that establishing a brand for marketing is the establishment of a brand. In other words, the sales activity would be more effective when establishing brands in the mind of potential customers and pre-selling products or services to consumers. Moreover, what are the functions and benefits of a brand? A brand not only could assist consumers in identifying

products and provide consistent commitment and guarantee with quality, but it is often the projection of self-image for distinguishing oneself from others.

Should Taiwanese enterprises invest in the manufacturing capacity, which appears higher operational risk, or look for better choices? The establishment of private brands might be the optimal solution, as competitors could rapidly duplicate the technology or products, but not the brand. A strong brand could create business differentiation to tell the enterprise from competitors. Since the trust in strong brands could enhance the purchase intention and loyalty of customers and further achieve economies of scale, the operation cost would be reduced and the cash flow would be produced. In this case, not only does the book numbers be embellished, but it could be the basis for product research and development, consumer investigation, and brand re-investment. The brand therefore could continuously bring competitive advantages for the enterprise, presenting the importance of Brand Strategy. As a consequence, this study aimed to research the effect of Brand Strategy on Purchase Intention and expected to provide enterprises with some suggestions in marketing strategies when creating private brands.

## Literature Review

### *Brand Strategy*

Aaker (2009) mentioned that an enterprise should first understand the strategic objective before planning Brand Strategy, which aimed to create consonance between an enterprise and

consumers, so as not to expose the advantages of competitors and to well utilize the weaknesses of competitors and the advantages of the enterprise itself. To achieve such an objective, an enterprise should precede consumer analyses, competitor analyses, and self-analyses to enhance and improve Brand Strategy as well as to define the uncertain factors in Brand Strategy (Bei, 2009). Aaker & Kevin (2011) proposed Brand Relationship Spectrum to define the combination structure of the relationship between brand role and brand. Four dimensions were covered.

1. A house of brands was the set of independent and not mutually subordinate brands. Such a strategy allowed an enterprise clearly positioning the brand to focus on the niche market.

2. Endorsed brands referred to a brand being endorsed by another brand (normally organizational brand). However, Endorsed brands were independent, meaning that Endorsed brands were the major driver on purchase decisions and use experiences, while endorsing brands played the minor role.

3. Sub-brands, the brand name connecting with the major brand or the parent brand, could enhance or embellish the brand association, including attributes, applications, unprecedented innovation, brand characters, and users.

4. A branded house extended a single brand to all products, where the role of the master brand turned from a driver into a dominant driver, and the sub-brand turned from a moderate driver into a weak driver or the one without any drive.

Brand Strategy proposed by Aaker & Kevin (2011) therefore was applied in this study.

### *Purchase Intention*

Schiffman & Kanuk (2009) regarded Purchase Intention as the possibility measurement of consumers purchasing certain products that the higher Purchase Intention, the larger purchase probability. Blackwell, Miniard & Engel (2008) considered what consumers wanted being a method to predict consumer behaviors, intention as the subjective judgment on how to behave in the future, and Purchase Intention as what people tended to purchase. Shao, Baker & Wagner (2011) pointed out Purchase Intention as the consumer intention to purchase certain products or visiting certain stores. Sometimes, consumers would purchase certain products or services for filling up the demand or solving individual problems, rather than caring about the product value or the service (Wang, 2009). For instance, female consumers would purchase handy, cute and colorful goods. Or, consumers purchased alcohol for collection or gifts, rather than drinking. It showed the factors of visual perception and other emotions or psychological benefits in purchase. Shao, Baker & Wagner (2011) indicated that Purchase Intention was the consumer intention of purchasing specific products or visiting specific stores. Newbery, Klemz & Boshoff (2009) discovered two purchase levels of consumers strongly expressing the purchase intentions, including having Purchase Intention before making purchase decisions and having Purchase Intention but not making purchase decisions. Based on the intensity of Purchase Intention,

consumer confidence, and the degree of involvement, Beckett, Hower & Howcroft (2011) developed four dimensions, namely 1.Repetitive passiveness (high confidence/low involvement), 2.Rational activeness (high confidence/high involvement), 3.Dependent relationship (low confidence/high involvement), and 4.Not-purchase (low confidence/low involvement). This study then developed the dimensions of Repetitive passiveness, Rational activeness, Dependent relationship, and Not-purchase, according to Beckett, Hower & Howcroft (2011).

#### *Correlations Between Brand Strategy and Purchase Intention*

Sinha & Batra (2007) suggested that retailers should reinforce the identity of customers towards products and enhance enterprise image to appeal wider consumers; and, the research proved that Brand Strategy appeared positive effects on Purchase Intention. Fishbein & Ajzen (2007) proposed Fishbein model that consumers were likely to present higher evaluation on products with high brand awareness than the ones with low brand awareness. In this case, consumers would show better attitudes to products with high brand awareness than the ones with low brand awareness and would enhance the purchase intention. With empirical research, Aaker & Keller (2011) found that favorable Brand Strategy could promote the loyalty and trust of consumers towards the brand and appear positive effects on Purchase Intention. Laroche & Saunders (2009) considered the important effect of Brand Strategy on the purchase process of consumers that Purchase Intention would present significantly positive effects. Want (2006)

believed in the effect of Brand Strategy on the purchase process of consumers that high Brand Strategy would show remarkably positive effects on Purchase Intention, in spite of specialties or convenience products.

According to the above points of view, the following hypotheses were proposed in this study.

**H1: Brand Strategy appeared significant effects on Repetitive passiveness in Purchase Intention.**

**H2: Brand Strategy showed notable effects on Rational activeness in Purchase Intention.**

**H3: Brand Strategy presented remarkable effects on Dependent relationship in Purchase Intention.**

**H4: Brand Strategy revealed outstanding effects on Not-purchase in Purchase Intention.**

#### *Demographic Variables*

Research on Brand Strategy indicated that younger employees and the ones with higher educational background or higher income tended to higher brand concept (Day & Landon, 1977; Zaichowsky & Liefeld, 1977; Bearden & Mason, 1984). Accordingly, the following hypotheses were proposed in this study.

**H5: The correlations between Brand Strategy and Purchase Intention would appear remarkable differences on gender.**

**H6: The correlations between Brand Strategy and Purchase Intention would show notable differences on age.**

**H7: The correlations between Brand Strategy and Purchase Intention would reveal significant differences on marital status.**

**H8: The correlations between Brand Strategy and Purchase Intention would present outstanding differences on educational background.**

**H9: The correlations between Brand Strategy and Purchase Intention would show notable on monthly income.**

Research Methods

*Research Framework*

Based on domestic and international literatures on Brand Strategy and Purchase Intention, the research framework was proposed, Fig. 1. The four dimensions of Repetitive passiveness, Rational activeness, Dependent relationship, and Not-purchase in Purchase Intention were the dependent variables, while the four dimensions of A house of brands, Endorsed brands, Sub-brands, and A branded house in Brand Strategy were the independent variables. The correlations between Brand Strategy and Purchase Intention were further discussed.

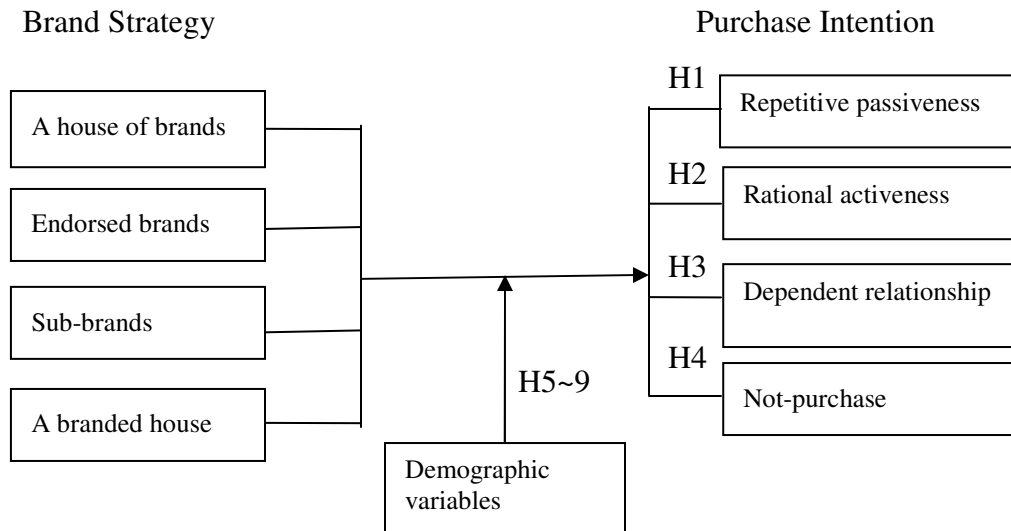


Fig. 1 Research Framework

*Research Subjects and Sampling*

With random sampling, the questionnaires were distributed and collected on-site. Commonwealth published 2011 the tenth Reputation of Benchmark Corporations in Taiwan, ranked as TSMC, Hon Hai, Formosa Plastics, Citibank, Chinatrust, Chimei, President Chain Store, China Steel, ASUSTek, and Media Tek. With the executives and employees in the top ten benchmark corporations as the research subjects, total 500 questionnaires were distributed. Within the retrieved 275 copies, 36 invalid ones were deducted that the total valid copies were 239, with the retrieval rate 48%.

## Analysis and Discussion

### *Factor Analysis of Brand Strategy*

The dimensions and the questionnaire in Table 1 were referred to Aaker & Kevin (2011). With Factor Analysis, the Cronbach's  $\alpha$  reliability of the four dimensions showed 0.91 (A house of brands), 0.87 (Endorsed brands), 0.89 (Sub-brands), and 0.83 (A branded house). With Principle Factor Analysis and oblique rotation, the explained variance appeared 87.359%.

### *Correlation Analysis of Brand Strategy and Purchase Intention*

1. Correlation analysis of Brand Strategy and Repetitive passiveness in Purchase Intention.

With Multiple Regression Analysis to test H1, the result appeared significant effects of A house of brands ( $t=2.812$ ,  $p<0.01$ ), Endorsed brands ( $t=2.134$ ,  $p<0.01$ ), Sub-brands ( $t=1.579$ ,  $p<0.05$ ), and A branded house ( $t=0.433$ ,  $p>0.05$ ) on Repetitive passiveness, Table 2, showing that H1 was partially agreed.

2. Correlation analysis of Brand Strategy and Rational activeness in Purchase Intention



With Multiple Regression Analysis to test H2, the result appeared the notable effects of A house of brands ( $t=3.167$ ,  $p<0.01$ ), Endorsed brands ( $t=2.542$ ,  $p<0.01$ ), Sub-brands ( $t=1.914$ ,  $p<0.01$ ), and A branded house ( $t=1.237$ ,  $p<0.05$ ) on Rational activeness, Table 3, that H2 was agreed.

Table 1. Factor Analysis of Brand Strategy

Factor	Variable	Eigenvalue	Factor loadings	Explained variance (Accumulated value)	Reliability coefficient
A house of brands	HB 03 HB 04 HB 01 HB 06 HB 02 HB 05	3.172	0.907 0.881 0.862 0.845 0.827 0.816	31.845 (31.845)	0.91
Endorsed brands	EB 09 EB 07 EB 10 EB 08 EB 11 EB 12	2.736	0.873 0.852 0.842 0.833 0.821 0.804	24.756 (56.601)	0.87
Sub-brands	SU 13 SU 14 SU 13 SU 15 SU 17	2.204	0.911 0.896 0.884 0.842 0.809	17.286 (73.887)	0.89
A branded house	BH 21 BH 20 BH 18 BH 19 BH 22	1.617	0.839 0.827 0.811 0.786 0.763	13.472 (87.359)	0.83

Table 2. Multiple Regression Analysis of Brand Strategy and Repetitive Passiveness in Purchase Intention

Predicted variable	Unstandardized coefficient		Standardized coefficient	t
	$\beta$ estimate	Standard error	$\beta$ distribution	
Intercept	3.735	0.473	---	9.721
A house of brands	2.715	0.311	0.354	2.812**
Endorsed brands	2.027	0.248	0.261	2.134**
Sub-brands	1.436	0.204	0.235	1.579*
A branded house	0.148	0.038	0.098	0.433

Note: \* stands for  $p < 0.05$ , \*\* for  $p < 0.01$ .

3. Correlation analysis of Brand Strategy and Rational activeness in Purchase Intention

With Multiple Regression Analysis to test H2, the result appeared the notable effects of A house of brands ( $t=3.167$ ,  $p < 0.01$ ), Endorsed brands ( $t=2.542$ ,  $p < 0.01$ ), Sub-brands ( $t=1.914$ ,  $p < 0.01$ ), and A branded house ( $t=1.237$ ,  $p < 0.05$ ) on Rational activeness, Table 3, that H2 was agreed.

Table 3. Multiple Regression Analysis of Brand Strategy and Rational Activeness in Purchase Intention

Predicted variable	Unstandardized coefficient		Standardized coefficient	t
	$\beta$ estimate	Standard error	$\beta$ distribution	
Intercept	4.127	0.583	---	14.510
A house of brands	3.115	0.336	0.299	3.167**
Endorsed brands	2.258	0.242	0.268	2.542**
Sub-brands	1.634	0.163	0.185	1.914**
A branded house	1.027	0.117	0.116	1.237*

Note: \* stands for  $p < 0.05$ , \*\* for  $p < 0.01$ .

4. Correlation analysis of Brand Strategy and Dependent relationship in Purchase Intention

With Multiple Regression Analysis to test H3, the result appeared the remarkable effects of A house of brands ( $t=3.347$ ,  $p < 0.01$ ), Endorsed brands ( $t=2.834$ ,  $p < 0.01$ ), Sub-brands

( $t=2.375$  ,  $p<0.01$ ), and A branded house ( $t=1.634$ ,  $p<0.05$ ) on Dependent relationship, Table 4, that H3 was agreed.

Table 4. Multiple Regression Analysis of Brand Strategy and Dependent Relationship in Purchase Intention

Predicted variable	Unstandardized coefficient		Standardized coefficient	t
	$\beta$ estimate	Standard error	$\beta$ distribution	
Intercept	4.325	0.612	---	16.278
A house of brands	3.271	0.347	0.342	3.347**
Endorsed brands	2.683	0.276	0.268	2.834**
Sub-brands	2.166	0.231	0.244	2.375**
A branded house	1.573	0.186	0.174	1.634*

Note: \* stands for  $p<0.05$ , \*\* for  $p<0.01$ .

#### 5. Correlation analysis of Brand Strategy and Not-purchase in Purchase Intention

With Multiple Regression Analysis to test H4, the result appeared the significant effects of A house of brands ( $t=2.315$ ,  $p<0.01$ ), Endorsed brands ( $t=1.724$ ,  $p<0.05$ ), Sub-brands ( $t=0.343$ ,  $p>0.05$ ), and A branded house ( $t=0.864$ ,  $p>0.05$ ) on Not-purchase, Table 5, that H4 was partially agreed.

#### *Moderating Effects Of Demographic Variables*

##### 1. The effect of gender on the relations between Brand Strategy and Purchase Intention

With Analysis of Variance, the empirical result presented the notable effect of gender on the relations between A house of brands ( $p<0.05$ ), Endorsed brands ( $p<0.05$ ), Sub-brands ( $p<0.01$ ) and Repetitive passiveness; between A house of brands ( $p<0.05$ ), Endorsed brands ( $p<0.01$ ) and Rational activeness; between A house of brands ( $p<0.01$ ), Endorsed brands

( $p < 0.01$ ), A branded house ( $p < 0.05$ ) and Dependent relationship; and between A house of brands ( $p < 0.05$ ), A branded house ( $p < 0.05$ ) and Not-purchase, Table 6, that H5 was partially agreed.

Table 5. Multiple Regression Analysis of Brand Strategy and Not-purchase in Purchase Intention

Predicted variable	Unstandardized coefficient		Standardized coefficient	t
	$\beta$ estimate	Standard error	$\beta$ distribution	
Intercept	3.281	0.345	---	23.842
A house of brands	2.435	0.263	0.278	2.315**
Endorsed brands	1.624	0.194	0.213	1.724*
Sub-brands	0.105	0.026	0.048	0.343
A branded house	0.375	0.057	0.079	0.864

Note: \* stands for  $p < 0.05$ , \*\* for  $p < 0.01$ .

Table 6. Effect Of Gender On The Relations Between Brand Strategy And Purchase Intention

Experiential marketing	Repetitive passiveness	Rational activeness	Dependent relationship	Not-purchase
A house of brands	$p < 0.05$	$p < 0.05$	$p < 0.01$	$p < 0.05$
Endorsed brands	$p < 0.05$	$p < 0.01$	$p < 0.01$	$p > 0.05$
Sub-brands	$p < 0.01$	$p > 0.05$	$p > 0.05$	$p > 0.05$
A branded house	$p > 0.05$	$p > 0.05$	$p < 0.05$	$p < 0.05$
Hypothesis test	H5 partially agreed			

## 2. The Effect Of Age On The Relations Between Brand Strategy And Purchase Intention

With Analysis of Variance, the empirical result presented the effect of age on the relation between A house of brands ( $p < 0.05$ ), Endorsed brands ( $p < 0.01$ ), Sub-brands ( $p < 0.05$ ), A branded house ( $p < 0.05$ ) and Repetitive passiveness; between A house of brands ( $p < 0.01$ ), Sub-brands ( $p < 0.01$ ), A branded house ( $p < 0.05$ ) and Rational activeness; between A house of brands

( $p < 0.01$ ), Endorsed brands ( $p < 0.01$ ), Sub-brands ( $p < 0.05$ ) and Dependent relationship; and between Endorsed brands ( $p < 0.01$ ) and Not-purchase, Table 7, that H6 was partially agreed.

Table 7. Effect Of Age On The Relations Between Brand Strategy And Purchase Intention

Experiential marketing	Repetitive passiveness	Rational activeness	Dependent relationship	Not-purchase
A house of brands	$p < 0.05$	$p < 0.01$	$p < 0.01$	$p > 0.05$
Endorsed brands	$p < 0.01$	$p > 0.05$	$p < 0.01$	$p < 0.01$
Sub-brands	$p < 0.05$	$p < 0.01$	$p < 0.05$	$p > 0.05$
A branded house	$p < 0.05$	$p < 0.05$	$p > 0.05$	$p > 0.05$
Hypothesis test	H6 partially agreed			

3. The Effect Of Marital Status On The Relations Between Brand Strategy And Purchase Intention

With Analysis of Variance, the empirical result presented the effect of marital status on the relations between A house of brands ( $p < 0.01$ ), Endorsed brands ( $p < 0.05$ ), Sub-brands ( $p < 0.01$ ) and Repetitive passiveness; between Endorsed brands ( $p < 0.05$ ), Sub-brands ( $p < 0.01$ ), A branded house ( $p < 0.01$ ) and Rational activeness; between A house of brands ( $p < 0.01$ ), Endorsed brands ( $p < 0.01$ ), A branded house ( $p < 0.01$ ) and Dependent relationship; and between A house of brands ( $p < 0.01$ ) and Not-purchase, Table 8, that H7 was partially agreed.

4. The Effect Of Educational Background On The Relations Between Brand Strategy And Purchase Intention

With Analysis of Variance, the empirical result presented the effect of educational background on the relations between A house of brands ( $p < 0.05$ ), Endorsed brands ( $p < 0.05$ ) and

Repetitive passiveness; between A house of brands ( $p < 0.01$ ), Sub-brands ( $p < 0.05$ ), A branded house ( $p < 0.01$ ) and Rational activeness; between A house of brands ( $p < 0.05$ ), Sub-brands

Table 8. Effect Of Marital Status On The Relations Between Brand Strategy And Purchase Intention

Experiential marketing	Repetitive passiveness	Rational activeness	Dependent relationship	Not-purchase
A house of brands	$p < 0.01$	$p > 0.05$	$p < 0.01$	$p < 0.01$
Endorsed brands	$p < 0.05$	$p < 0.05$	$p < 0.01$	$p > 0.05$
Sub-brands	$p < 0.01$	$p < 0.01$	$p > 0.05$	$p > 0.05$
A branded house	$p > 0.05$	$p > 0.01$	$p < 0.01$	$p > 0.05$
Hypothesis test	H7 partially agreed			

( $p < 0.05$ ), A branded house ( $p < 0.05$ ) and Dependent relationship; and between A branded house ( $p < 0.01$ ) and Not-purchase, Table 9 that H8 was partially agreed.

5. The Effect Of Monthly Income On The Relations Between Brand Strategy And Purchase Intention

With Analysis of Variance, the empirical result presented the effect of monthly income on the relations between A house of brands ( $p < 0.01$ ), Endorsed brands ( $p < 0.01$ ), Sub-brands ( $p < 0.05$ ), A branded house ( $p < 0.05$ ) and Repetitive passiveness; between Endorsed brands ( $p < 0.01$ ), Sub-brands ( $p < 0.05$ ), A branded house ( $p < 0.01$ ) and Rational activeness; between A house of brands ( $p < 0.01$ ), Endorsed brands ( $p < 0.05$ ), Sub-brands ( $p < 0.05$ ), A branded house ( $p < 0.01$ ) and Dependent relationship; and between Endorsed brands ( $p < 0.01$ ), Sub-brands ( $p < 0.01$ ) and Not-purchase, Table 10, that H9 was partially agreed.

Conclusion

Promotion in an organization aims to select the proper manpower in each position or cultivate the ones with potential to present better development and to contribute to the organization effectively enhancing Purchase Intention and competitiveness. For this reason, this study proposed the following suggestions for effectively establishing a complete promotion system to enhance Purchase Intention.

Table 9. Effect Of Educational Background On The Relations Between Brand Strategy And Purchase Intention

Experiential marketing	Repetitive passiveness	Rational activeness	Dependent relationship	Not-purchase
A house of brands	p<0.05	p<0.01	p<0.05	p>0.05
Endorsed brands	p<0.05	p>0.05	p>0.05	p>0.05
Sub-brands	p>0.05	p<0.05	p<0.05	p>0.05
A branded house	p>0.05	p<0.01	p<0.05	p<0.01
Hypothesis test	H8 partially agreed			

Table 10. Effect of monthly income on the relations between Brand Strategy and Purchase Intention

Experiential marketing	Repetitive passiveness	Rational activeness	Dependent relationship	Not-purchase
A house of brands	p<0.01	p>0.05	p<0.01	p>0.05
Endorsed brands	p<0.01	p<0.01	p<0.05	p<0.01
Sub-brands	p<0.05	p<0.05	p<0.05	p<0.01
A branded house	p<0.05	p<0.01	p<0.01	p>0.05

Hypothesis test	H9 partially agreed
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1. house of brands in the target consumers, the house of brands could be classified (e.g. Coke), regional (e.g. Swiss watches, French wine), or consumer-decisive (e.g. durability) and further get into the house of brands in the company. It would reduce the dislocation risk between brand positioning and target consumers as well as enhance Purchase Intention.
2. Both the brand and the strong become the strong. In comparison with pure Brand Image, Brand Image established by the group attribute of brand presents more stable status in consumers. The attribute positioning of A house of brands could result in consumer illusion and save a large amount of communication cost and time cost that it could connect brands with the recognized strong of consumers and rapidly become the strong.
3. The planning of Brand Strategy. Enterprises should apply Brand Strategy to enhancing Brand Image, promoting product awareness and loyalty of consumers, and establish a favorable Brand Image. First, quality, as the key of Brand Strategy implementation, is the life of products that strict quality control is regarded as the primary condition for expanding, maintaining, and developing a brand. Second, market is the basis of Brand Strategy implementation that market-oriented ideas should be built in market strategies. The topic of market change should be firmly covered from the development to the marketing of products

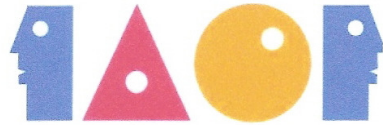


so as to furthest satisfy customer demands.

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## WHY CAN TECHNOLOGY CONTINUE TO BE INNOVATED?

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### Abstract

The study based on a longitudinal and qualitative case study to analyze, develop and establish “Creative Dynamics Field” perspective, from which we induced that there apparently is a “Creative Dynamic Field” existing inside excellent organizations. The major key factors come from organizational belief and leadership, employees’ characteristics and passions, and the

establishment of core technologies. The dynamic source that drives organizational technology to continue innovating is resulted from the harmonious coexistence of the three aforesaid factors and must be built on organizational field in order to be formed and realized. Result of this study can also be extended to explain the source of creating competitive advantage and emphasizes the importance of “Creative Dynamic Field” in companies’ technology innovation process.

Key Words: Innovation, Organizational Belief, Dynamic Capabilities, Field Theory , Creative Dynamic Field Theory

## Introduction

Innovation capability is one of the key factors that dominate future competitive advantage of business (Tang, 1999) and can also effectively increase a business’s competitiveness (Nonaka and Takeuchi, 1995) meaning that after a business finds opportunities it goes ahead with the creation of new product, technology, service and operation flow (Van de Van, 1986) and thus obtain success in innovation (Akman and Yilmaz, 2008). For companies, understanding the process of how to create competitive advantage is very important. In the domain of enterprising management and strategic management, companies are concerned about how to base on analysis of outside environment to identity competitive advantages that can create value (Shane and Venkataraman, 2000) establish advantageous market positioning (Porter, 1980) and, through analysis inside the company, effectively utilize the resources built inside the organization to develop benefit brought about by opportunities (Barney, 1991) and even use network

relationship to obtain possible complimentary resource from outside environment to help companies developing opportunities (Tsang, 1998; Gulati, Nohria, and Zaheer, 2000; Hitt, Ireland, Camp, and Sexton, 2001).

The earliest literature on dynamic capability is proposed by Richardson (1972) who believed that dynamic capability provides companies the capability of renewing or innovating self ability in market position, such as expanding companies' market position to further renew development of related activities, thus entering new market. Teece, Pisano and Shuen (1997) effectively integrated "dynamics capability" and explained that resource basis theory cannot appropriately explain why a business, although possesses unique capability, cannot own competitive advantage in a fast changing and highly uncertain environment. Veorna and Ravasi (2003) argued that companies integrate organization's competitiveness and capability to allow organization creating new product and flow to cope with dynamic market environment.

The field theory proposed by Lewin (1951) treats human behavior as the result of continuous interaction of internal force (such as personal need, feel and attitude) and outside force (environmental characteristic that a person cognizes in a specific place) meaning that behavior moves in a living space full of both attractive and obstructive force. In a simple term, behavior is the result of interaction between people and environment. Nonaka and Takeuchi (1995) believed that "Ba" is a physical, imaginary, and mental facility. The relationship between hidden

knowledge of business organizations and "Ba" is inseparable. Therefore, for flexible application and creation of knowledge, "Ba" has become the basic important element. (Nonaka and Takeuchi, 1995)

In this study we based on literatures of field theory, "Ba", and Dynamic Capabilities Theory to develop "Creative Dynamics Field" perspective and through a longitudinal and qualitative single case study to analyze and explore in depth case company-Largan Precision Co., Ltd.(Largan Precision), to conclude important factors of "creative dynamic field" theory, thus fulfilling the process that cannot be explained by past theories. The study would disclose how the nature of those important factors affect organizations' continuing in technology innovation, further identifying opportunities in the market, making favorable market positioning, and maintaining the best competitive advantage in the industry.

## Literature Review

### *Organizational Belief*

For a business entity, in the process of setting strategies, organizational belief is a rather important sector, because a long lasting organizational belief system can be seen as a source of competitive advantage. (Collins and Porras, 1994; Porac and Rosa, 1996; Tripsas and Gavetti, 2000) On the other hand, Watson Jr. (son of IBM founder Watson) proposed that the success of an organizational business comes from the inspiration of employees' talent and energy and the

adaptability of a great entity is not the organizational form or management skill, but the power of belief and the attractiveness of the belief on employees. He pointed out: “Any organization that wants to survive and succeed must first has a complete set of belief as the utmost principle of every policy and behavior, and, secondly, must abide by those beliefs; in a ever-changing world, to confront challenge, one must prepare for self pursuance of changes while the only thing that cannot be changed is belief.” (Watson Jr., 2003).

From the perspective of cognition school of thought, a company in the process of creating competitive advantage would be affected by the manager’s personal cognition. Entrepreneur under the influence of past experience would play a very important role in the establishment of organizational belief (Prahalad and Bettis, 1986; Baron, Hannan and Burton, 1999). In another words, in processing strategy making in an organization, the key participants, such as beliefs of CEO’s and high level operating management team, etc., would form an organizational belief of a particular strategic activity. Such organizational belief represents an organization’s determination on insisting and executing certain strategic activity and thus affects the result of the strategy being implemented.

Although organizational belief, organizational culture and main stream logic share the same creator-all from high level management, but for the subject of analysis, the main analyzed subject of organizational culture and main stream logic usually uses organization as a unit, such

as 3M, which has an organizational culture of encouraging innovation, and Apple Computer, of which the main stream logic is an inspiring type of logic. However, organizational belief is usually focused on certain strategic action as analyzing unit, and further understands what kind of effects these specific strategic action has on organization. For example, Cliff, Jennings, and Greenwood (2006) pointed out that organizational belief would affect organization in the result of innovation action. The study aims to analyze the collective belief formed by members of high level operating management team within an organization (not only concerns on individual's value concept), how organizational belief (not focus on the constraining power of norms) affects the executing result of organizational strategic action.(not simply focus on overall performance of organization, such as organizational culture, main stream logic). Thus, the study used "organizational belief" as one of the explanatory variables, attempting to disclose how organizational belief affects a company's innovation action and result.

### *Innovation Capability*

Innovation capability is one of the key factors that dominate a business's future competitive advantage (Tang, 1999) and can effectively bring up competitiveness, (Nonaka and Takeuchi, 1995) meaning that after finding opportunities, a business would go on create new products, service and operation flows (Van de Van, 1986) and further obtain innovation success (Akman and Yilmaz, 2008). After 1990s, because of the increasingly complex and highly



competitive operating environment, the sole reliance on individual inventors or research and development inside a business in dominating process can no longer complete innovation, which can only be treated as the result of a continuous process. The success of such process must be done through cooperation and interaction of a group of interdependent individual knowledge holders. Therefore, innovation is not an accidental event of technology development any more, but is established on the process of social interaction (Teece, 1998).

Henderson and Clark (1990) classified technology changes into gradual and radical advancing innovation types, of which radical advancing innovation establishes a structure inlaid and linked by new type of professional design and core concept, while gradual advancing innovation refines and expands existing design further. Past researches have found that internal and external factors would affect innovation capability, which in turn is significantly related to innovation performance (Romijn and Albaladejo, 2002; Akman and Yilmaz, 2008). For example, Herrmann (1999) argued that the ability and knowledge needed by organizational gradual advancing innovation is less than its radical counterpart, and the risk is also lower (Pitt and Clark, 1999).

#### *Dynamic Capability and Dynamic Field Theory*

The so-called dynamic capability can be classified to two parts, dynamic and capability, of which dynamic means that an organization can renew its capability to be consistent with the

changing environment, so that when the timely market, timing, and technology rapidly change and the future competitive market and competition is hard to be decided, there is a need for a specific innovation response. Capability relates to the way a business adapt, integrate, reestablish skills, resources, and ability inside and outside the organization to comply with the changing environment (Teece et al., 1997). Eisenhardt and Martin (2000) argued that dynamic capability is the use of one's own capability to create, integrate, merge and release resources, a process that companies implement to integrate and regroup resources to comply with or create market changes. Molin (2000) pointed out that dynamic capability allows companies to develop better capability than their competitors in confronting changing and uncertain market environment and they can rely on this capability to maintain competitive advantages and increase market value. Zollo and Winter (2002) proposed that dynamic capability comes from learning. In the pursuance of improving effectiveness, it is a learned stable model of common activities systematically generated and modified for its operating rules and regulations through organizations.

In addition, Zott (2003) believed that dynamic capability is inlayed in the organizational process and decide forms of resources and operating rules and regulations of organizations (Nelson and Winter, 1982; Zollo and Winter, 2002). The forms of resource adjustment experience three processes: "variation- imitate or experiment to seek possible resource modification plan, selection – evaluate and select plan that can bring in most profit, retention-

execute selected new plan and maintain special resource forms,” through which company’s resource form is changed, thus affecting company’s competitive advantage in the industry.

The field theory proposed by Lewin (1951) treats human behavior as the result of continuous interaction of internal force (such as personal need, feel and attitude) and outside force (environmental characteristic that a person cognizes in a specific place) meaning that behavior moves in a living space full of both attractive and obstructive force. In a simple term, behavior is the result of interaction between people and environment. In his field theory Lewin pointed out that group should be seen as commonly formed by a part of interaction, meaning that during any time group is equipped with a mind field. Such life space includes everyone’s internal and external characteristics (Lewin, 2001). The study of Cattell and his team members in the University of Illinois has contributed a lot on the concept of group dynamics. Cattell believed that leaders have rather huge influence on group dynamics. Leaders can be defined as persons with influencing syntality (Cattell, 1980).

“Inside freedom and outside freedom” is similar to the situation of knowledge creation in scientific society and “Ba”(Lin, 1983) is the situation of knowledge innovation in a business organization. “Ba” is a physical, imaginary, and mental facility. The relationship between hidden knowledge and “Ba” is inseparable. For flexible application and creation of knowledge, “Ba” has become the basic element (Nonaka and Takeuchi, 1995). Nonaka and Takeuchi (1995) further

pointed out that in the process of instigating SECI (knowledge flow) and promoting knowledge workers' self development, "Ba" plays an important role. "Ba", in one way is an agent that actuates individual object, while at the same time the individual object may actuate the organization. How to make the kinetics of "Ba" to evaporate, organizational culture and reform in personal conscious are necessary and important factors (Nonaka and Takeuchi, 1995). Thus, 'Ba' is the key mechanism in creating hidden knowledge and promoting interactive circulation of knowledge. "Ba" is the essential factor of knowledge creation. The core elements forming "Ba" are organizational culture and personal conscious. The "Ba" (or situation) of organizational knowledge creation is the key factor that affects knowledge innovation. Only an effective handling of the complex and unstable humane side of organizations can stir up an organization's dynamics and release employees' potentials (Barnard, 1938).

In this study we based on literatures of the aforesaid Field Theory, Ba, and Dynamic Capabilities Theory to develop "Creative Dynamics Field" perspective and analyze and explore in depth through a longitudinal and qualitative inspiring case study to conclude important factors of Creative Dynamic Field theory. Therefore, the study defines "Creative Dynamic Field" as a gradually forming thinking concept or technology base only through an organization's existing Ba or Field in compliance with the organization' original dynamic capability and under multi-dimensional interactions, thus a business can maintain its competitive advantage in the industry.

## Research Methods

### *Research Strategy*

The study aims to develop and extend “Creative Dynamic Field” perspective based on the aforesaid literature review, for exploring, analyzing and concluding the key factor of creative dynamic field of Largan Precision, disclosing how the nature of these important factors affect continuance of an organization’s technology innovation, thus seeking and identifying opportunities in the market, and making favorable market positioning to maintain best competitive advantage in the industry. All is summarized in Figure 1, concept research structure chart.

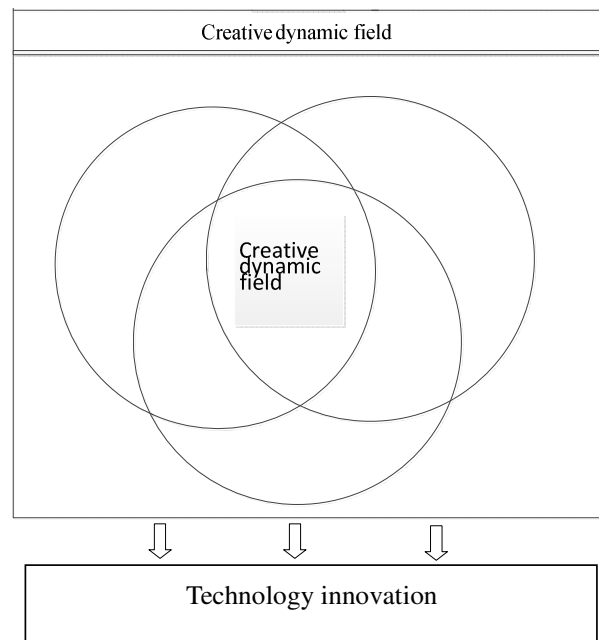


Figure 1. Concept structure of this study

Case study is the use of a specific thing or object in a specific time as study subject. For a single case, an in-depth and all around exploration on a business not only can be done by a longitudinal observation from historical evolution point of view, but also can be viewed cross-sectional on environment, industry and market competition in a particular time point for a complete analysis. An in-depth and complete case study, regardless of exploring a business's successful process, or examining the business's reason of failure, or even the strategic evolution and transformation of company development, all must be done by in-depth case study to learn the picture, meaning that the form of study question is "how" and this study "does not need to control behavior event" and "emphasizes on the event that happened". Thus, research strategy of this study implements "case study method", attempting to clarify one or a group decisions: why it is selected, how to execute, and what kind of result (Yin, 1994; Schramm, 1971).

On the other hand, according to Yin (1994), the reason of performing single case study include: the case is a test on a key case of a well-formulated theory; the case represents an extreme or unique case, because it is very rare, it is worthy to be recorded and analyzed; disclosed type of case, for phenomena that cannot be explored by previous scientific research, when researchers have chance to analyze, the situation would appear. In addition, the correspondence author of this study has been working in Largan Precision for over twenty years and is presently the special assistant to the chairman of the board and the third author also has

been the company's secretary for four years. Through the authors' personal participation in industry observation and even obtaining information that cannot be known outside the company, they all make this study a disclosing type of effect.

#### *Data Collection Source and Summary Analysis*

In the source of data, the study based on Yin's data collection principle of case study (1994)-implementing multiple sources of evidence and triangle examination method. The study used triangle examination method of multiple sources of evidence to increase reliability of the structure, aiming to confirm through cross examination of different data sources whether the data collected can correctly reflect the case's background knowledge that the study needs to understand and the phenomena that study wants to observe, in order to examine whether multiple data achieve convergence, thus increasing the structural reliability of this study. Data of this study mainly consist of primary and secondary data, as shown in Attachment Table 1. In addition, the study applied the form of narrating font (Pentland, 1999) in explanation-building (Yin, 1994) and presented evolution of technology enterprising and the cause-effect relationship among events by timeline (Yin, 1994). In the process of data analysis, the study relied on the spirit of Eisenhardt (1989) in inductive research, such that data analysis is usually difficult to be separated from data collection, because the systematic comparison processed on theory based on data and evidence obtained from single case is a repetitive process.

Table 1. List of case study data bank

Type of data	Content of data	Method of data recording method and place of storage
Primary data	Interview record	Electronic word documents and recording file
Secondary data	Website of Largan Precision Co., Ltd.	<a href="http://www.largan.com.tw/">http://www.largan.com.tw/</a>
	Related information in the internet	Categories files of electronic word documents
	Related books or reports in newspapers and magazines	Please refer to reference of this study
	Organizational belief and strategic entrepreneurship: Case study of Largan Precision Co., Ltd.	Doctoral dissertation, Department of Business Administration, National Yunlin University of Science and Technology
	The Technology Innovation Evolution of Optical Component Industry in Taiwan	PICMET'2011 CD-ROM

### Introducing Case and Enterprising Tack

#### *Introduction of Largan Precision*

The headquarter office and four manufacturing plants of Largan Precision are all in Taichung Industrial Zone, Taiwan. Subsidiary in mainland China includes Largan Optronics Co. Ltd., in Dong-Guan and Suzhou Largan Co. Taiwan headquarter is responsible for productions, sales, operations, and performing relative management and control operations on subsidiaries, while subsidiaries in China have functions of productions and sales, not only to domestic market in China, but also marketing operations in international market and operate international division of labors in the production with parent company in Taiwan. In present the total employees in



Taiwan and overseas are approximately 2,500 and 3,000, respectively. The company's main products and their usage are illustrated in Table 2.

Table 2. Products of Largan Precision Co., Ltd.

Major products	Purpose/Function
Optical lens module	Mainly used in scanner, camera, multifunction printer, LCD, digital camera, cell phone camera, kinect, monitor, car, medical equipment, laptop, tablet.
Optical lens	Mainly used in projector, RP TV, digital camera, DVD reader, LED, optical mouse, CD driver.

Source of data: Modified from 2010 Annual Report of Largan Precision Co., Ltd.

In the scale of operations, total sales of Largan Precision in the year is NTD12.351 billion, an increase of 51.47% from year 2010, in which nearly 80% of sales are contributed by cell phone lens products. The consolidated sales of Largan Precision for the years from 2000 to 2010 are shown in Figure 2, while gross profit ratio for the years 2000 to 2010 are shown in Figure 3, in which we can see that the gross profit ratios in last decade all achieve approximately 42.4%. In addition, earnings per share for the years from 2000 to 2010 are shown in Figure 4, in which we can see that earnings are 1 to 3 times of capital every year.

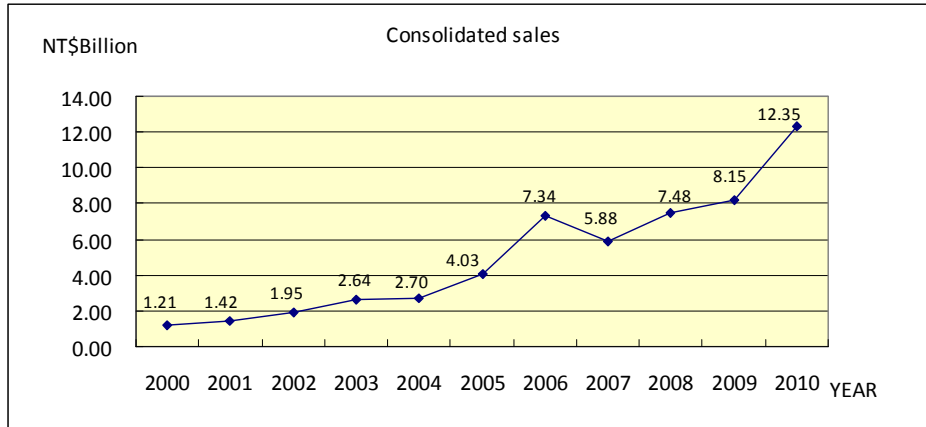


Figure 2. Consolidated sales for years 2000—2010

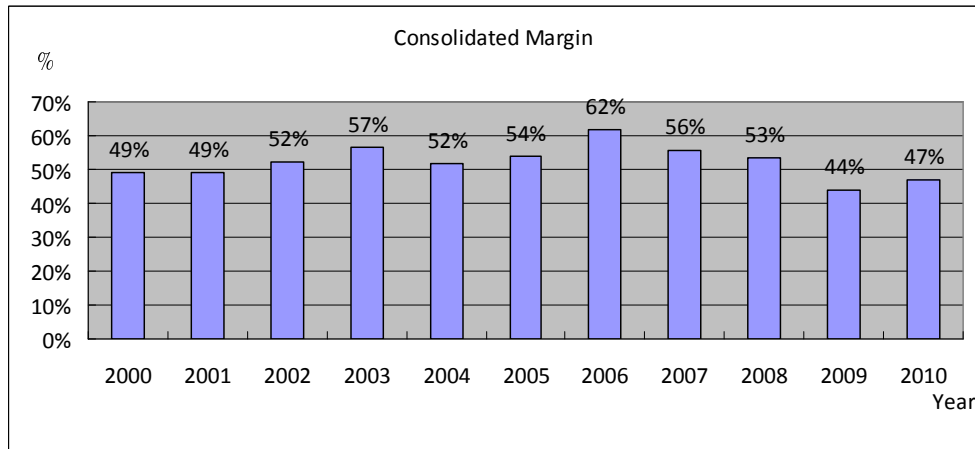


Figure 3. Consolidated gross margin ratio for years 2000—2010

### *Track of Technology Enterprising*

The study divides Largan Precision’s track of technology enterprising to three stages for further exploration. The three stages are divided based on three timings of the company’s opportunity identifications and such three stages represent the rising of three optical

technologies, which are spherical lens technology, aspherical lens technology, and hybrid lens technology, a trend of resource integration development.

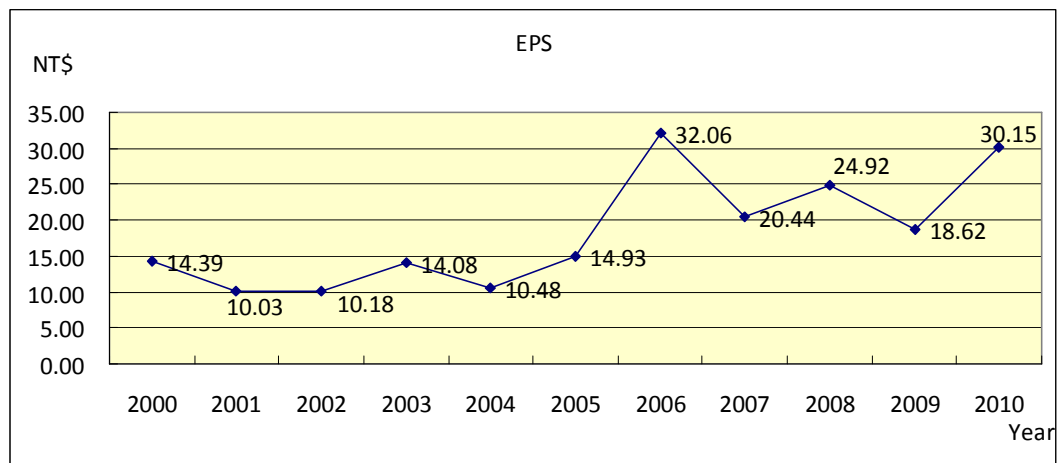


Figure 4. Earnings per share for years 2000—2010

*1. 1980-1990: Establishment of Technology Autonomy Belief and Period of Technology Roots Planting*

After WWII, the developing center of optical technology shifted from Germany to Asia. In this stage, Japan, especially, enjoyed the fine reputation of “World’s Japanese Camera Nation”. At the same time optical component industry in Taiwan clustered in central Taiwan, a region with good weather. Most of Taiwanese optical companies started as OEM, expecting to obtain stable profit and absorb technology transferred from Japanese companies through cooperation process. However, Largan Precision did not take the path of OEM, strongly believing in building its own technology. Why did Largan Precision have this kind of cognition and way of doing thing? It is mainly because the three founding members with optical industry

background experience in German company could fully control the characteristic of optical industry technology and understand that the knowledge of optical core technology is full of hidden quality, which is difficult to get from outside and even more difficult to transfer from foreign business, thus must depend on oneself to nurture and build from within. In order to build organization's core technology capability and form organizational culture of continuous technology innovation, the founders strong believed it must base on apprenticeship to achieve the objective. The method of technology root planting mainly go through the following process: (1) Besides focusing on providing new employees educational training in general knowledge, it is more important to rely on old master to effectively transmit company's core technology (highly hidden knowledge) to suitable people, (2) Through expansion of the emotional relationship between masters and apprentices to build trustful organizational culture, allows everyone to inspire each other, repeatedly examine, cumulate and integrate to more valuable experiences, (3) all engineering personnel must have practical experience and training on site.

In this stage the optical technology was mainly spherical lens. In 1986 Largan Precision was the first to invent new manufacturing technology of three piece-five- face (the average optical lens is three-piece-six-face, with different refraction degree. this invention of technology innovation of three-piece-five-face lens was the first in the world, largely reducing manufacturing cost.) conventional camera lens. Because development of this technology

innovation largely reduces cost, large volume of conventional camera orders crowded in. In 1987 Largan Precision implemented radical technology innovation to successfully research and develop, by itself, three piece plastic spherical optical lens for conventional cameras and sold to large multi-national companies in US and Japan. With sales leaped and countless orders continued, Largan Precision was ahead of competitors for three years. In this stage production strategy positioning was mainly in providing lens to conventional cameras. In 1990 the company received “The Best Supplier Award” from Kodak, USA, the first company in Taiwan to be awarded such honor.

## *2. 1991-2000: Technology Breakthrough and Production Growth Period*

Under the influence of believing in continuous insistence on technology autonomy, after ten years of root planting in apprenticeship of optical technology talent and accumulation of experience Know how, plus being the pioneer of the industry in introducing ultra precision mold kernel processing machineries (the cost of this ultra precision mold kernel processing machinery is more than half of Largan Precision’s Capital back then. Because of the founder’s persistence in technology autonomy belief, it was bold and necessary for the company to take this step, determining to go upstream in developing and producing mold and mold kernel for relative components.and cutting edge optical design software to speed up the development of new products, Largan Precision finally successfully mass produced plastic aspherical lens in 1991.

Breakthrough in such technology allowed the company to jump far ahead of optical industry in Taiwan for twelve years long and become the largest manufacturer of plastic aspherical lens in the globe. The manufacturing principle of plastic aspherical lens is different from the one of glass spherical lens. Value of the technology is that it is a break through from the usage of glass as basic material of spherical lens that has been around for centuries. Plastic lens formed from ejection can achieve light, thin, short, and small in size and low in cost. Although this technology principle is not original, which many companies also understood and had some expectation, only Largan Precision had the determination to boldly throw itself into this new technology domain. The company took its existing optical core technology to accumulate inherent and skillful onsite formation processing skill, integrate optical, ultra precision machinery, mold, chemical material knowledge, finally overcome uncertain factor of ultra precision ejection formation to achieve mass productivity. The more critical is the company's insistence on "technology autonomy belief" that distinguishes itself from other companies for its fearlessness to risk, its spirit of daring to take risk, and having dream that actually come true.

In this stage optical technology mainly focused on aspherical lens. Because the application of ultra precision equipment speeded up breakthrough of aspherical plastic lens, it at the same time also speeded up the integrated innovation application of plastic and glass lens technology, and developed products more complying to the market's need. For example, in 1992

the company was the first to develop mass production of hybrid lens to be used on conventional camera, in 1994 extended the products to scanners, in 1997 took the lead among competitors to develop scanner/bar code hybrid lens, in 1998 was the first in the world to take 600 dpi scanner hybrid lens into mass production, in 1999 successfully developed the world's first 1200 dpi scanner hybrid lens that only supplied to HP, and in 2000 took the lead again to develop 4X focus changing actual image viewfinder for mass production. In simpler term, the company's firm technology autonomy belief has led to fast innovation development and application of new products, further stabilize its best competitive advantage in the industry. Moreover, in order to comply with the need of expanding production capacity, in this stage Largan Precision not only expanded its plants in Taiwan one after another, but also made arrangement overseas in Dong-Guan China plants to get ready for future supply need.

### *3. 2001-2011: Continue to plow deep in core technology and innovation development period*

At this period Largan Precision had gradually prospered. To continue on grow and expand production scale, the company also started to plan toward conglomerate operation. In 1998 the company invested in Largan Digital, stepping into unfamiliar down stream, the newly rising digital camera system industry. Because the operation style and management method was very different from the original one in Largan Precision, the operation in Largan Digital turned out to be unprofitable and was eventually downsized to transform toward optical precision

equipment. In 2002 Largan Digital was integrated to management system of parent company, Largan Precision, and it has been successful in the development and manufacturing ultra precision testing instrument to be applied on optical and machine automation. With this experience, Largan Precision became more certain in the importance of focusing on its own operation to continue plowing deep in core technology and strongly believed in focusing mainly on optical technology in the next 5-10 years and will not jump to any far away domain. The belief that has been built since the company was established, plus mentor's leadership style and continuously strengthen onsite technology realization and apprenticeship experience transferring, a solid sentiment between masters and apprentices were built up to form a family-like emotional organizational recognition, thus led technology team to be more stable and with more solidarity, which speed up selfless sharing, inspiring, and inheriting core experience inside the team. The entire organization, under the interactive application of hidden and apparent technology over long period of time, has generated virtuous circle and speeded up effect on continuous improvement in technology. In addition, at this stage the core technology of optical component manufacturing flow, such as technology and talent bank of optical design mechanical structure design, ultra precision mold processing design, mold design and manufacturing, optical testing equipment, and ultra precision automatic assembly equipment, etc. can all be self built and completed internally to get ahead of optical industry.



In this stage optical technology mainly focused on hybrid lens. Just in the period that electronic information technology highly developed and prospered, the integration of electronic information and optical component has become a trend. Because Largan Precision has accumulated solid foundation in deep plowing optical core technology, the company played a leading position in the industry in integrating technology development speed and innovation capability of new electronic information products. For example, in 2001 Largan Precision and Seiko, Japan jointly developed high level auto focus taking lens and mass produced and was the first to successfully developed VGA cell phone lens in Taiwan. The company succeeded in developing 4M digital camera lens in 2002, mold with ultra precision achieving less than 0.7 nano, 3M cell phone lens, and 6M digital camera lens in 2004, 5M/3X Zoom digital camera lens, 5M cell phone lens, auto assembling machine with precision achieving 0.1mm, and optical lens for 2M liquid lens in 2006. In 2009 the company completed development of 12M cell phone auto focus lens and become the first in the globe to mass produce cell phone EDOF lens.

In this period of time many successfully developed optical lens are applied on cars, monitors (IP), laptops, and tablets. In present the globally popular smart phones, tablets, i-pad, etc. are all equipped with optical camera lens. Largan Precision, because its technology continues to innovate and quality is well recognized by global technology companies, such as Apple tablet,

i-phone, i-pad and HTC's product series, it is appointed as the primary supplier, thus operational performance remains high.

Explore and Analyze Important Factors that form "Creative Dynamic Field"

### *Organizational Belief and Leadership*

Organizational belief is like a person's deep characteristic and motives, a set of stable concept that is not easy to change. A sustainable organizational belief system can be seen as a source of competitive advantage (Porac and Rosa, 1996; Tripsas and Gavetti, 2000). According to study of Collins (2002) on excellent companies, "the fifth level leadership" tops the six key factors. In every company transforming "from outstanding to excellent" during the critical period, there were the fifth level leaders, whose main characteristics are humble personality and professional and persistent willpower.

From the start the founding team has known that back then in Taiwan research and development in lens is a difficult and long path, which though cannot be overcome in short period of time, they believe that is the road they must take. Therefore, without doubt the leadership team has aimed for establishing optical technology at the very beginning of business. The reasons for such persistence are because they have known characteristics of optical technology in depth, the organization has passion for the technology, and core technology of lens is difficult to be obtained outside the company. Their value is that in-depth optical technology

prioritizes above company's expansion and profit. Thus, the establishment of "optical self-owned technology" is the organization's core belief. (value)

*"At the beginning, the company did not know where business is. At that time lens is 'rare animal'. Most people waited to laugh at us. Facing the doubt of ex-colleagues, I could only visit camera companies more often, relying on camera maintenance and lens replacement to earn for basic living. The general manager had to 'stay home and watch', studying on lens grinding and optical research and development design. Design is the path we have decided to take from the beginning. 'Design is easy. but there is no use if you cannot make it.' explained by the chairman of the boards. Back then with the lens made by lens manufacturing technology in Taiwan, only the center point of the picture taken was clear, the surrounding area is all blur. The problem lies in that Taiwan only has lens grinding technology, but has no concept on lens design. With our understanding in lens manufacturing process learned from German owned optical company in the past, we decided to design lens by ourselves." (Digital Era, 2002).*

*"Largan Precision does not take risk to invest in unfamiliar industry. The company's investment is only related to its major operation and does not want to enter assembly market like its competitors. The chairman continued: 'I feel that this component has not been explored thoroughly, like we cannot do the lens of this camera. We are still pretty shallow in this industry. Changing focus can be done, but to this extent, Taiwan has not had this capability.' 'Indeed, assembling can make more money, but I always want to plant deeper in the technology. It's not that I don't have plan to enter assembling in the future. But the market*

*changes fast, we will decide after we see how the market changes.' For Largan Precision's development in the next 5 to 10 years, it will still focus on professional optical domain, not jumping to far away territory."*

The organizational leadership of Largan Precision is similar to the fifth level leadership in many ways. The founding team very much insisted on managing daily affairs with scientific attitude. They earned customers' respect for they strived for business not with relationship skills, but actual technology strength. They emphasize actual work and practical directed leadership. Technology and manufacturing leaders are humble and actualization directed, thus recognized by subordinates for their personal demonstration leadership styles. Therefore, scientific, practical, humble and personal demonstration leadership style is the company's organizational leadership characteristic. An interview with the manufacturing in-charge in Largan Precision mentioned that:

*"Our manufacturing manger started from on-site work. He is very experienced. Often in the work field we can learn a lot of practical experience and technology from him and we are all very submitting to him. For example, problems often occur in formation site. When the in-charge is busy and cannot be present to handle the situation, manager would directly assist if he sees it. Afterward he would also explain the handling process and suggestions to the in-charge."*

*"Presently in Largan Precision there are more than 50 research and development staffs, directly led by Tony Chen. 'A lot people's techniques are better than*

*mine!’, said Tony Chen. Has he been too humble? ‘Absolutely not! I always want my subordinates to be very capable. Because Peter Drucker said that first class people cooperate with first class ones. Only second class supervisors lead third class people’, emphasized by Tony Chen. As products become more and more, he let many people to focus on developing their own techniques.’*

### Employees’ Characteristic, Passion, and Affiliation

Hurley (2007) proposed that “work passion” is a type of emotion that affects a person’s involving behavior on value innovation and explanation and judgment on things and objects. If employees generate emotional affiliation in a organization, in the long run in addition to lower turnover ratio, positive influence can also be generated on work quality and work information sharing (Randall, Fedor and Longenecker, 1990). Tony Chen, recognized as the first chair in Taiwan optical technology by optical industry, has led technology research and development of Largan Precision for more than thirty years since the company’s established. Largan Precision’s fruitful results of optical technology innovation have knocked the socks off the global optical component industry. The source of this dynamics can be traced back to Tony Chen’s earlier interest in photography, his engineering quality and motive, thus generating passion and promise for optical technology. Largan Precision’s selection, training and development on talents apparently is passing the company’s ideals and motives. The company’s selection of talents

emphasizes in: has the quality of pursuing perfection, has stable characteristic, personality, special quality and motive that complies with industry characteristic and organizational culture.

From this we learn that because employees' special quality and characteristics of optical technology are significantly related to organizational culture, the leaders of Largan Precision's technology team and members are full of passion and involvement in optical technology. A senior supervisor of Largan Precision in the interview mentioned that:

*“Chairman Chen’s personality is the sincere and honesty type. He can spend more than eight hours in front of the machine all day without feeling unhappy. He just feels that these are what he likes to do... even talking to his two sons, their topics are still computer related....”*

*“In seeking for talents, we do not necessarily look for the best, but for geographic, such that the person’s home is not far away from the company, or has been studying in central Taiwan... Nonetheless, this industry appears to be quite boring, because the thing we make does not move. It takes someone who can stand loneliness to remain. So we would also look at whether this person’s personality and special quality suitable or not....”*

*“We will look for someone who is more attentive and trustful, so we can pass everything full-heartedly. Otherwise if we lead ten people, not all of them would stay or be able to learn.”*

*“Scott Lin said sincerely and earnestly: ‘It is really not easy to find talents in this industry.’ But only with the “blood line” of German craftsmanship that requests*

*perfection can let Largan Precision challenging 'high gross margin ratio'." (e Common Wealth, 2002).*

Since Largan Precision was established, its technology team has totally taken up apprenticeship of German technology tradition, in which leaders possess mentors' leadership style and apprentices surpass their masters. Because the close interaction between masters and apprentices and the selfless passing of technology, a family like emotional relationship is established so that turnover ratio of core technical personnel are extremely low and increase cohesion of technology team, thus promoting continuous accumulation of core technology and quality improvement. Because apprenticeship culture forms family warmth and organizational atmosphere of revolutionary sentiment quality, it furthers implementation of organizational belief and achievement of objective. The nurturing of talent in Largan Precision is almost through "Largan College", as called by people in the company, a company owned "talent bank" built and completed inside an organization. A senior manager of Largan Precision mentioned in the interview:

*"Largan Precision not only can pass on knowledge through apprenticeship, it even forms a social network inside the organization to bring organizational people closer. Therefore, turnover ratio in Largan Precision is very low, leading to Largan Precision's corporate culture of 'not caring for individual heroism, but pursuing team spirit.'"*

*“In the apprenticeship culture of Largan Precision, through the passage of teaching and learning between masters and apprentices, they build up deep emotion between them, forming an organizational atmosphere of family warmth and revolutionary sentiment quality in the company....such emotion in employee’s mind, with power generated by interactive influence, not only makes employees having high loyalty to the company, but also allows organizational belief to be carried through, thus let organization achieving expected goals.”*

*“There are many major elite cadre in our company. They have been in the company since they were released from the military duty... It’s like entering Largan Precision to be “apprentice private” until retirement. Last year there was an assistant manager in the manufacturing department who has worked for the entire 30 years, but had to take early retirement due to personal reason. He has retired with honor, with everyone’s blessing.”*

*“Even we would aggressively help major important cadre finding wives. It is one of the assigned jobs...the result is rather successful...”*

### Building Core Technology

The key factor in predicting whether a professional technical personnel or sales representative can succeed in the future is not their knowledge or skills in professional domain, but whether their characteristic and motive comply with the quality required in the professional area (Spencer, 2002). Under the same rational, to predict whether an organization can elaborate innovation capability in industrial technology development, the key is not the industrial



knowledge owned by the organization, but whether the organization's characteristic, value and culture comply with the technical characteristic of the industry.

The technology cumulated in Largan Precision is dependable, precise, and internally stable. Because the making of tiny and highly variable optical plastic lens must reach nano level of precision, the temperature, humidity, pressure and dust particle in the air all would affect formation precision of mold and quality of mass production. A senior manager of Largan Precision mentioned in the interview:

*“There is no short cut in this industry. You must try so that experience can be cumulated. There is no overnight success in optical industry, only cumulating one drop at a time. You may tumble many times in the process, but you must continue on trying without stop. When you jump from 3M resolution to 4Ms, there is another manufacturing process..... What I mean is that optical industry especially emphasizes in this (trial and error). There is no such thing as jumping several stairs at a time, only climbing up one stair after another.”*

*“The learning curve of optical industry is longer. There is not return in the first five years of investment. Average person would not invest. But once the entrepreneurs step in, they usually need to spend long time every step of the way, thus most leading companies in the optical industry are over 20 years old companies...”. “Spending money to buy machineries is no use at all. Every manufacturing flow must be exceptionally good and integrating together step by step to make things work. Largan Precision's performance today is because it*

*accumulated more than thirty years of experience continuously in relative technology.”*

Because of the hidden nature of technology transmitting, any slight change or interaction in environmental factor would affect product's precision and quality. Such complex influence, theory design, standardization, process equipment can only achieve average precision control. The handling of complex problems and technology breakthrough in manufacturing process all rely highly on accumulation of practical experience and people's onsite judgment in order to achieve the best. Research and development and production site especially need practical (hidden) knowledge to effectively achieve mission. Therefore, the establishment of optical core technology must rely on internal apprenticeship contact and transmitting. Through the established internal knowledge inheritance, technology innovation can continue without interruption

*“Key man of key tech all starts from internal basic training.... Besides, if the key man was recruited by competitors, he is not necessarily able to perform as expected. This person has to be in Largan Precision, using this machinery, in order to make this finished goods. If he is in non-Largan facility, not using this machinery, he cannot make the product. What is this about? This is our apprenticeship inheritance...”*

*“Everyone wants to understand the reason of high threshold in entering optical field. It should be the difficulty in transmitting technology. Because optical design*

*or manufacturing take a lot of effort, 'mega' and skill all exist in a person's brain. Sometimes it is hard to communicate clearly using languages or documents. It means that technology work has hidden characteristic. The transmission of knowledge or skill relies on implication and teaching between masters and apprentices. It usually takes at least three years or more of experience to build up this team chemistry."*

Based on the aforesaid exploration and result of analysis, there apparently is a "Creative Dynamic Field" inside the organization of Largan Precision. The important factor of its major keys comes from combination of three characteristics, consisting of organizational belief and leadership, employees' characteristic/passion/emotional affiliation, and establishment of core technology. The harmonious relationship of the aforesaid three characteristics is shown in Figure 5. As the three characteristics agree with each other more, the creative organizational dynamic field formed would be more powerful, the opposite would be weaker. In other words, the dynamic source that drive Largan Precision's technology to continue on innovation is because the three essential elements agreeable with each other and they must be built on organizational "Ba" in order to be realized, also explain that successful stories are actually not easy to be duplicated. Through the in-depth analysis of empirical evidence in this study, we conclude that the existence of "Creative Dynamic Field" can fulfill the detailed process that cannot be explained by past theories.

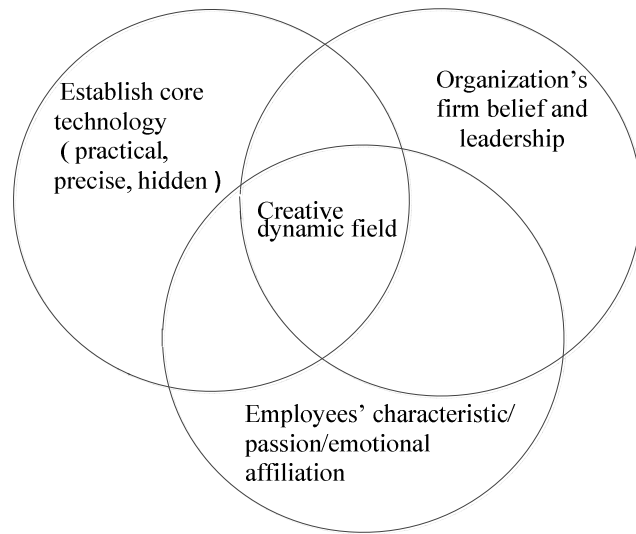


Figure 5 Three essential elements of creative dynamic field

## Conclusion

### *Theoretical Contribution*

The main purpose of this study is to disclose why technology of Largan Precision can continuously be innovated while maintaining its leading competitive advantage in the industry. In the past study on related theories, Porter (1980) suggested from perspective of industry analysis that companies must understand the industrial environment they are situated through five force analysis and analyze every possible competitions and threatening force to further decide their market positioning. The market position built through this analysis will be favorable for the companies' every strategic action that follows, thus creating companies' high competitive advantage. Barney (1991) argued from resource basis theory, believing that companies should be

able to effectively develop their internal core resources, and even through integration usages of every kind of resources to make resources generating strength of synthesis effect. Because such resource is different from the one owned by other companies, it will help companies creating their competitive advantage. When companies encounter highly volatile outside environment, Teece et al. (1997) proposed that the resources or capabilities owned by the companies must have dynamic characteristics. However, it still cannot offer sufficient explanation on why excellent successful stories cannot be duplicated easily.

The study based on literatures of Field Theory, Ba and Dynamic Capabilities Theory as foundation to structure, develop and extend perspective of “Creative Dynamic Field” and through the inspiring case study to analyze and explore in-depth and conclude important factors of creative dynamic field. Overall, the study further proposes through case study on Largan Precision that there is apparently a “Creative Dynamic Field” inside the company’s organization. The important factor of the major critical points comes from combination of three characteristics, organizational belief and leadership, employees’ characteristic/passion/emotional affiliation, and establishment of core technology. The dynamic source that drives Largan Precision to continue technology innovation is a result of the aforesaid three characteristics in agreement, and must be built on organizational “Ba” to be realized. To be specific, result of this study can be extended to

explain the source of creating competitive advantage and through which to emphasize the importance of Creative Dynamic Field in the process of companies' technology innovation.

### *Practical Contribution*

In practical contribution, first of all, the study suggests that a company must focus on its major operation and build core technology. For example, after Largan Precision entered the company's stable growth stage, it also set a foot in conglomerate operation. In 1998 the company invested in Largan Digital, stepping into unfamiliar down stream, the newly rising digital camera system industry. Because the operation style and management method was very different from the original one in Largan Precision, the operation in Largan Digital turned out to be unprofitable and was eventually downsized to transform toward optical precision equipment. With this experience, Largan Precision was more certain in the importance of focusing on its own operation to continue plowing deep in core technology and strongly believed in focusing mainly on optical technology, not jumping to far away domain.

Secondly, the study suggests that establishment of a company's organizational belief must be able to comply with the characteristic of industry development. For example, for optical industry, owning autonomous technology capability is the important condition that determines whether a company can maintain a long-term competitive advantage in the industry. Besides, because technology knowledge in this industry usually implies lots of hidden knowledge that is

not easy to reveal, knowledge inheritance happens to be a very important and essential surviving lifeline in this industry, such that optical technology research and development and adjustment in parameter value of machinery equipment all need trial and error, and learning for a long period of time in order to obtain usable experience value and learning effect. In addition, because Largan Precision implemented apprenticeship culture, it formed organizational atmosphere of family warmth and revolutionary emotional quality, thus promoting realization of organizational belief and goals achievement. Talent nurturing is also the self-built “talent bank” inside the organization. In another words, Largan Precision cognized the organizational belief of “ base on apprenticeship inheritance to build technology autonomy capability” formed by the key characteristic of industry development, so it can continuously create high competitive advantages and value creation in strategic business start-up operations.

Thirdly, the study suggests that a company should aggressively develop organizational members’ characteristics and passions. Hurley (2007) proposed that “work passion” is a type of emotion that affects a person’s involving behavior on value innovation and explanation and judgment on things and objects. For example, Tony Chen, recognized as the first chair in Taiwan optical technology by optical industry, has led technology research and development of Largan Precision for more than thirty years since the company’s established. Largan Precision’s fruitful results of optical technology innovation have knocked the socks off the global optical component

industry. The source of this dynamics can be traced back to Tony Chen's earlier interest in photography, his engineering quality and motive, thus generating passion and promise for optical technology. Technology team totally took up apprenticeship of German technology tradition, in which leaders possess mentors' leadership style and apprentices surpass their masters. Because the close interaction between masters and apprentices and the selfless passing of technology, a family like emotional relationship is established so that turnover ratio of core technical personnel is extremely low.

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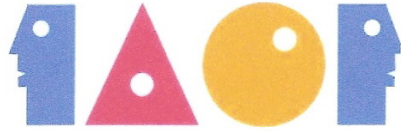
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## A STUDY OF PRODUCT INNOVATION ON FIRM PERFORMANCE

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### Abstract

This study applies the perspective of new product development, brand extension and organizational change to highlight the impact of product innovation on firm performance. The paper relies on earlier research that has been carried out relating to successful product innovation and the sources of innovation. The results of the study indicate that when firms decide to allocate resources to product innovation, they expect to gain leverage in terms of competitiveness and performance. It reveals that continuous product innovation increases the capacity of a firm to serve wide ranging consumer needs thereby upholding their loyalty. The issue of early innovator and follower firms also emerge whereby a short-lived monopolistic operation is established through new product launch. The early innovators earn super profits before competing follower firms imitate their products. Generally, the study leads to the conclusion that product innovation is significant for a firm's performance and survival.

Key words: product innovation, firm performance

### Introduction

Product innovation is the introduction of a new product in the market that uses different technology and has a higher utility for the consumer than the existing products. In the contemporary competitive environment, a business requires to maintain leverage in relation to its

competitors through ensuring that consumer loyalty is maintained and hence a greater market share. Precautions should be observed during product innovations since the process may have a positive or negative impact on the existing product categories. They may result in a greater market share, cannibalism and destabilization of products. Nevertheless, the significance of product innovation can not be ignored. This study explores the positive relationship between product innovation and firm performance.

### *Product Innovation and Firm Performance*

Aboulnasr et al. (2008) established that innovation originates from the application of creative ideas to develop marketable products from the existing ones. This process begins through invention whereby the new ideas are generated in relation to the performance targets of business. Products usually have a life cycle that decreases over time and requires enhancement through constant innovations to maintain competitiveness in the market. Kim & Huang (2011) noted that innovations can be accomplished through development of fresh knowledge or new products in the market that increases a firm's leverage through increased profits and consumer satisfaction. Customer preferences change with time and therefore continuous assessment of the market is needed. Innovations targeted at consumer satisfaction depend on research that helps managers to determine market dynamics in terms of consumer preferences.

Studies indicate that innovativeness leads to improved quality of products and services (Lee, 2010). Any invention in business is focused on the improvement of the current product in the market. Innovations emerge from understanding of the need to change the prevailing product quality to match market demand. Radical changes need to enhance product quality and to strengthen its competitiveness in the market. Firms engage in research and development to identify the gaps that hamper profitability. It also assists them to identify the strategic responses to competition. Strategic response is a continuous process that involves decision making and analyzing a firm's strengths and weaknesses, opportunities and threats. In many situations, a firm capitalizes on its strengths and takes opportunity of the competitor's weaknesses. With this regard, innovation is necessary to keep an organization abreast with the prevailing market circumstances hence a greater capacity to cope with competition (Kim & Huang, 2011).

Innovations allow product differentiation giving consumers an array of products to choose from. An organization is able to serve a wide range of consumer's needs. Kendall et al. (2010) also view innovation as a strategy to ensure that a firm enhances performance through establishment of a monopoly of profits by satisfying all consumer needs. This is accomplished through creating new products that are consistent with customer desires. New products attract consumers while facing minimal competition making the firm to retain market leadership in

terms of profitability. Even if profitability in new products may not be maintained in the long-run, a firm that consistently introduces new products is able to maintain high performance.

Lee (2010) noted that productivity and organizational growth are accomplished through innovation. Lee further argued that for organizational change to occur, firms must maintain innovativeness in their operations. Organizational change is the transformation of an organization from the existing status to a desired state in future. It is a change of organizational culture that allows new values and beliefs to be integrated in the organization. It arises after introducing a new way of thinking and undertaking tasks in the organization. The change is mainly aimed at helping the organization to adapt to variations in the operating environment.

Innovations include changes that affect an organization's mission, goal or overall organizational structure. Some of these innovations may lead to change of the organization's business name such as structural adjustments. Innovations can be triggered by factors such as technological advancement, increased competition and quality standards among other aspects of the external environment (Rodríguez-Pinto et al., 2011). On many occasions, innovation is associated with basic and radical transformations in an organization's operations. Lee (2010) argues that the survival or death of an organization depends on innovation. Innovative products provide an opportunity for a firm to offer new utility to consumers thereby giving it minimal competition at the onset of its introduction in the market.

Before competing organizations can imitate the innovative products, a firm enjoys a large market share that is similar to a monopolistic competition in the short-run. It can only make normal profits in the long-run. Initially, when the firms introduce innovative products in the market, they charge prices that give them the highest profits. Figure 1.1 portrays a firm that operates in a situation where the marginal costs (MC) are equal to Marginal revenue (MR) during the initial stages of innovative product launch thereby making super normal profits. However, this is only accomplished in the short run since follower firms begin imitating the product after being attracted by the high profits. With free entry and exit, new entrants have the liberty to introduce the product especially when the firm has no patent rights to protect its product from imitation (Artz et al., 2010). As more firms enter the market to take advantage of the prevailing situation, the demand curves of the normal firms behave as in a perfectly competitive market whereby an increase in competitors and more differentiated products in the market lead to a shift in demand to the left.

At this point,  $MC=MR$ . However, as more firms introduce the imitated product in the market,  $AR_i$ , which is the demand curve shifts to the left, i. e. to  $AR_{ii}$ . At this point, the prices drop to  $P_{ii}$  while the quantity remains the same. The shifts in  $AR_i$  are continuous until the point that all firms earn normal profits (Fig. 1.2).



Figure 1.1: A firm that is making super normal profits at prices  $P_i$  and Quantity  $Q_i$ .

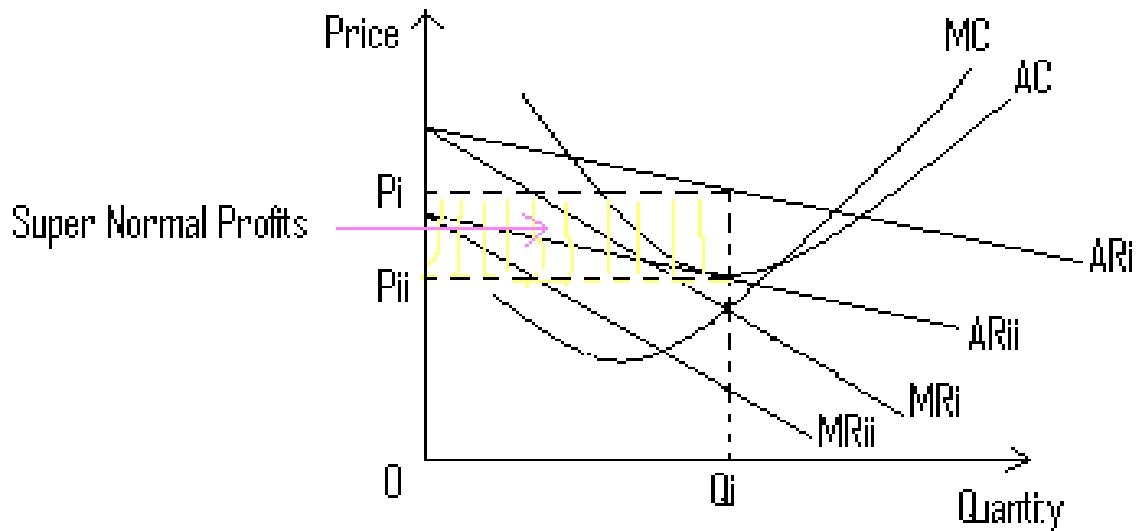
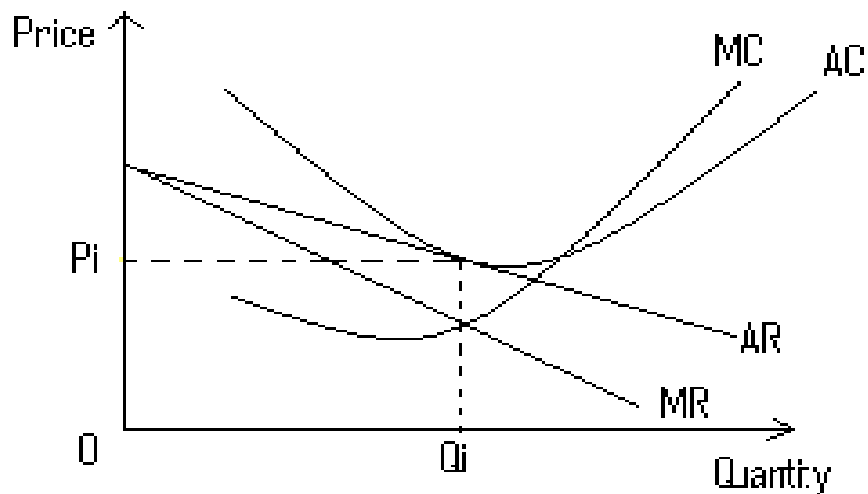


Figure 1.2: A firm Earning Normal Profits in the Long-run



Lages et al. (2009) also emphasizes on the role of innovation in the enlargement of a firm's market share through product differentiation targeted at various market segments. Market segmentation has been an important tool for the success of firms in coping with competition. It

involves division of the market in to various segments that consist of groups of consumers with common characteristics. This innovative practice allows managers to know the targeted customers, identify their preferences and understand the approach of other competitors so that they can determine the most appropriate segment that is likely to bring success to the business. In case of new product launching, it is possible to target a particular group of consumers meaning that the organization is able to attract a large consumer base.

Kendall et al. (2010) present a perspective of constant brand extension to maintain a firm's performance. Brand extension is a significant strategy used by firms in marketing whereby the name of a popular brand in the market is used to market an innovative brand from the same company. The spin-off, which is the new product, is unlikely to be known by consumers on its own. The brand name under which it is sold may encourage consumers since they associate it with the quality of the original product. Brand extension raises a firm's profitability since it deals with various products. The attitude of consumers towards a particular brand determines the success of the firm in extending it (Rodríguez-Pinto et al., 2011).

The higher the value attached to the brand, the more a firm is likely to succeed in its extension. Moreover, the satisfaction derived from both products matters since the more related the products are in terms of utility, the more consumers are likely to accept the extended brand. Brand extension also revitalizes the diminishing image of the original brand. Consumers in most

situations are attracted to an innovative firm whereby they are presented with creative products that they believe are an advancement of the old brand. The new products make the old brand to reappear or become more frequent than before in the market. With the understanding that the new product has an added value, they are likely to purchase more and in the process, the brand maintains its position in the market (Zhang et al., 2009).

However, brand extension has various risks that it may have on the original product. If the new products are not satisfactory to the consumers, their loyalty for the core brand may decline. For this reason emphasize it is important for firms to evaluate consumer satisfaction in relation to the new products as well as assessment of the impact of brand extension on the core brand before undertaking the strategy. This would help the company to maintain popularity of the main brand while using it to create markets for new products (Yalcinkaya et al., 2007).

Lages et al. (2009) further noted that organizational learning is significant in enhancing innovativeness among workers. Employees are empowered to challenge the status quo and come up with better strategies to accomplish an organization's success. Organizational learning involves continuous acquisition of knowledge and taking risks through testing the applicability of new knowledge. A learning organization is that which makes it possible for the members to learn continuously thereby maintaining constant transformation that is necessary for the accomplishment of organizational goals. The outcome of organizational learning is innovation

which helps employees to come up with solutions to the day to day issues affecting their work thereby increasing their productivity and customer satisfaction. Innovations increase customer focus since new strategies are developed through research and development which also allow specialization in the functional design characteristics of products (Yalcinkaya et al., 2007).

According to Lages et al. (2009), innovation increases flexibility in production and service delivery. Firms operate in unstable environments that may influence the outcome of activities. Managers need to ensure that the external forces do not hamper the profitability of business. Firms can maintain profitability by changing to suit the changing environment and also to resist the adverse impacts of these changes. Flexibility is therefore paramount to the success of business. Flexibility is the capacity of varying the processes to give a different output over a particular time period in the production cycle. A balance between the supporting systems and the business operations is maintained through flexibility. It also allows the business to adapt to the changes in the operating environment. It is the extent of change that a business is capable of accommodating in an unstable operating environment (Zhang et al., 2009).

An innovative firm applies cost effective means to vary its production processes (Aboulnasr et al., 2008). Innovative firms also use different approaches in the production processes such as constantly adopting new production techniques that allow rebranding of products to satisfy the market demand as well as the constantly changing consumer preferences.

One of the innovative production strategies is the production of goods with different sizes, which are sold at different prices for the high and low end markets (Kim & Huang, 2011).

Innovative business models are business approaches for managing innovation in the production process such as functional transformation whereby the firm can vary the technologies applied in production to accomplish maximum efficiency. The managers ensure that employees are capable of adopting fast to the changing technology (Story et al., 2009). Efficiency in the production process portrays the degree to which time and energy are well utilised in the accomplishment of tasks or the intended rationale. Innovation that increases efficiency in production allows the firm to apply resources precisely to produce the exact output that was intended without wastage, unnecessary expenses and effort. The product serves the needs of intended consumers hence maintains their loyalty devoid of regret.

Contemporary firms' success is founded on continuous innovations that are aimed at increasing productivity with minimal inputs. For example, firms that use innovative energy saving production processes are able to lower the cost of production of the same output that could be attained at a higher energy cost. Moreover, innovations lead to a reduction in the cost of inputs by establishing cheaper raw materials and processes. A competitive advantage is accomplished when a firm attains a capacity to develop vibrant capabilities (Yalcinkaya et al.,

2007). The firm makes use of resources that offer it a sustainable competitive lead through constant adjustment of resource utilization.

Innovations aimed at improving service quality help in maintaining competitiveness. Service quality can be used to measure how precise a service delivered by a firm corresponds to consumer expectations. Innovativeness in service delivery facilitates satisfaction of consumer needs while the firm maintains economic competitiveness. Satisfaction of customer desires is significant for a firm's survival and performance. Innovations for quality improvement are accomplished through recognizing and constantly improving operational processes, discovering problems fast and systematically, developing valid and consistent service performance measures as well as measuring the level of consumer satisfaction (Lau et al. 2010).

According to Zhang et al. (2009), new product development is significant in leveraging an organization's capabilities with the view of declining product lifecycles. The products act as a new or better way out to customer problems. This further leads to transformation of the existing market as well as development of new ones. In a healthy competition, many firms engage in practices that are focused on placing them at an upper hand in terms of attracting and retaining consumers. A firm has to ensure that its products are up to date to avoid other innovators moving faster to bring new products in the market rendering its products obsolete; hence lowering profitability.

Lee (2010) observes that firms also do not operate in isolation. Rather there exists significant inter-dependence in the supply chain and in case of complementary products. A firm's end product may be a raw material for another. This means if the second firm is innovative in its production process, the firm providing materials will be obliged to ensure that it remains abreast with the new developments to ensure that it is able to supply the desired raw materials, otherwise the recipient firm may seek alternative sources of inputs. Complementary products compel producing organizations to maintain high levels of innovativeness since a product from one firm has to match with its corresponding part produced by another firm. The operating environment in such a situation is influenced by counterpart players and competitors in the market and therefore it is necessary for a firm to possess means of adapting to the changing environment (Rodríguez-Pinto et al., 2011).

### Conclusion

A firm's performance is dependent on product innovation that increases its market power as well as its capacity to cope with market conditions. Product innovation increases a firm's leverage in a highly competitive market. It increases consumer loyalty and satisfies a wide range of consumer needs since they are presented with a variety of products to choose from. Innovative products earn a firm super profit in the short-run that declines over time as follower firms imitate the new product. Firms have to maintain innovativeness especially for complementary products

that generate inter-dependence in the market. Product innovation also increases the capacity of a firm to adapt to a constantly changing environment and hence is significant for a firm's survival.

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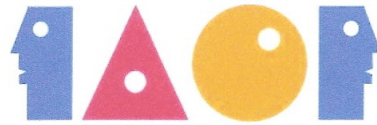
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A STUDY OF THE RELATIONSHIP AMONG SERVICE INNOVATION,  
CUSTOMER VALUE AND CUSTOMER SATISFACTION: AN  
EMPIRICAL STUDY OF THE HOTEL  
INDUSTRY IN TAIWAN

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Abstract

While business operators in the hotel industry manage to provide consumers with comprehensive facilities and quality services, they are increasingly concerned with the willingness of consumers to repeat or continue their patronage, i.e., customer repurchase intention. Hence, business operators must consider how to attract consumers in the formation of their management strategies to stay competitive in the industry. This empirical study was conducted with a questionnaire survey of consumers at locally-renowned chain hotels in Taiwan to explore customer satisfaction in relation to service innovation and customer value. The results of this study indicate that both service innovation and customer value have significant positive correlations with customer satisfaction and that service innovation has a significant intervening

(or moderating) effect on the relationship between customer value and customer satisfaction. It suggests that higher customer satisfaction arise when hotel customers perceive higher customer value and higher service innovation.

Keywords: Service, Innovation, Customer Value, Customer Satisfaction, Hotel Industry

## Introduction

Amid the progressive evolution of market environment, the 21st century has developed into an era of all-around competition for the service industry in which business proprietors are compelled to shift their attention from cost-oriented management to customer service-centered operation. In compliance with the needs of customers, business operators manage to accommodate market changes externally and provide professional services internally to increase their enterprise brand value and competitiveness.

Danneels & Kleinschmidt (2001) consider that in the face of changeable consumers in a constantly changing environment, the ability to innovate is important and should not be ignored in the promotion of service innovation. Meanwhile, Kolter (2002) thinks that customers frequently evaluate various kinds of products or services to see if their values will be maximized. Accordingly, enterprises in modern times should not only improve their products and services to raise competitive edge, but also work actively to find out their targeted customers and provide them with products and services of high value. Kolter (2002) also notes that the ability of

enterprises to meet customer value will affect customer satisfaction and the likelihood of repurchase and that customer satisfaction will be the greatest factor an enterprise should consider in pursuit of its business survival and prosperity.

To a country striving for economic development, hotels represent a kind of national dignity and the axis of the tourism industry. A successful hotel is able to make visitors feel at home, cultivate sources of revenue and facilitate related industries around. This study intended to treat locally-renowned chain hotels in Taiwan as the subjects for empirical analysis. It was conducted with a questionnaire survey among hotels consumers to explore the relationship between innovation service and customer satisfaction in the dimension of customer satisfaction. Researchers expected to present the results of this empirical study as a reference for the hotel industry to improve management efficiency.

## Theoretical Background

### *Service Innovation*

The concept of service innovation was first proposed by Betz (1987). He points out that service innovation is different from product innovation as well as from technology innovation. It serves to introduce technology-based service to the market. Voss (1992) expresses further that service innovation can make multiple profits for enterprises and can be measured in terms of quality, finance and competitiveness.

According to prior literature, a number of researchers adopt the viewpoint of “new service” to propose that service innovation refers to a successful development of new service or new product, including innovative activities on any scales undertaken to modify and improve products, services and transmission systems (Drejer, 2004; Kotler, 2002; Mattsson et al., 2005). Based on the key characteristics of service, innovation service is defined in a more concrete manner: Innovation service is a new concept of service that calls for businesses to make improvements in terms of their interactions with customers, service transmission systems or technology. The chances are high for the idea of innovation service to play a leading role in the course of management coordination and integration to renew or develop service functions on the market, to transform product/service supply, and pursue an organizational capability with regards to technology development, organizational members or service organizations (van Ark et al., 2003). Accordingly, this study assumed that innovation service can be considered a kind of measure an enterprise takes to create new products or increase service value in response to customer demands for service improvement or diversity, and that innovation service can be measured in terms of organization innovation, process innovation and production innovation, as proposed by Voss (1992) and Avlonitis et al. (2001).

#### *Customer Value*

The theory of customer perceived value was initiated by Zeithaml (1988) from a consumer perspective. She defines customer perceived value as a customer's overall assessment of product or service effectiveness as a result of a comparison between perceived benefits and costs. Another scholar Woodruff (1993) defines customer value as a customer's perceived preference over a product following an evaluation of its attributes. It is mentioned in *Return on Customer: Creating Maximum Value From Your Scarcest Resource* by Peppers & Rogers (2005) that the level of customer value is determined by customer demands instead of products or services.

On the measurement of customer value, Han & Han (2001) have developed a structure of customer value evaluation based on the dimension of value addition and the components of value. Naumann (1995) considers that customer value can be examined in terms of customer anticipated product quality, customer perceived service quality and value-based price setting. It is noted in *Marketing Management: An Asian Perspective* by Kotler et al. (2008) that customer value refers to the total amount of value a customer acquires from buying a product or service. It is a collective sum of product value, service value, individual value and image value. With its questionnaire developed with reference to the above theories and in consideration of the management characteristics of the hotel industry, this study was conducted to measure product value and service value empirically.

### *Customer Satisfaction*

Fournier & Mick (1999) consider that satisfaction has been conceptualized as an assessment resulting from a series of interactions involving a single transaction or a specific product over a period of time. According to Peter & Olson (2007), customer satisfaction is a measure of the extent to which a customer's expectation can be fulfilled or surpassed. Gustafsson et al., (2005) cite Johnson and Fornell (1991) as defining customer satisfaction as a customer's overall evaluation of the performance of an offering to date.

Kotler (1999) proposes from his integration of various theories that satisfaction is a difference function between perception and expectation. Accordingly, customer satisfaction is an expression of pleasure or disappointment as a result of a comparison between perception and expectation of product function/effect. In other words, customer satisfaction is a subjectively positive or negative feeling that arises as a result of a comparison between pre-consumption expectation and post-consumption perception. It is thus a task of great importance for both academic research and business performance investigation to accurately measure the level of customer satisfaction and to develop appropriate responses (Tsai et al., 2010).

#### *The Relationship between Service Innovation, Customer Value and Customer Satisfaction*

Woodruff (1997) finds that an overall evaluation of products or services by a customer is a response of perceptions as a result of multiple consumption experiences. A positive response

corresponds to a high level of satisfaction, which infers that the customer is more likely to be retained. Meanwhile, Kotler (2002) points out that an enterprise must create a distinctive kind of customer value as a customer's overall evaluation of its product to maintain its competitiveness. Customer satisfaction and value will arise when the product is successfully transmitted from the provider to the customer. Hence, this study proposes the following hypothesis:

*H1: Customer Value Has A Positive Effect On Customer Satisfaction*

Kim & Mauborgne (2005) consider that innovative value lies in the powerful influence a business strategy produces on customers and that customer-oriented service innovation is what can be seen as a kind of valuable innovation. To Korsching & El-Ghamrini (2003), service innovation is by nature a kind of service provided by an enterprise to customers. The major difference between service innovation and operational innovation lies in that service innovation involves not only the enterprise but also customers. Accordingly, this study assumes that an enterprise should engage in comprehensive innovation service to fulfill or surpass customers' expectations in pursuit of high level of customer recognition and customer satisfaction. Hence, this study proposes the following hypothesis:

*H2: Service Innovation Has A Positive Effect On Customer Satisfaction*

Jan & Christian (2005) proposes that service innovation is an improvement measure undertaken by a business organization to elevate its product or service value to meet the diverse



needs of customers. Meanwhile, Drejer (2004) considers service innovation as a kind of action taken by an enterprise to develop new products or services as well as to modify and improve its existing products or services in the face of market competition and decreasing profitability. This study argues that an enterprise in the hotel industry must understand the needs of customers to increase customer value and improve its existing products and service in preparation for the development of new products and services to elevate customer satisfaction. Thus, we propose the following hypothesis:

*H3: Service Innovation has a significant moderating effect between Customer Value and Customer Satisfaction.*

#### Methods

This study intended to explore whether service innovation and customer value positively perceived by customers will produce a positive effect on customer satisfaction and whether service innovation will produce a moderating effect between customer value and customer satisfaction. This section presents a description of sampling structure and measurement scales.

#### *Sample and Data Collection*

This study adopted purposive sampling and snowballed sampling to conduct an empirical model analysis of locally-renowned chain hotels in Taiwan with a questionnaire survey of hotel consumers. A total of 1000 copies of the questionnaire have been distributed and 476 have been returned with a collection of 433 valid samples at a return rate of 43.3%.

### *Measurement Scales*

A seven-point Likert scale was used to measure each of the constructs in the research model (1=strongly disagree, 7=strongly agree), except basic information about the respondents. This study constructed the questionnaire and modified the context based on the previous research on service innovation, customer value and customer satisfaction. SPSS 18.0 and AMOS 7.0 were employed to conduct tests on the hypotheses.

In the examination of individual item reliability, Hair et al. (2009) indicate that when the factor loading is greater than 0.50, latent variables are sufficient to explain every observed variable. This study employed Cronbach's  $\alpha$  to test the internal consistency of the construct, with  $\alpha$  greater than 0.70 indicating a good reliability of scale measurement (Hair et al., 2009; Nunnally, 1978). Meanwhile, the composite reliability (CR) represents the internal consistency of items measuring the construct. According to Hair et al. (2009), CR should be larger than 0.7. Average variance extracted (AVE) is a measure of the correlation between a latent variable and its items. AVE can be used as a measure of reliability and convergent validity. High AVE represents high level of reliability and convergent validity. Fornell & Larcker (1981) suggest that AVE measures should be greater than 0.5.

As shown in Table 1, the values of Cronbach's  $\alpha$  and CR are greater than 0.7, meaning the model of this study has met the criterion for the reliability of the measures required by the scholars.

Finally, the study adopted convergent validity to measure the consistency of multiple items in the same dimension. Fornell et al. (1981) propose that AVE for each construct must exceed 0.5 to reach a significant level of convergent validity. As shown in Table 1, AVE for each dimension is greater than 0.5, indicating that the model has met the requirement of convergent validity.

Table 1. Summary of validity and reliability analysis

<i>Construct</i>	<i>Factor</i>	<i>Factor Loading</i>	<i>Measurement error</i>	<i>CR</i>	<i>AVE</i>	<i>Cronbach's <math>\alpha</math></i>
<i>Service Innovation (SI)</i>	<i>Organization innovation</i>	0.813	0.261	0.865	0.717	0.889
	<i>Process innovation</i>	0.798	0.318			
	<i>Product innovation</i>	0.826	0.305			
<i>Customer Value (CV)</i>	<i>Product value</i>	0.845	0.217	0.841	0.692	0.857
	<i>Service value</i>	0.833	0.303			
<i>Customer Satisfaction (CS)</i>	<i>Product/service appearance</i>	0.869	0.295	0.827	0.706	0.843
	<i>Well-rounded performance</i>	0.794	0.266			

## Data Analysis and Results

### *Measurement Model*

This section proceeded to establish the linear structural relation model for the constructs of service innovation, customer value and customer satisfaction. In addition to an examination of

the cause-effect relationship, this research consulted other fitness indexes such as GFI, AGFI, RMSEA and CFI to evaluate the overall goodness-of-fit for the model. As shown in Table 2, the results indicate that it is a good model.

Table 2. Analysis of overall model fit

Evaluation indicators	Evaluation criteria	Model value
$\chi^2$	Small is better	376.583
p-value	>0.05	0.000
$\chi^2/df$	<3	2.214
GFI	>0.9	0.977
RMR	<0.05	0.032
RMSEA	<0.05	0.046
AGFI	>0.9	0.912
CFI	>0.9	0.968
NFI	>0.9	0.949
PNFI	>0.5	0.653
PGFI	>0.5	0.596

### *Hypotheses Model*

We present the hypothesis results in Table 3. The expected relationship between customer value ( $\beta = 0.461$ ,  $p < 0.05$ ) and customer satisfaction show a positive and strong correlation, thus Hypothesis 1 is supported. Besides, there was a positive relationship between service innovation and customer satisfaction ( $\beta = 0.328$ ,  $p < 0.05$ ). Thus Hypothesis 2 is supported. Lastly, service innovation has a significant moderating effect between customer value and customer satisfaction ( $\beta = 0.207$ ,  $p < 0.05$ ). Thus Hypothesis 3 is supported.

Table 3. Summary of hypothesis results

Hypothesized paths		Beta	t-value	Support
<i>Direct effect</i>				
H1	Customer Value → Customer Satisfaction	0.461*	6.792	Support
H2	Service Innovation → Customer Satisfaction	0.328*	4.136	Support
<i>Moderating effect</i>				
H3	Customer Value × Service Innovation → Customer Satisfaction	0.207*	0.284	Support

Note: \* denote significance at the 0.05% level.

### Discussion and Implications

The model of this study suggests that business operators in the hotel industry should possess the ability to engage in service innovation and take measures for consumers to perceive multiple customer value to raise customer satisfaction and business performance effectively. This suggestion is empirically confirmed.

The empirical results demonstrate that customer's perceptions of service innovation administered by hotel business operators in terms of organization innovation, process innovation and production innovation will help to raise customer satisfaction. This viewpoint is consistent with the findings by several scholars (Kim & Mauborgne, 2005; Korsching & El-Ghamrini, 2003). Meanwhile, customer perceptions of product value and service value created by hotel business operators will help to elevate the overall evaluation of the hotel. This result is consistent with the opinion of several scholars (Woodruff, 1997; Kotler, 2002).

The empirical results also show that service innovation produces a significant moderating effect between customer value and customer satisfaction, indicating that customer's perceptions

of high customer value and the ability of the hotel to perform service innovation will raise customer satisfaction. This result is consistent with relevant scholars (Jan & Christian, 2005; Drejer, 2004). Therefore, this study recommends that business operators in the hotel industry should work constantly to elevate the level of their service innovation in terms of organizational management, operational procedure, and products/services as well as to enhance infrastructural facilities, product value and service value in pursuit of higher customer satisfaction. Simply put, hotel business operators who can take advantage of their ability in service innovation to raise customer value will win customer recognition and satisfaction and even increase the frequency of customer repurchases.

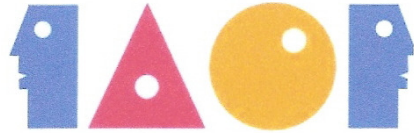
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MORAL MEANING IN GREEN MARKETING AND  
SOCIALLY RESPONSIBLE MARKETING

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Abstract

In this study, moral meaning in green marketing is considered. Later, advertising ethics and social responsibility are addressed. This is followed by socially responsible marketing. An extensive topical bibliography is provided.

Keywords: Moral, Meaning in Green Marketing, Socially Responsible Marketing.

Moral Meaning In Green Marketing

To deal better with problems of morality, marketing needs more explicit moral meaning, like societal marketing as it relates to the natural environment. It is commonly known “green

marketing”. Ethical decision making in marketing provides an essential acknowledgement that how managers realize ethical dilemmas or know when ethical problems are present is a critical matter in facilitating personal moral reflection by marketing professionals. It is difficult, if not impossible, to make a case for ethical behavior in marketing without an appeal to a higher set of priority wants beyond those of corporate self interest or individual. This is the dilemma of our society and the development of the political economy that is reasonable. In a world where social benefit has no meaning, the definition of society is unimportant. Common responsibility or interests to recognized publics are functionally non-existent. What is missing is an internal sense of wrong and right as it applies to a social-ethical standard. Since marketing’s goal is to sell and distribute a benefit to consumers, it represents a binding of both the company and the society based on a respect for both the environment and the product.

Nowadays, the public accesses numerous sources of information. Contrarywise, while the availability of products with ethical trade labeling and fair trade increase essentially all over the world, the ability of customers to understand, most important, believe in this labeling shows signs of having reached a plateau. Brand recognition concerns loyalty beyond reason and public policy is increasingly formulated on the basis of human rights, environmental protection, labor standards, and liberalized markets, therefore a possible future is that customers globally will look at the label and the symbol. Within an organization, public relations practitioners should be the

standard bearers of corporate ethical initiatives, toward candor and accuracy as well as away from lying and hiding the truth.

### Advertising Ethics And Social Responsibility

Advertising can be a key ingredient of a competitive economy, but as advertising budgets become more tight, it is also increasingly a weapon that benefits the large at the expense of the small. In Britain, Procter and Gamble and Lever Brothers dominate washing powder advertising and between them they share nearly 90 per cent of the total market. Advertising has also some claim to help reduce costs by high volumes of production, but that does not necessarily mean goods cost less to the consumers. It means higher profits, but high volume is bought at an advertising cost that more than cancels out any other savings. But advertising, encourages makers of goods and suppliers of services to change perceptions rather than the products themselves. It is argued that advertising encourages manufacturers to downgrade quality from the start. It is cheaper and simpler to run commercials than introduce quality control. Consumers anticipate life to be exactly as it is in commercials. Advertisements often do not involve the truth. For example, advertising actively encourages people to smoke.

Advertising continues to grow, both in quantity and in the impact it has upon our lives. What consumers must do is know learn to live with advertising more intelligently. "Intelligently" refers to education and control. Advertisers and the agency professionals claim they have a duty

to provide the best possible work for their consumers. Advertisers give consumers no opportunity to react except at the moment of buying.

In Thailand, Colgate-Palmolive is accused of spending disproportionately large amounts on advertising in order to gain domination of the market. According to Ministry of Commerce figures, up to 40 per cent of the cost of toothpaste and 32 per cent of the price of soap was being earmarked for advertising and marketing. A government source claims that local, small companies can not compete with the big marketers, who will do anything to boost their market share. But advertising is also a big, highly talented, powerful and immensely wealthy industry. Its target is us.

Social and ethical issues form an essential part of the environment in which advertising operates. Perhaps the most important of these is that of possible deception in advertising, which forms the rationale for much monitor of advertising content by government organizations. Some advertising is essential offensive, but exact standards are difficult to determine because judgments about matters of taste are subjective. Certain types of advertising may have harmful effects on children. Advertising is also at times perpetuate undesirable stereotypes. Little evidence shows that advertising creates social values; advertising itself is merely a reflection of everyday life. Advertising uses both persuasion and selected facts to convince consumers to buy products they want but don't really need. It is foolish to buy something you don't need. The

comparative advertising brings up certain ethical questions, but at the same time it provides a competitive weapon. Advertising sometimes builds a certain sense of insecurity in its attempts to sell goods and services, but it can do this only when the anxiety is already present in consumers.

Advertising refers to the action of calling something to the attention of the public, specially by paid announcements. Advertising is an agent selection. Customers must know about the product improvement and the manufacturer, therefore, buys advertising to inform the customer about the changes and to convince the customer to try the product once. If the product does not the expectations from the advertisement the customer will not buy twice. Sometimes each product improvements seem small and the claims exaggerated, but the products are bought and continue to be bought if they meet to their claims and customers' needs.

This relation between the customer and the manufacturer through advertising has economic consequences, but advertising has additional social significance. If consumers play a full role in society, they can choice, and that choice must be depend on multiplicity of sources of information. Advertising contributes to this process. It is a source of information in its own right. Consumers know that someone pays for the time or space to communicate with them and brings this into consideration when appraising information. Moreover, advertising provides revenue for the media. Advertising has a future because consumers often want to communicate their ideas and to producers about products and services they ought to offer. In various parts of the world,

advertising is increasingly under attack from consumers who prefer government control of the media to what they think to be undesirable commercial influence. They believe anyone ought to buy time or space to communicate the message responsible and true for the advertising business into the future. Advertising messages across boundaries is a reality in numerous parts of the world and raise challenging other legal problems and copyright. Advertising information is still essential perhaps increasingly so, to these publics who find information relevant to them, and their interests with no sales person to help the decision process. In the selling of products and services and the relationship to the environment, advertising becomes more important. In some European nations, there is already considerable media overlap, so that consistency of presentation between nations is essential. Such international advertising and marketing activities will raise interesting new creative and specific challenges for advertising regulation.

Advertising may be different in the future, because almost every where there is a trend towards augmented expenditures on social messages and services, rather than products and brands, and this will continue. However, advertising plays role in our lives that will remain important. The content and the form of the messages will change with time, but the need for consumers to communicate with each other through paid for space and time will remain with us.

### Socially Responsible Marketing

Social responsibility is a duty of marketing. Marketing shall enhance the quality of life for the society as a whole. Corporate social responsibility is the managerial obligation to take action to protect and improve the interests of the organization and the welfare of society as a whole.

According to the concept of corporate social responsibility, a manager.

Social responsibility is created from social power. Business influences on critical social problems as environmental pollution and minority employment. Business has power over society, society is able to hold business responsible for social conditions. Business operate two open systems with receipt inputs from society and its operation to the public. Business ought to be willing to listen to society's representatives about what must be done to sustain or improve societal welfare. In response, society ought to be willing to listen to business on what is doing to meet social responsibilities. Ongoing open communications and honest between society's representatives and business ought to exist if the overall welfare of society is to be improved or maintained. The social benefits and costs of an activity, service, or product would be considered and calculated in deciding whether to proceed with it. Business must consider both the short-and long-term societal consequences of all business activities before being undertaken. Social costs related to each activity, service, and product would be passed on to the customers. Business is not able to receive financing completely from activities that are socially advantageous but economically disadvantageous. The cost of maintaining socially desirable activities can pass on

to customers through higher prices for the goods or services. Business institutions, as citizens, possess the responsibility to involve in certain social issues, that are outside their operation.

Business has the expertise to solve a social issue to help society to solve that problem. Business finally shall share increased profit from improving society. They should perform all legally needed social responsibility activities. They should inform all relevant persons that their organizations involve in performing social responsibility activities. A Protection Agency possesses the authority to require business to adhere to certain socially responsible environmental standards. Legislated social responsibilities is the minimum standard of social responsibility performance that company managers must accomplish, while making a desirable contribution to improving or maintaining the welfare of society.

The following is the relation between stakeholders and social obligations:

#### STAKEHOLDERS SOCIAL OBLIGATIONS

- |                                 |  |
|---------------------------------|--|
| - Local communities and society | - To avoid harming the environment       |
| - Competitors                   | - To compete fairly                      |
| - Customers                     | - To sell safe products                  |
| - Workers and unions            | - To support safe working environment    |
| -                               | - work fairly with union representatives |
| - Government agencies           | - To obey laws                           |



- Other lenders and Banks - To pay debts
- Suppliers of materials - To contract with them fairly
- Stockholders/owners of the company - To augment the value of the organization

Managers are able to apply a general guideline for making social responsibility decisions that enhance the social responsiveness of their company. Moreover, once managers decide to have a special social responsibility, they must determine the best way to undertake activities related to achieve this obligation.

### Conclusions

Quality service is important for consumers. Quality is often responsive to the needs of its customers, and service on time, as well as reliability. For this, I recommend that a feedback mechanism for consumers' perception of quality be established and products must meet required quality standard. Consumer satisfaction is the key to survival and success of any company.

Almost nothing is good enough if it is able to be made better, and better is never good enough if it is able to be made best. In the increasing demand for quality, the consumers have a powerful new tool : computer software programs and web services to appraise the quality of goods and services. Let the company beware of this tool. Quality must meet the needs of consumers and stakeholders. To satisfy consumers' needs involves the following principles of Deming's Total Quality Management:

- Identification of consumers,
- Understanding consumers needs,
- Understanding consumers expectations.

Furthermore, the private sector has a critical role to play in the industrial development of nation and in augmenting market-share in global trade. This is to move towards high quality output and, implicitly, total consumer satisfaction. Success in this venture is our success and finally the nation's success. For example, Government departments provide various services and facilities the public who are their customers, and often sensitive to the needs of the consumers, changing work process, regulations, systems and procedures to provide services which benefit the consumers. Departments support comprehensive training to their workforce to comprehend the values of professionalism and accountability.

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THE SELECTION AND ASSESSMENT OF STRATEGIC ALLIANCES  
ON THE HYPERMARKET IN TAIWAN

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Abstract

The local hypermarkets in Taiwan like RT-Mart, AMart and Taiwan Sugar hypermarket are facing increasingly competitive pressures due to the operation of international large-scale hypermarkets such as Carrefour and TESCO. The business strategy managers in Taiwan are forced to follow the operation environment and adjust their business strategies for the most profit. The implement of strategic alliances are constantly applied in the operation environment, but the alliances are still unstable. For achieving a solid relationship, an appropriate selection criterion would decrease the difficulty of integration. Combining Analytic Network Process (ANP) and the theory of Fuzzy Set, this study not only prepossesses an integrated Fuzzy Multiple Criteria Decision Making Method (Fuzzy MCDM) to assess the difficulty of strategic alliances, with discussing the types of cooperation, information technology, and transaction cost theory, but also identifies the priority of the factors. The results show that joint X-Union, a type of cooperation in strategic alliance, is an critical element. In measuring transaction costs, the assessment criterion is the interest allocation, followed by monitoring the performance of

cooperative relations. Because of the ambiguity and complexity in the real world, the study also makes effort in the concept of Fuzzy Set and proposes an integrated decision analysis procedures, including the assessment of criterion, content of questionnaire, and mathematic analysis. In sum, the decision-making methodology is effective in the strategy management domain.

Keywords: fuzzy multiple criteria decision making method, fuzzy analytic network process, strategy alliance, transaction cost

## Introduction

Retail industry is an industry which closely related to consumers, recently in Taiwan, its rapid development has drawn urgent attention. Due to Taiwan's economic growth, the continuous development in the metropolitan area and the gradual change in consumer behavior have driven Taiwan's business model toward large-scale, chain, and professional development. The domestic retailers have suffered from the increasing challenging environment because of the rapid changes in consumer behavior and preferences, shorter product life cycle, increasingly saturated market, high rent, personnel and other operating costs. To be more competitive, the retail markets have shown the trend: to be bigger, through expanding itself or combining with other industries to provide value-added services and business projects. Furthermore, to concrete its influence on the consumer market for a dominant position (sales force, information ability, purchasing ability), the major retailers have developed their vertical trading constrain from the

upper stream to the downstream for improving their manufacturers or suppliers' bargaining advantage.

In the shrinking profits era, the companies must deal with the cost, the progress of technological development, the increasing shorter product life cycles, the changing industry environment, and the increasing competitive market. As a result, the corporations need to have faster response, more resources and knowledge to survive and grow (Sītú, 1992). Many of them have begun to realize that they cannot go alone merely by their own. In order to enhance their competitiveness for providing customers a more complete comprehensive products and services, and to create a bigger market and more profits, the business should get rid of the “Zero-sum competitive strategies” and start seeking a partner with strengthening or complementary resources to form a win-win situation.

Although the practice of strategic alliances is continuously applied in modern society situation with instability and disintegration still happens (Sītú, 1992; Wú, Q. S.,1992; Yè, Q. J., 2004; Còi Z. Y., et. al. 1991; Barney, J. B., 1990; Spekman, R. E., et. al., 2000). Investigating in 500 large enterprises to find out the failure of alliance, Freidheim (2000) topped the wrong partner the cause of the failure, followed by over-optimistic, not being keen on the commitment, poor communication, role uncertainty, vague value creation, loose agreement, lack of relationship building, weak business plan, lack of union experience, and lack of unified partner

style. Therefore, when seeking a strategic alliance, appropriate selection criteria are needed.

Carefully choose the strategic alliance partners is one of the motivations of this study.

The achievement of strategic alliance is to reduce the cost; therefore, the Transaction Cost Theory is the basic explanation for the motivation of the alliance. Lin (2003) pointed out that in the Transaction Cost Theory, the main goal of the strategic alliance is to pursue the economic interest, in which the cooperation contractual relationship and the rational behavior with the alliance partners are especially focused. Consequently, “Joint Venture” appears a part of a strategic alliance; both partners in their new cooperative business have the share of capital stock.

In addition, the information technology can be applied in Customer Relation Management (CRM), Quick Response (QRT), Point of sale (POS), and other issues at different levels (Van der Veeken, D. J. M., et. Al., 1998). Moreover, in the implementation of the strategic alliance, the department stores hypermarkets have to establish and integrate the Information Technology, Internet, Intranet, Extranet, and Data Warehouse to support the management of supply chain. Because of the differentiation, they can effectively reduce cost to enhance competitiveness. The international case, Wal-Mart, has developed a “Retail Link” with the supplier to achieve both cooperation relationship and strategic alliance partnership. The alliance between Save & Safe and RT-Mart is a successful example in Taiwan. The two groups

implementing the same POS as a logistics information system management support (Lee, A. H. I., 2009). In view of this, the secondary motivation of this study is what type of cooperation patterns and information technology assistance the department store hypermarkets need to form the strategic alliances.

Also, this study aims at exploring the questions that if there are any interactions when the enterprises decide to implement the strategic alliance, among the decision based on the motivation in Transaction Cost Theory in considering strategic alliance partners, the alliance formation, and patterns inlaid with information technology. This becomes the third research motivation.

This study combines Analytic Network Process (ANP) proposed by Saaty (1996) and Zadeh's (1965) Fuzzy Set Theory (FST) to form the Fuzzy Multiple Criteria Decision Making (Fuzzy MCDM) and get the selection criteria for choosing a best hypermarkets partner and the integration of information technology strategies to increase the flexibility and make room for policy making. In short, there are a number of research purposes, including the following points:

1. Through document method, this study will search in the Transaction Cost Theory, information technology, journals of strategic alliance types, papers and statistical data, and other secondary data. As the basis structure, transaction cost is applied to obtain the theoretical framework to strengthen the theoretical foundation of this research.

2. Based on Fuzzy Delphi Method (FDM), the study will compile the theory and evidence scholars have in the past. Also based on the questionnaires, conducted by the experts, the study will analyze and compile the motives for cooperation, the cooperation types and information technology level, along with the verification to the second motivation in this study.
3. Based on Fuzzy Network Analysis (FANP) and with the experts' questionnaires, the study will first evaluate the items and the relative importance of criteria, then conduct the evaluation model of cooperation partner in department store hypermarkets.
4. According to experts' opinions and the experiences in related duties the author of this study has had in the past decade in department store hypermarkets domain, the study will explore the relevance and the rationality of cooperation modes.
5. Finally, the study will provide information for hypermarket partners selection and practical suggestions.

This study is to establish the partner selection model of strategic alliance for the department store hypermarkets and provide hypermarkets a reference in choosing partners. Therefore, this study focuses only on the related issues in cost reduction. Other issues like Core Competence, Resource Based View (RBV), and Dynamic Capability View are not included in the scope of this study.

The Fuzzy MCDM in this study is to present a series of planning, analyses, and execution activities; this cycle means the highly interactions and nonlinear dependencies. Dubois and Prade (1982) stated that the Fuzzy MCDM is basically divided into two steps. Step one is to derive an integrated utility value for each feasible option, while step two is based on the integrated utility value gotten in step one to process priority ranking for each option.

However, it is difficult to take all into account comprehensively because of the difficult decisions for complex problems a single decision-maker makes and the inherent subjective thinking displays in the assessment selection. Hence, Fussy Delphi Method (FDM), a combination of Fussy Set Theory and Delphi Method, determines the main factors in the assessment. The concept of this combination intends to get better integrate results from each expert's advice expressed in the linguistic variables and to reduce biased data interpretation. For better results in selection, the geometric mean, as a basis, is to obtain a statistically unbiased result and to avoid the influence of extreme values.

In the second stage, the study applies Analytic Network Process (ANP) first, added with the fuzzy preference naturalization method and plus the decision-making information weight, and then, based on Fuzzy Theory, finds out the main issues of this study. From the proposed methodology, many complex issues in the real world can be processed, and the strategic options can be carried out. In general, the application areas of Fuzzy MCDM is of a wide range.

## Research Concepts

### *Retail Industry and Hypermarket*

Kotler (2000) pointed out that the types of major retailers include specialty stores, department stores, supermarkets, convenience stores, and discount retailers. In addition, based on different consumer needs, the retailers also provide innovative and advanced products. This kind of economic activity provides not only tangible but also intangible goods, including professional services, such as finance and insurance. Therefore, retail industry is a business that sells goods or services, a general business activity providing the final consumption (Hasty, R. W., et. al. 1997).

Although at the present the definitions and interpretations of the hypermarket are different, this management style do not provide consumers a lot of services but entirely by open-display (self-service) shopping with low pricing strategy. Overall, the hypermarket originally starting in Europe and the United States thirty years ago is recently an emerging retail patterns in cross-strait. It is a combination of shopping centers and supermarket features to provide a full range of goods in open display, quantity price discount strategy with an area of large stores, and spacious parking lots for customers.

### *Strategic Alliance*

There is no single definition for the term of Strategic Alliances though there are words as cooperation, collaboration, union coalition, alliance, and so on. Although the terms vary, the



meaning and the purpose of discussion generally are similar (Spekman, R. E., et. Al., 2000; Buckley, P. J., et. al., 1985; Porter, M. E., et. Al., 1985; Lewis, J. D., 1990). Hence, the strategic alliance is that two or more enterprises exchange the resources in the both sides and then reach a common goal, based on mutual needs, through the formation of a formal contract but not consolidation of cooperation relations, and by the establishment of alliances.

According to the classification from different scholars with different basis, there are several classification of strategic alliance. Porter (1985) considered that the best strategic alliance is the specific activities of the alliance involved in the Value Chain. After proposing the concept of the Value Chain, Porter and Fuller (1986) divided strategic alliances into (1) production operations and logistics, (2) marketing, sales, and service, and (3) technology development. They also developed two types of strategic alliances: X-Union and Y-Union. X-Union alliance, a vertical division of strategic alliances in which the alliance partners implement different value activities, is the alliance relationship between the Value Chain in different company industry. While Y-Union is the alliance relationship with the same or similar Value Chain activities; each coalition partner cooperating with one or several Value Chain activities to enhance the industry position of value activities.

#### *Transaction Cost*

Nobel economist Coase (1937) with different point of view in economics, pointed out that firms and markets related to different managements. The main difference relies on which transaction cost is relatively lower. Consequently, in the exchange economic system of the professional labor division, costs include both prior operational costs (such as the costs in information searching, contract making, and negotiation) and posterior operational costs (the cost of supervision and contract enforcement), which collectively referred to as transaction costs. Ross (1997) stated that by strategic alliances integration the enterprise can not only reduce the product development, distribution, and other aspects of risk but also share interests.

#### *Information Technology Integration*

The relative literature in the past showed, when processing strategic alliances, the businesses only take into account the ability of the soft capability, such as management ability and compatible organizational culture (Henderson, J., et. al., 1992; Sabherwal, R., et. al., 2001). When the synergy is generated through strategic alliances, the enterprise should take into account the integration of information technology to alignment corporate strategy. The reason why this study takes “information technology integration” as an important criteria is based on the consideration of the strategic alliance with the level of specific means of competition in hypermarkets. In the future, the strategic alliance matching will be involved with information

technology strategy, which will be helpful in the performance of the cooperation, information exchange, and open communication.

### *Partner Selection Criteria*

There are a variety of factors that make strategic alliance relationship fail, one of which often mentioned is that partners are not compatible (Freidheim, C., et. al., 2000). Through the appropriate selection criteria for alliance, the failure can be prevented. From the point of view in the transaction costs proposed by the past academic, Table 1 shows the selection criteria for coalition partners, arranged in accordance.

Table 1. Strategic Alliance Partner Criteria

Main Criteria	Sub Criteria	Scholar (Year)
Compatibility	Operation policies, management team, company size, culture, organizational management, manufacturing capabilities, export channel capacity, financial situation, security maintenance	Geringer (1988); Cauley de la Sierra (1995); Brouthers et al., (1995); Lei et al., (1997); Spekman, et al., (2000)
Complementary	Complement of technology and resources, interdependence, strategic complementarity, the complementary capabilities	Geringer (1988); Cauley de la Sierra (1995); Brouthers et al., (1995); Lei et al., (1997); Spekman, et al., (2000)
Trust and Commitment	Trust and commitment	Geringer (1988); Spekman et al. (2000); Xiong Xinhua (2001)
Information Sharing	Joint planning, information exchange, open communication	Spekman et al. (2000)

## The Decision-Making Process In Analytic Network Process (ANP)

The decision making process in ANP is derived from Saaty and modified according to different studies structure (Mikhailov, L., 2003). The content of the decision making process in ANP is applicable to analyze the decision making problems, and at same time, meets the objectives and requirements in the selection criteria for the result selected by ANP. There are several steps in the process:

Step 1: to define the problem of decision making and the expert groups in decision making,

Step 2: to establish the pairwise comparison matrix of interdependence,

Step 3: to calculate eigenvalues and eigenvectors,

Step 4: to test consistency,

Step 5: to calculate limiting super matrix of decision-making, and

Step 6: to rank the criteria superiority dominance.

### *The Study Approach And Content Of The Hypermarket In Taiwan*

This study aims at studying the important factors which appear when forming hypermarket strategic alliances. These factors related to decreasing the difficulty of cooperation and are in line with company expectations decision model. From Fuzzy Delphi, this study expects to reach a consensus as soon as possible in selection criteria for the alliance partners. In addition, in the group decision making, the network analysis is able to add the “feedback”

mechanism to the hierarchical structure in decision-making model and presents the correlation between criteria in each level. The policy makers, by pair comparisons, conduct the review in participating co-decision-makers. This study also applies Fuzzy Preference Programming (FPP) with the network analysis to find out the problems of inaccurate decision-making the decision-makers face. Furthermore, the study combines ANP with FPP to effectively handle the uncertainty or ambiguity the policy-makers face and to obtain the relative weighting value, with which to build an evaluation model for hypermarkets strategic alliance partners.

#### *Fuzzy Delphi Method*

In addition to handling the fuzzy part of the human mind, Fuzzy Delphi Method can also sum up the uncertain information the subjectives found. It is also used with geometric mean as the basis for selection evaluation criteria, in order to achieve statistically unbiased results, avoid the impact of extreme values, and accordingly make selection criteria more accurate (Chén H. W., 2002). The advantages of applying FDM are as following:

1. it can reduce the number of investigation time,
2. it is more comprehensive in expressing the opinions from experts,
3. by the application of fuzzy theory, expert knowledge will be more rational and meet the needs, and
4. it is more cost- and time-effective.

There are four main steps implementing FDM (Ling, H. C., et. Al., 2006; (Hsu, T. H., et. Al. 2000):

Step 1: to establish evaluation factors set in which the decisions are deferred,

Step 2: to collect opinions from experts or decision-making groups,

Step 3: to establish the assessed value in TFN, and

Step 4: to screen assessment criteria.

#### The ANP Decision-making Process with FPP

This study follows with the eight steps Mikhailov (2003) proposed; the computational steps are as following:

1. based on the policy objectives, to construct network structure, including the constituent elements such as major criteria, minor criteria, and options;
2. to define the mutual dependencies of all the elements and present it in tabular form to show the elements relations;
3. to judge with the interval for establishing Pairwise Comparison Matrixes in the construction elements;
4. to execute FPP individually in each comparison matrix for calculating the local priority of each comparison matrix;
5. to construct the unweighted super matrix: filling in the table of element dependencies with

- partial priority, according to mutual dependencies of construction elements;
6. to process the fuzzy method in all those involved in the decision-making assessment, in accordance with standards within each of the minimum, maximum, and average geometric mean, based on the formula, and then to form an overall unweighted super matrix;
  7. to adjust the suspect in the vertical unweighted super matrix, making the sum of each element equal to 1, then generate weighted super matrix; and
  8. based on a weighted super-matrix conducting many times multiplied matrix to obtain the Limiting Super matrix, a stable convergence which is no longer to change.

In accordance with the criteria weightings in the matrix and the relative criteria weightings between criteria, the advantages of each criterion weighting are calculated. The one which gets final priority score from the summary of criteria and selection options weighting is the best option.

#### The Assessment Of Strategic Alliance Partner In Taiwan

##### *FDM Survey Results*

From the questionnaires issued in the first time, while asked if there are any elements to be influential in reducing the cooperation difficulty, among transaction cost measurement, strategic alliance type, and information technology integration, seven of the experts show the consensus value in “transaction costs measuring” a 7.819, reaching the threshold value 7 set in

this study. The type of strategic alliance got a consensus value 6.2, while information technology integration, 6.288, neither of them reach the threshold value.

In Figure 1, it shows that only two experts hold the different views in transaction cost measurement; the integrity of this criteria is not affected by the degree of consensus. As to

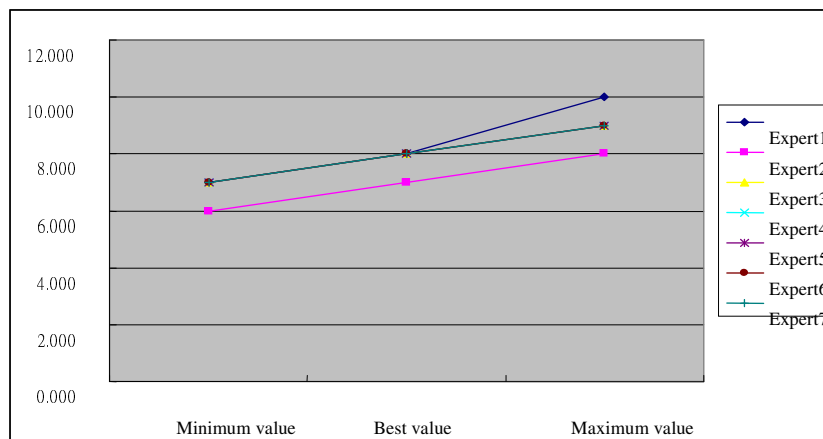


Figure 1. The assessment criteria for measuring transaction costs

Figure 2. and Figure 3., show the assessment criteria in which all experts are in different cognitive values; therefore, it fails to lead the consensus value to reach the threshold value set in this study, making the transaction cost measurement, in the first FDM questionnaire results, as the only agreement from experts.

#### *The Assessment Criteria For Solidifying Strategic Alliance Partner*

The assessment of cooperation partners has had basic direction via fuzzy weighting analysis, but long-term stability in strategic alliance partners is also critical to business survival. The purpose of this study is not only in selecting partners but also in strengthening stability of the hypermarket when in



forming strategic alliance partners, from the literature and empirical analysis of the questionnaire to conduct the criteria ranking. In the main objective of reducing the difficulty of cooperation, the transaction costs measurement is the main factors for hypermarkets, compared its weighting value of 0.547 with the weighting value of 0.453 in strategic alliance type. This slight difference is caused by the consideration from one of the four decision makers. While one favors that the strategic alliance type is comparatively important to transaction costs in reducing the difficulties of cooperation, the other three consider transaction costs more important, leading a value differentiation of 0.09.

The joint ventures X-Union of the strategic alliances types is the most important evaluation factor, so when conducting the strategic alliances, the recommended cooperation type is to set up a third-party company with equity joint-venture to assist both enterprises to engage in different value activities, like a logistics and procurement activities company cooperation.

As to transaction cost measurement, the most important assessment criterion is the consideration for benefits distribution, a weighting value of 0.344, followed by the performance of monitoring partnership, 0.32. However, in the consideration for benefits distribution, the change in the other party should be taken into account when there are possibilities in obtaining other benefits.

While establishing a clear relation is the major assessment for the level of developing the cooperation relationship, meeting the specifications and quality standards is the main consideration in the

performance of partnership monitoring, and in dealing problems which occur in alliance, a clear division of responsibility for problem solving takes the lead. Other various criteria are ranked in Table 2.

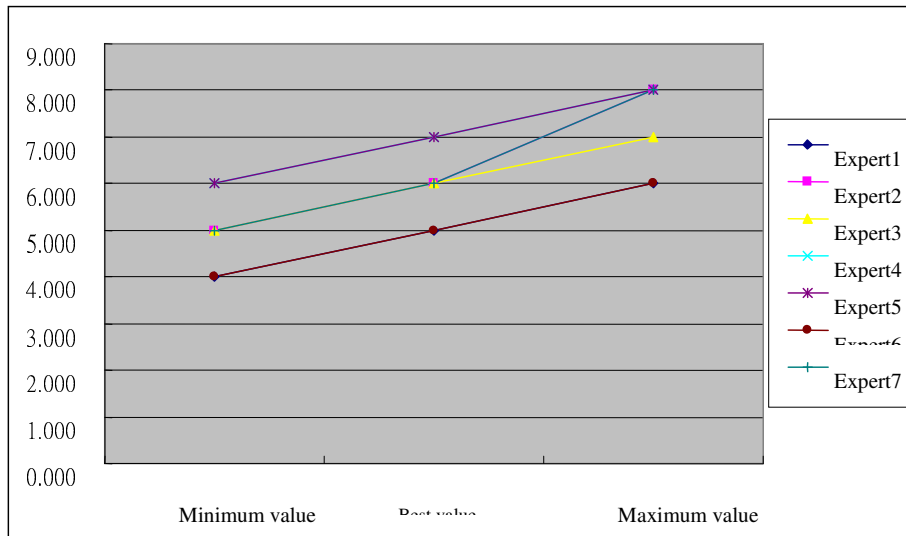


Figure 2. The assessment criteria for strategic alliance types

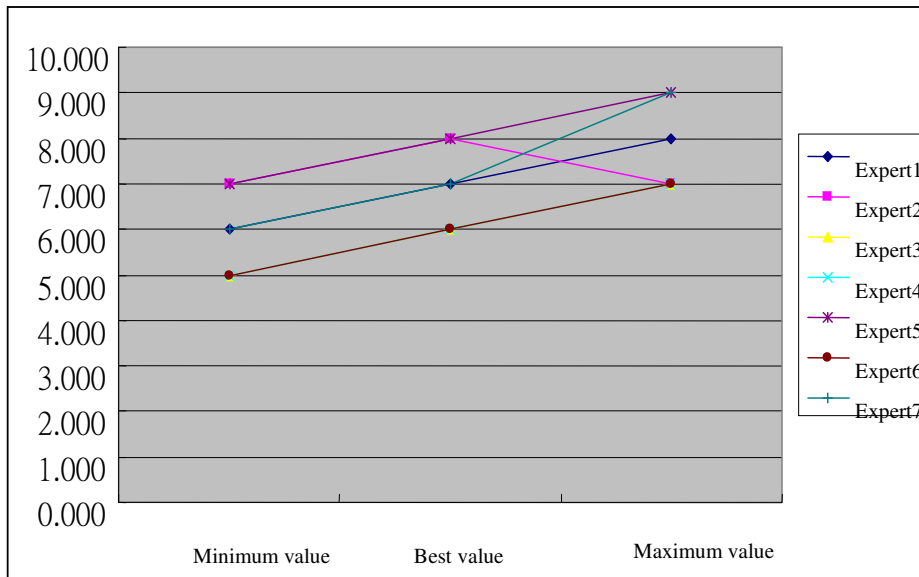


Figure 3. The assessment for information technology integration

Table 2. Criteria Weighting Ranking

Criterion	Rank	Criterion	Weighting
Reducing the difficulties of cooperation	1	Alliance type	0.453
	2	Measuring transaction costs	0.547
Alliance type	1	Joint X-Union	0.304
	2	X-Union Cooperation Agreement	0.256
	3	Y-Union Cooperation Agreement	0.234
	4	Joint Y-Union	0.205
Measuring transaction costs	1	Consider the benefits distribution	0.344
	2	Monitor the partnership performance	0.32
	3	Deal the problems occurred in alliance	0.175
	4	The lever of effort in developing the cooperation relationship	0.161
Considering the benefits distribution	1	easily change the action for other benefits	0.228
	2	Significant motivation to take advantage of laws or provisions which can not be implemented	0.198
	3	Strong incentive to detain or distorted information	0.141
Monitoring the performance of partnerships	1	Meet with specifications and quality standards	0.227
	2	Accurately assess the results	0.195
	3	Performance assessment	0.15
	4	Spend time and energy on detecting performance	0.122
	5	Reciprocal relationship	0.119
Dealing the problems occurred in alliance	1	A clear division of responsibility for problem solving	0.211
	2	Need to develop SOP	0.207
	3	As to solve the problem as a challenge	0.117
The lever of effort in developing the cooperation relationship	1	Establish a clear relationship	0.177
	2	Play their respective roles clearly	0.146
	3	The major cooperation issues and details of needs	0.127
	4	Integrate the necessary data	0.099

### Conclusions and Recommendations

The rise of hypermarkets has resulted in changes in the domestic distribution channel and formally opened a new shopping mode to a “self-served, low-cost, one stop shopping” era of large scale stores. With the spacious floors, complete various items, cheap prices, and convenient parking advantages, the hypermarkets have been rapidly growing and have a great impact on the department stores, supermarkets, and traditional retailers. Currently, Carrefour, a French giant

chain hypermarket, ranks the top one, followed by Taiwan RT-Mart. Facing the strong impacts from foreign hypermarkets, the hypermarkets in Taiwan should join the strategic alliances and, from their cooperative relationship, to increase their own competitiveness. Although there are many causes resulting in the instability in the strategic alliance, the study starts discussion with reducing the difficulty in alliance, and then practically analyzes the assessment criteria in carefully choosing appropriate strategic alliances partners. In addition to considering the type of cooperative enterprises, the transition cost reducing is also discussed. From this study, the conclusions are as following:

From document analysis method, this study deduces the structure of integrated research, when making a strategic alliance, in which the strategic alliance types, transaction cost measurement, and information technology integration can reduce the difficulty of cooperation. When applying the Fuzzy Delphi Methods to evaluate the reduction of cooperation difficulty, the study found that the Fuzzy Delphi Methods are effective to shorten the idle time in questionnaire survey and increase the effectiveness of the implementation along with solving the limitations of single decision. From practical analysis, the study found that the conceptual framework in information technology integration does not generate an expert group consensus. This study supposes that the consideration factors, as a cause, makes the information technology integration has no direct impact before making cooperation consultations.

When selecting the partners in hypermarkets, the assessment criteria have the characteristics of multi-criteria and fuzziness; therefore, this study applies Analytic Network Process proposed by Saaty with Fuzzy Set Theory to form a Fuzzy Analytic Network Process for obtaining the best cooperation partner selection criteria and cooperation types in order to increase the flexibility and make room for decision-making. When applying FANP to assess the

difficulty reducing, the study found that the policy makers' subjective assessment, the determination differentiation, and the uncertainty, increase many complex variables in the critical policy assessment. Therefore, from Fuzzy Preference Programming and with the interval level concept, the importance of the comprehensive assessment criteria the decision-makers have is explainable.

Taking into account the ambiguity and complexity in real world, this study proposed a methodology in decision analysis, including the importance of population factors in assessment criteria and the thinking mode the respondents show in completing the questionnaire. And then in the integration, the application of fuzzy theory makes it effective in understanding the inner thoughts of the policy-makers, avoiding generating conflict when companies making strategic alliances. In sum, the main contribution in this study is to achieve the goal that the proposed methodology in decision analysis is executed on a reasonable and effective way.

The currently booming strategic alliance in businesses is a type of investment to strengthen the competitive advantages, reduce risk, and enter the international market. Nevertheless, the stability of strategic alliance management cooperation is one of the key success factors that the firms often overlooked. The results in the study show that on the strategic alliance management, the benefits of distribution is with the highest impact. In addition, in searching of transaction cost measurement criteria, the consideration of the performance of cooperation should be taken to ensure the stability of cooperative relationship with the organization. Carefully assessing the benefits to join the alliance and taking the alliance a must means to achieve business goals, the alliances can be of advantages.

The investment in mainland China currently, Taiwanese enterprises have faced the complex mainland's economic investment environment, political situation, and different business

cultures. As a result, the business alliances often end in failure. The research data show, in the type of assessment project, X-Union topped highest in cooperation integration. The literature also shows that, to the degree of control on the alliance, the relationship between the degree of the alliance management and the alliance performance will be a difference affect in duration.

The successful example of Save & Safe and RT-Mart alliance has proved the advantages of using the same POS as a logistics information system management support. In view of this, the type of information technology which can help to form a strategic alliance should be considered when integrating the strategic alliance. While there is no direct impact on nature, in the future the enhanced joint competitiveness will be a research topic.

Although the alliance partners is an interdependent relationship, both sides must have the necessary independence in other conditions (technology, finance, marketing management, and other conditions). When unstable alliance occurs, having interdependence and developing interaction are essential. And as time goes on, the alliance relations will show different changes because of the demand for the sake of each other. How to strengthen cooperation to maintain stability once again is a topic for future research.

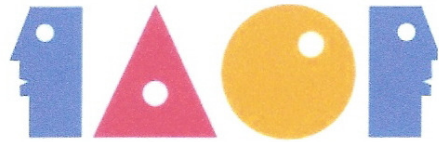
Because of the time restrictions, the study only focuses on the strategic alliance partnership in the transaction cost perspective, the patterns of cooperation, and strategic alliance management. The integration of independent inner layers, such as organizational culture and human resources, are not explored. Further research can make the assessment results and contents more sufficiently comprehensive with the decision-making framework established in the study.

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A STUDY ON THE RELATIONSHIP BETWEEN HUMAN  
RESOURCE MANAGEMENT STRATEGIES  
AND CORE COMPETENCIES

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Abstract

With the arrival of the knowledge economy era, the accumulation of staff knowledge, experiences, and skills can be considered the foundation of a corporation's core competencies. This research explores the influence of a corporation's human resource management strategies on its core competencies using the scales of human resource management strategies and core competencies as research tool. The study objects are the supervisors of the department of human resource of the car component manufacturers in Taiwan. 280 questionnaires were delivered, 132 were collected, and 105 are valid. After the data analysis, the results show that the human resource management strategies (HRMS) have significant and positive influences on the market-access competencies, integrity-related competencies, and functionality-related competencies of core competencies. Moreover, the study results also indicate that the moderating effects of the organization's age on the relationship between human resource strategies and core competencies and the moderating effects of the organization's size on the relationship between human resource strategies and core competencies are significant.

Key words: Human Resource Management Strategies (HRMS), core competencies, organization size, age of organization

## Introduction

The 21st century is a new era of technological innovation. With the development of the knowledge economy, an organization has to continually update and innovate its management strategies and enhance its core competencies so that its performance can be improved and strengthened. The high-tech industry is knowledge intensive and high value-added. Therefore, when facing a fast-changing business environment and a situation in which the product life cycle shortens sharply, in addition to developing external competitiveness, it's more significant for an organization to integrate its internal knowledge and establish its core competencies. The core competitive advantages of an organization are based in the foundation of its human resources or human capital. *Human Capital* is the stock of competencies, knowledge and personality attributes embodied in the ability to help industries handle and solve various complicated problems (Wright et al., 1994 ; Wang et al., 2005), and it has gradually been considered one of the most important core assets of companies.

In order to continue its competitive advantages, a company has to use its internal resource in an efficient manner that is unique and can not be copied by its competitors. (Javidan, 1998) Based on the integration of a company's internal resources, the resource-based theory thinks that industries have to own unique core competencies, which cannot be easily copied, to gain competitive advantages in the market. In addition to these competitive advantages, human resources can also be regarded as one of the most significant factors for companies to achieve its foundation purposes and sustainable management (Barney, 2001; Wright et al., 2001; Jiang et al., 2002).

Strategic human resource management means that industries systematically deal with problems they are confronting and effectively make use of their employees through human

resource management measures to achieve their business goals and strategies (Huang, 1998). Schuler and Jackson (1987) also pointed out that an organization has to systematically integrate the human resource management strategy with the business operation strategy to effectively enhance its competitiveness and management benefit. With the proposal of the concept of the best human resource management (Pfeffer, 1994), the influence of human resource management on organizational performance has become an important issue studied by scholars who specialize in strategic human resource management; they regard human resource management as the basis of an organization's competitive advantages and a help in enhancing organizational performance (Delaney and Huselid, 1996; Delery and Doty, 1996; Youndt et al., 1996; Wang and Hsu, 2006). Drucker (2002) stated that continuous innovation, which is based on adequate knowledge, is a necessity for companies. Previous research has shown that innovation has positive benefits to organizational performance. Wang and Hsu (2006) pointed out that if companies can operate a human resource management system, resulting innovation will benefit their organizational performance; Aragón-Correa et al. (2007) found that innovation has an obvious influence on the organizational performance; Orfila-Sintes and Mattsson (2009) and Keskin (2006) also proved that there's a positive relationship between innovation and organizational performance. These studies show that innovation is pretty significant in enhancing core competencies. However, the enhancement of core competencies needs the accumulation and integration of time, knowledge, skills, and experiences; competitive advantages of an organization should be strengthened by adapting to the business environment. Through the execution of human resource management, industries can transfer employees' knowledge and skills into real output, which will become their core competitive advantages (Pfeffer, 1994). Pfeffer's study result shows that there's a very close and inseparable relationship between human resource management strategy and a business's core

competencies. Therefore, this study will explore the relationship between these two items with the goal of becoming a reference for industry, government, and academia.

## Literature Review

### *Human Resource Management Strategy*

The fast changes in society and the environment have transferred human resource management from a businesslike role into a functional one. Human resource management is a significant link in administration. Through a systematic human resource management strategy, a company would be able to cultivate and develop techniques, behavior and employees that meet their demands. Besides, through the implementation of such a strategy, a company can deal with problems flexibly, effectively make use of their human resources, and maintain or create strategic directions that will have their continuous competitive advantages (Lee, 2000).

Many scholars have proposed different points of view about strategic human resource management. Walton (1985) divided strategic human resource management into control and commitment. His studies show that strategic human resource management has a positive relationship with organizational profits and growth (Fang, 2002). Dyer & Holder (1988) brought up the concepts of cost reduction and commitment maximization. Corporations adopting a human resource system of control (cost reduction) will formulate punishment rules and standards to evaluate employees' work performance and enable employees to obey the rules and follow procedural supervision, hoping to reduce direct labor cost and enhance work efficiency. Corporations that adopt a human resource system of commitment (commitment maximization) trust their employees and consider employees' psychological needs; therefore, they establish a formal mechanism to help their employees cultivate problem solving skills so that their behavior and attitude meet the corporations' demands, enabling them to accomplish tasks and goals,

thereby increasing and enhancing organizational effectiveness and productivity. In commitment maximization mode, the employees are trusted to complete tasks with their own methods as long as they do not violate the corporations' rules and/or otherwise damage the corporation property or reputation.

According to Delery and Doty (1996), human resource management can be separated into two types: internal system and market-type system. The internal system is based on an internal labor market where employees are expected to be loyal to the organization and provide long-term contributions through the provision of job guarantee, broad educational training, long-term investment of resource and time, and high participation in decision making. The market-type system focuses on short-term benefits. In this system, staff are recruited through an external channel instead of a formal training mechanism offered by the organization. Industrial relations are founded on the basis of mutual use and reciprocity. Once reciprocity disappears, the employment relationship ends. So there's no protection for employees. It can be stated that this system focuses on economic incentives such as result-oriented performance evaluation and profit sharing. Moreover, Delery and Doty (1996) also chose high-tech companies as a case study, whose results show that the companies adopting the internal system have better organizational performance than those adopting the market-type system.

Bird and Beechler (1995) referred to the points of view proposed by Carroll (1991) and Cascio (1991) and divided human resource management strategies into accumulation, facilitation, and utilization. The corporations adopting the accumulation strategy think about human resource management over the long term. They will put emphasis on the cultivation of their employees, invest funds to train their staff, carefully select excellent employees, emphasize their employees' recognition of the corporation's culture instead of prioritizing their working

skills, fairly treat every employee, emphasize the lifelong employment relationship, and acquire human resources from their employees based on the latest investment and executive technology (Bird and Beechler, 1995; Schuler and Jackson, 1987).

Corporations adopting a utilization strategy evaluate human resource management activities within short-term considerations. They will hire their staff through an external channel and put less emphasis on the cultivation and training of their employees. The employment relationship is founded on the employees' working skills. So when their skills cannot meet the corporations' needs, the relationship ends immediately. Moreover, there are two methods for personnel employment in this strategy: internal promotion and external recruitment. The corporations will hire or fire staff based on the minimum commitment, high utilization of their staff's techniques and their short-term demands. They will complete the organizational human resource configuration through the rapid transfer of labor power, techniques, abilities, and tasks to achieve the biggest return in effectiveness (Bird and Beechler, 1995; Schuler and Jackson, 1987).

The facilitation strategy is between the accumulation strategy and utilization strategy. Corporations adopting this strategy will emphasize long-term employment, but they won't sign a lifetime employment contract with their employees. When it comes to staff training, the corporations will consider the long-term view, providing financial and non-financial resources for their staff to help them take related courses offered by other organizations. In addition, they will maximize the performance of human resource development on the basis of the production of innovative knowledge through the acquisition of self motivation and the encouragement and support of employees' developing skills and knowledge related to the job. As for staff appointments, the corporation will use both internal promotion and external recruitment (Bird

and Beechler, 1995). This study explores the relationship between the accumulation, facilitation, and utilization strategies and business's core competencies.

### *Core Competencies*

Core competencies are the integration of capabilities and accumulative knowledge such as techniques, management, and so on that are significant for companies to gain their competitive advantages. The industries with core competencies can create or offer services or products with lower capital and more different features than their competitors. Core competencies are not physical assets, so their characteristics are irreplaceable, peculiar, and hard to copy. In addition, core competencies can also strengthen customer's core value, create differences from competitors, and build up the capacity to enter new markets (Quinn et al., 1990; Li and Huang, 2007).

Core competencies can be discussed from the aspects of capacities and assets. In regards to capacities, core competencies mean supportive capacity such as threshold capacity and human resources that can support industrial competitiveness and basic abilities that the staff need to own to carry out the corporations' plans and business. Critical capacities refer to the skills and systems that have great influence on the competitive advantages of corporations and customers. Future capacities are the capacities that the corporations should own in order to maintain their competitive advantages in the future (Long and Vickers-Koch, 1995; Lin and Wu, 2005). Hamel and Heene (1994) categorized core competencies into three types, market-access competencies (sales and marketing, distribution and logistics, and technical support), integrity-related competencies (flexible production process and product provision ability), and functionality-related competencies (skills that enable the company to invest its services or products with unique functionality, and products with distinct customer benefits). Prahalad and Hamel (1990)

pointed out that market-access competencies refer to brand development management, sales and marketing, distribution and logistics, and after-sales service, all of which enable companies to meet customers' needs. Integrity-related competencies enable the corporations to do things more quickly and more reliably than their competitors. Functionality-related competencies refer to skills that enable corporations to provide their services or products with unique functionality that allows the product to provide distinctive customer benefits, rather than merely making it incrementally better.

As for the concept of assets, strategic assets are the specific assets of a corporation (Amit and Schoemaker, 1993). Core competencies can be regarded as the integration of knowledge, experience, system, and capacities, and can also be considered the ability to accumulate strategic assets (Markides and Peter, 1994). Coombs (1996) also proposed that core competencies are composed of products, production processes (professional knowledge), and every capacity that will effectively allocate professional knowledge. Core competencies cover the concepts of capacities and assets, so they can be regarded as critical capacity that allows corporations to strengthen their competitive advantages including basic threshold capacities, critical capacities, and future capacities (Lin and Wu, 2005). After reviewing the references above, the researcher regards core competencies as an idea of dynamic capacities that matches the unique extension of core competencies and high-tech industry characteristics as well.

#### *Relationship Between Human Resource Strategies and Core Competencies*

The establishment of an organization's competitive advantages results from the core competencies of the staff. The acquisition and development of core competencies are closely related to the human resource activities and strategies of the organization (Bohlander et al., 2001; Lado and Wilson, 1994). And there's a close connection between the cultivation of staff's



abilities and the enactment of selection criteria, the regulation of work content, the types and models of training plans, the objects and standards of performance evaluation, and the types of payment. However, there are few studies that discuss the relationship between organizational core competencies and human resource strategies. Bae & Lawler (2000) pointed out that organizations with core competencies usually tend to adopt human resource strategies that will encourage the staff to take part in related activities. With the match of human resource strategies and core competencies, the efficiency of the human resource should be able to be raised and strengthened. Meanwhile, with the establishment of competitive advantages, the organization's performance can also be enhanced. However, the interactive relationship between the foundation of the corporation's core competencies and the quality of employees, technical abilities, training system, coordination, and the accumulation of internal knowledge (human resources, knowledge resources, technological infrastructure, and financial resources) greatly influences the corporation's competitiveness. According to the references and discussions above, the hypotheses are as follows:

**H1: The corporation's human resource strategy has a significant influence on the "market-access competencies" of core competencies.**

**H2: The corporation's human resource strategy has a significant influence on the integrity-related competencies of core competencies.**

**H3: The corporation's human resource strategy has a significant influence on functionality-related competences.**

*The Influence of the Organization's Size and Age on the Corporation's Human Resources Strategies & Core Competencies*

Youndt et al. (1996) have pointed out that the size of the organization will influence the development of its human resource management. Therefore, this study adopted the evaluation designed by Youndt et al. (1996), taking the natural logarithmic of the total number of the

organization’s staff to evaluate the size of the organization. Moreover, a different organization age will have different founding values and maturation effects. According to the reference review, the hypotheses are as follows:

**H4: The organization’s size will influence the relationship between the human resource strategies and core competencies of a corporation.**

**H5: The organization’s age will influence the relationship between the human resource strategies and core competencies of a corporation.**

### Methodology

After reviewing the related literatures about the relationship between the human resource strategies and core competencies of a corporation, the research framework is presented as Figure 1. Core competencies are taken as the dependent variables including market-access competencies, integrity-related competencies, and functionality-related competencies. The corporation’s human resource strategies are taken as the independent variables including accumulation strategies, facilitation strategies, and utilization strategies. These two variables are

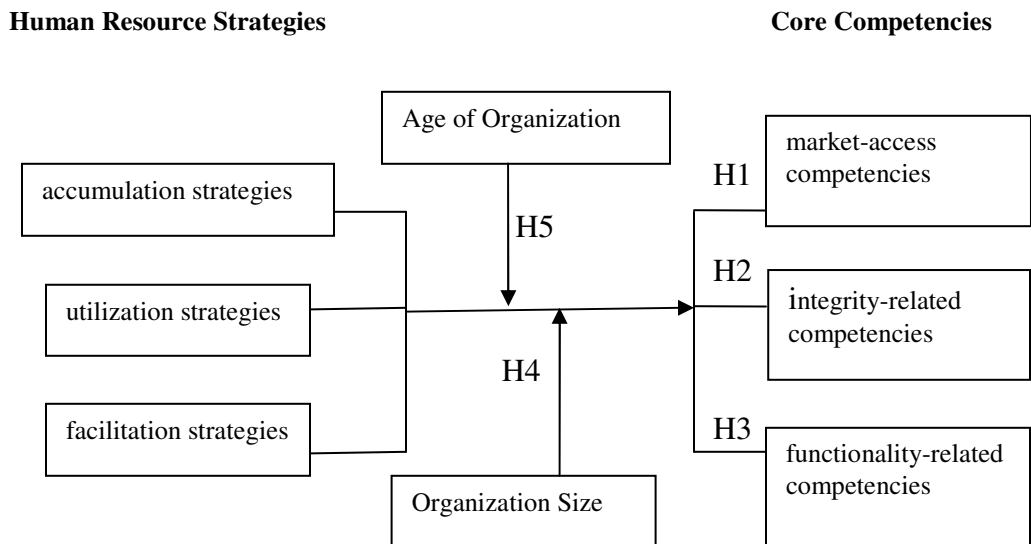


Figure1: Research Framework

used to explore the relationship between the human resource strategies and core competencies of a corporation.

### *Sample and Data*

The supervisors of Human Resource Department of car component manufacturers in Taiwan are chosen as the research objects. Two hundred and eighty questionnaires were sent. Through continual phone reminders and reissued questionnaires, 132 questionnaires were collected with 105 of them being valid.

### *Variables and Measures*

**Human Resource Management Strategies:** This study refers to the definition of human resource management strategies proposed by many scholars including Carroll (1991), Cascio (1991), Bird and Beechler (1995), and Miles and Snow (1994), and then categorizes the strategies into accumulation, facilitation, and utilization. There are 10 questions using a five-point Likert Scale, covering human resource management strategies such as employees' promotion channels, career development, performance evaluation, educational training, salary adjustment, and recruitment selection. Companies with high scores are more likely to adopt the accumulation strategy. On the contrary, companies with low scores tend to adopt the utilization strategy. The companies whose scores are mean use the facilitation strategy. The categorization standard is based on the standard deviation resulting from the average number of every aspect of human resource management strategies. The companies whose scores are higher or equal to the average number plus a standard deviation are categorized into "accumulation strategy;" the companies whose scores are lower or equal to the average number minus a standard deviation are categorized into "utilization strategy;" the companies whose scores are in the mean are categorized into "facilitation strategy."

Core competencies: This study refers to the definition and categorization of core competencies proposed by Hamel and Heene (1994) and the points of view about the competencies raised by Long and Vickers-Koch (1995) and Coombs (1996). Organization's core competencies are categorized into market-access competencies, integrity-related competencies, and functionality-related competencies to measure and evaluate a corporation's core competencies. There are 13 questions using a five-point Likert Scale in this questionnaire.

Control Variables: The control variables are the size, age, and management of the organization.

### Analysis and Results

#### *The Influence of Human Resource Strategies on Market Competencies*

According to the results shown in Table 1, it can be inferred that the accumulation strategy ( $t=2.38$  ,  $p<0.01$ ), utilization strategy ( $t=2.58$  ,  $p<0.05$ ), and facilitation strategy ( $t=3.86$  ,  $p<0.05$ ) have a significant influence on the market-access competencies of core competencies, so Hypothesis 1 (H1) is supported.

Table 1. Regression Analysis of the Influence of Human Resource Strategies on Market-access Competencies

Predictor Variables	Non- Standardized Coefficients		t Value
	$\beta$ Estimates	Standard Error	
Intercept	3.96	0.73	5.42
Accumulation	0.64	0.26	2.38*
Utilization	0.56	0.21	2.58*
Facilitation	0.63	0.16	3.86*

Note: \* p value <0.05

*The Influence of Human Resource Strategies on Integrity Competencies*

As the results shown in Table 2, accumulation strategy (t=3.517 , p<0.01), utilization strategy (t=2.641 , p<0.01), and facilitation strategy (t=2.738 , p<0.05) have a significant influence on the integrity-related competencies of core competencies, so Hypothesis 2 (H2) is supported.

Table 2. Regression Analysis of the Influence of Human Resource Strategies on Integrity-related Competencies

Predictor Variables	Non- Standardized Coefficients		t Value
	$\beta$ Estimates	Standard Error	
Intercept	4.74	0.53	8.96
Accumulation	0.77	0.22	3.51*
Utilization	0.45	0.17	2.64*
Facilitation	0.35	0.13	2.73*

Note: \* p value <0.05

*The Influence of Human Resource Strategies on Functionality-related Competencies*

As the results shown in Table 3, the accumulation strategy (t=2.33 , p<0.05), utilization strategy (t=3.26 , p>0.05), and facilitation strategy (t=2.68 , p<0.05) have a significant influence on the integrity-related competencies of core competencies, so Hypothesis 3 (H3) is supported.

*The Moderating Effect of the Organization's Size on the Relationship between Human Resource Strategies and Core Competencies*

The test results of Hypothesis 4 (H4) are summarized in Table 4. The results of the interaction effects between the size of the organization and accumulation strategy on core competencies are  $t=3.12$  and  $p=0.001<0.05$ ; the results of the interaction effects between the size

Table 3. Regression Analysis of the Influence of Human Resource Strategies on Functionality-related Competencies

Predictor Variables	Non- Standardized Coefficients		t Value
	$\beta$ Estimates	Standard Error	
Intercept	4.56	0.61	7.48
Accumulation	0.42	0.18	2.33*
Utilization	0.36	0.11	3.26*
Facilitation	0.38	0.14	2.68*

Note: \* p value  $<0.05$

of the organization and utilization strategy on core competencies are  $t=2.84$  and  $p=0.001<0.05$ ; the results of the interaction effects between the size of the organization and facilitation strategy on core competencies are  $t=4.11$  and  $p=0.001<0.05$ . These numbers are statistically significant, so Hypothesis 4 (H4) is supported. In other words, the interaction effects between the organization's size and different human resource strategies are significant, which proves that the moderating effect of the organization's size exist.

*The Moderating Effects of the Organization's Age on the Relationship between Human Resource Strategies and Core Competencies*

Table 5 shows the interaction effects between the age of the organization and accumulation strategy on core competencies are  $t=2.71$  and  $p=0.001<0.05$ ; the results of the interaction effects between the age of the organization and utilization strategy on core competencies are  $t=4.12$  and  $p=0.001<0.05$ ; the results of the interaction effects between the age of the organization and facilitation strategy on core competencies are  $t=3.76$  and  $p=0.001<0.05$ .

These numbers are statistically significant, so Hypothesis 5 (H5) is supported. In other words, the interaction effects between the organization's age and different human resource strategies are significant, which proves that the moderating effect of the organization's age exist.

Table 4. The Moderating Effects of the Organization's Size on the Relationship between Human Resource Strategies and Core Competencies

Mode	Regression Coefficient	t Value	p Value
Intercept (Constant)	2.06	2.85	0.005
Organization Size *	0.24	3.12	0.001*
Accumulation Strategy			
Organization Size *	0.32	2.84	0.001*
Utilization Strategy			
Organization Size *	0.41	4.11	0.001*
Facilitation Strategy			

Note: \* p value <0.05

Table 5. The Moderating Effect of the Organization Age on the Relationship between Human Resource Strategies and Core Competencies

Mode	Regression Coefficient	t Value	p Value
Intercept (Constant)	3.12	3.14	0.005
Organization's Age*	0.52	2.71	0.001*
Accumulation Strategy			
Organization's Age *	0.44	4.12	0.001*
Utilization Strategy			
Organization's Age *	0.28	3.76	0.001*
Facilitation Strategy			

Note: \* p value <0.05

## Conclusion and Suggestions

### *Conclusions*

With the arrival of the knowledge economy, the accumulation of members' knowledge, experience, and techniques are considered to be the foundation of a corporation's competencies. And the enhancement of the competencies is based on the utilization of the corporation's human

resource strategies and the collation of human resource strategies and management strategies. These elements will determine if the sustainable management of the corporation will succeed or not.

This study chose supervisors working in car component manufacturers in Taiwan as the objects, in order to investigate and discuss the influence of human resource management strategies on the corporation's core competencies. According to the questionnaires categorizing the human resource management strategies into three types, which are accumulation, utilization, and facilitation, and core competencies include market-access competencies, integrity-related competencies, and functionality-related competencies.

Based on the study results, it can be inferred that accumulation strategy, utilization strategy and facilitation strategy have a significant and positive influence on core competencies. This confirms that all car component companies have complete supporting measures for human resource management, regardless of the human resource management strategy they adopt. In other words, all of these companies have a complete and systematic plan for employee welfare, educational training, work allocation, performance standards, promotion channels, and staff recruitment. The effectiveness of human resource management can not only support the corporations' marketing, logistics, and techniques, but also help the corporations set up a flexible process to provide their products and offer special values to their customers. The success of an organization may be ascribed to a wise and farsighted leader, excellent technology, innovative products, excellent quality, and impressive reputation. All of these elements, however, are associated with "human being" so it shows how important human resource management strategies are to strengthen the corporations' core competencies.



In addition, this study also explores the moderating effects of the organization size and age on the relationship between human resource management strategies and core competencies. The results show that under different human management strategies, which are accumulation, utilization, and facilitation, the corporations' age and size will indeed influence their core competencies. So the moderating effect indeed exists. Generally speaking, the size of an organization is measured by taking the natural logarithmic of the total number of the organization's staff. In consideration of the resource-based view, the bigger an organization is, the more funds and more diverse markets it will have, so it will have stronger ability to risk failure. However, Hannan and Freeman (1984) pointed out that the larger an organization size is, the more complicated it will be, which means that it will be more likely to make the organization rigid and not able to easily push or adjust its policies to follow market trends. The funds, labor power, and markets of a smaller organization may not be as big and strong as a large organization, but its advantages are its mobility and good execution, so it can immediately adjust its management to respond to current market trends and meet the customers' needs. Therefore, the size of an organization indeed has a significant influence on the relationship between human resource management and core competencies.

The calculation of an organization's age is based on its foundation time. The longer a company has been established, the more organizational problems it may encounter such as rigid internal structure, standardized systematic regulations, and difficult promotions. If the companies want to adjust and change, the costs they invest are increasingly expensive, the time they take to change must be long, and the reaction they respond to the external environment must be slow, all of which are not conducive to innovation (Amburgey et al., 1993; Hannan and Freeman, 1984). On the contrary, in order to gain a foothold in the competitive market, young companies actively

invest in the development and exploration of new markets, the production of innovative products, and pay more attention to market information to respond immediately and build up their reputation in the market. Based on the discussions above, the manager can choose human resource management strategies according to the company's size, age, and other related factors.

However, the core of the organization's operation is still manpower, and human resource is regarded as the most important core asset for an organization in this knowledge economy era. Therefore, if a company wants to effectively enhance its profits and core competencies, perform efficiently, and achieve the ultimate goal of sustainable management, it must take a positive attitude to the value of human resource, consider labor a development core, draw up strategic human resource management projects based on a complete human resource management plan, integrate internal competencies, make good use of external resources, and follow up on the company's management strategies.

#### Suggestions for Future Research

The scale of human resource strategies and core competencies used in this study are adopted from the studies of domestic and foreign scholars. During the process of the survey, some objects were not willing to fill in the questionnaire because some questions were sensitive. Therefore, it is suggested that the future researchers can improve the presentation of the questionnaires to make the scale better and improve its reliability.

The objects of this study are supervisors working in the car component manufacturers. So it is suggested that future researchers choose different industries as study objects and do more in-depth studies on the company characteristics and the size of the organization to explore and discuss if there are differences in the influence of different human resource management

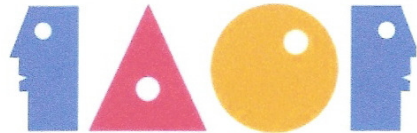
strategies on core competencies, and to understand the relationship between the human resource management strategies and core competencies of different companies.

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PERFORMANCE ANALYSES OF TRADITIONAL INDUSTRIES IN  
TAIWAN WITH DATA ENVELOPMENT ANALYSIS

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Abstract

Traditional industries, with the brilliant performance, present certain contribution and historical status in the economic development in Taiwan. Nevertheless, because of the impact of rapid development in economy, the gradually open market, continuous development of technology industry, and rapidly internal and external changes, the proud advantages of cost and quality in some traditional industries are disappearing. Based on the performance survey of traditional industries in Taiwan during 2007-2009, both Data Envelopment Analysis (DEA) and Malmquist Productivity are applied to measuring the Total Efficiency (TE), Pure Technical Efficiency (PTE), and Scale Efficiency (SE) of ten Taiwanese companies in traditional industries. The outcomes are provided reference for further efficiency improvement.

In terms of Overall Efficiency, the empirical results appear the average efficiency 0.89 in three years, showing the best performance of Uni-President and Formosa Plastics, but the worst of PEWC. In regard to Pure Technical Efficiency, the average efficiency in three years reveals 0.88, presenting the best performance of Uni-President, but the worst of PEWC. In terms of Scale Efficiency, the average efficiency in three years displays 0.87, showing the best performance of Formosa Plastics, but the worst of Far Eastern. According to Malmquist Productivity, both Uni-President and Formosa Plastics are approaching the permanently optimal scale, while the rest companies are required improving the operations to reach the permanently optimal scale.

Key words: traditional industry, Data Envelopment Analysis, Performance

## Introduction

In the process of economic development, traditional industries have played the key roles in Taiwan so that Taiwan could survive Asian Financial Crisis. The technological innovation or the employment creation in traditional industries is not worse than general high-tech industries. Traditional industries are considered as the best portrayal of economic miracle as they spread in various towns and villages offering the local citizens with employment opportunities, which present the stable power in the society and economy. Their management might not base on solid theories as well as the administration might follow the rules of thumb; however, they have created several achievements with the flexible contingency management and presented absolute contributions and historical status in Taiwan. Unfortunately, with the rapid change of environment, the mature of product market and the impact of joining in WTO, the economic status of traditional industries is gradually replaced by high-tech industries, such as IT, biotechnology, and nanotechnology. In spite that traditional industries displayed brilliant performance and certain contributions and historical status, the proud advantages of cost and quality in traditional industries might disappear because of the impact of rapid economic development, open market, development of technology industry, and rapid change of internal and external environments.

In recent years, the emergence of high-tech industries has replaced traditional industries and become the new motive power for economic growth in Taiwan. The environment change might obstruct the development of traditional industries; however, several companies in traditional industries have endeavored to innovate and create the development opportunities. Moreover, most companies have noticed the insufficiency of traditional high-quality and low-cost requirements on the success of new products. The continuous growth of an industry lies on

constant innovation and rapid applications of the innovative knowledge and technology to the innovation of the industry and the products. It is regarded as the key success factors in business competition. In such a highly competitive environment, it is expected to discover a useful operation model for the performance of traditional industries.

## Literature Review

### *The Present Development Situation Of Traditional Industries*

According to the definitions of Council for Economic Planning and Development, the Executive Yuan, the manufacturing in Taiwan is divided into high-tech industry and traditional industry. The former contains emerging technical industries of communication industry, information industry, consumer electronics industry, semiconductor industry, precision machinery and automation industry, aerospace industry, advanced material industry, special chemical and pharmaceutical industry, medical healthcare industry, and pollution control industry. The latter covers the ones other than the emerging technical industries, such as livelihood industries of machinery, steel, appliance, food, construction, and rubber and fundamental industries.

With the acceleration of globalization, the major traditional industries, including machinery & metal industry, simple vehicles manufacturing industry, plastic-chemical industry, and food manufacturing industry, have been delicately divided the labor since 2000. To cope with such a brand-new challenge of globalized economy, the Government accelerates the promotion of information electronics industry as well as enhances to research and develop, innovate, and create original brands, based on the solid industry supply chain. It is expected to promote the performance of industries and to create business opportunities for traditional industries.



## *Performance*

Businesses are profit-oriented that proper performance measurement allows managers to understand the achievement of objectives as well as the factors in adjusting the investment.

Performance is regarded as the achievement of strategic objectives, i.e. the index of overall competitiveness. Lumpkin and Dess (1996) indicated that business performance should be evaluated by multiple measurements. Hertenstein and Platt (2000) suggested that analyzing an industry with relative financial ratios appeared better discrimination than with the original financial ratio. Murphy et al. (1996) studied several literatures on business performance and found the wide applications of multiple measurements, in which the dimensions of Financial Efficiency, Growth, and Profitability were often applied to the research statistics.

Li (2004) analyzed businesses with the financial distress prediction and found that the financial ratios of total asset turnover, working capital turnover, inventory turnover, net worth ratio, operating margin, capital stock margin, earnings growth rate, and return on equity would appear signs three years before financial crisis. Lee & Liu (2008) divided business performance into three dimensions for the measurement. Organizational Effectiveness indices contained flexible reactions, stable control, communication, and cohesion; Financial indices covered sale, cash flow, profit, and return on investment; and Strategy indices included market share and market growth. When discussing the correlations between internal factors of an organization and the performance, Hung, Chen & Lin (2007) developed the index of performance measures into Organizational Effectiveness indices, including flexible reactions, stable control, communication, and cohesion, Financial indices, containing sale, cash flow, profit, and return on investment, and Strategy indices, covering market share and market growth.

Based on the top 32 steel manufacturers in the world, Huang (2000) benchmarked the businesses and indicated that steel manufacturers with high Technical Efficiency and high Scale Efficiency appeared higher staff productivity, total asset productivity, the income created per million US dollars, and net profit than the ones with high Technical Efficiency and low Scale Efficiency as well as the ones with low Technical Efficiency and high Scale Efficiency. Chou & Hsieh (2002) utilized the investment of 1.total asset, 2.operating cost, 3.operating expense, and 4.number of employee and the yield of 1.operating revenue and 2.net operating profit for the efficiency evaluation of component manufacturing in Taiwan. Chang, Li & Yu (2003) applied the investment of 1.fixed asset, 2.R&D expense, and 3.number of employee and the yield of operating revenue to the efficiency analysis of IC design listing companies in Taiwan. Hung (2001) studied the operating efficiency of 50 manufacturers in metal & machinery industry, information electronics industry, chemical industry, and livelihood industries and indicated that the improvement of production management indices in chemical industry, livelihood industries, and metal & machinery industry was the key of promoting performance; besides, manufacturers in information electronics industry presented the worst performance.

There has been a lot of research on traditional industries; nevertheless, few of them utilized DEA for performance analyses. In consideration of the production theory, various cost integrity (including direct cost and indirect cost) as well as data acquisition, number of employee, operating cost, and fixed total asset were selected as the investment, while operating revenue was the yield, to measure the performance.

#### *Data Envelopment Analysis*

Performance assessment aims to measure the investment and the yield of an organization. It is not easy to measure the indices with multiple attributes with a common standard that

different indices are utilized for evaluating Performance. Based on Pareto optimality, Data Envelopment Analysis (DEA) tends to evaluate the relative efficiency of a group of Decision Making Units (DMU). Under the objective environment, the evaluated efficiency is regarded as an advantageous result for the evaluated units. Such the analysis is considered flexible and could integrate the subjective opinions of experts or decision-makers into the evaluation. In this case, it not only could objectively evaluate the performance of each unit, but could also subjectively guide the units to the direction emphasized by the decision-makers (Kao, Huang & Toshiyuki Sueyoshi, 2003).

### Research Methods

When Data Envelopment Analysis is utilized for the efficiency evaluation, the discrimination would be reduced by adding each investment/yield. When four investments and five yields are applied, twenty investment/yield values would be derived. Theoretically, more than two DMUs are required for better discrimination. Golany & Roll (1989) proposed the rules of thumb for Data Envelopment Analysis that the number of evaluated Decision Making Units should be at least double the total number of investment and yield.

This study selected four investment/yield and ten DMUs that it corresponded to the above rules of thumb. All the variables in this study are acquired from the income statements, prospectuses, and annual reports of listing, unlisted, and public issue companies. The variables are defined as follows.

#### (1) Investment

1. Number of employee refers to the total number of employees in a company, including executives, R&D personnel, sales staff, and operating employees.
2. Operating cost refers to personnel cost, office expense, maintenance cost, material cost,

and other expense for operations.

3. Fixed total asset. Fixed asset covers the equipments required for operations and not for sales. Fixed total asset, on the other hand, contains the total amount of land cost, housing and building cost, machinery and equipment cost, other equipment cost, construction work-in-process and advance payment, asset revaluation value-added, and accumulated depreciation.

## (2) Yield

The sole operating revenue refers to the incomes from selling products or offering labor in a period of time, including sales revenue, labor revenue, business revenue, and other operating revenue.

### *Empirical Analysis*

#### (1) Relative Efficiency Analysis

Table 1 shows the relative efficiency of the companies in traditional industries. In terms of Overall Efficiency, the average efficiency of the three years appeared 0.89; Formosa Plastics presented the best performance (1.00), followed by Uni-President (0.99), and PEWC the worst (0.83) in 2007; Uni-President and Formosa Plastics presented the best performance (1.00) and PEWC the worst (0.81) in 2008; and Uni-President presented the best performance (1.00), followed by Formosa Plastics (0.99), and Far Eastern the worst (0.81) in 2009. Accordingly, Uni-President and Formosa Plastics displayed the best performance in the three years, while PEWC the worst.

In regard to Pure Technical Efficiency, the average efficiency of the three years appeared 0.88; Formosa Plastics presented the best performance (1.00), followed by Uni-President (0.99), and PEWC the worst (0.80) in 2007; Uni-President and Formosa Plastics presented the best

performance (1.00) and PEWC the worst (0.79) in 2008; and Uni-President and Formosa Plastics presented the best performance (1.00) and Far Eastern the worst (0.76). Apparently, Formosa Plastics showed the best performance in the three years, while PEWC the worst.

Regarding Scale Efficiency, the average efficiency of the three years appeared 0.87; Uni-President and Formosa Plastics presented the best performance (1.00) and PEWC the worst (0.79) in 2007; Uni-President and Formosa Plastics presented the best performance (1.00) and Far Eastern the worst (0.77) in 2008; and Uni-President and Formosa Plastics presented the best

Table 1. Relative Efficiency of the Companies In Traditional Industries

Traditional industries		Overall Efficiency	Pure Technical Efficiency	Scale Efficiency
TCC	Average in 2007	0.92	0.90	0.91
	Average in 2008	0.94	0.91	0.92
	Average in 2009	0.90	0.91	0.90
	Average in 3 years	0.92	0.91	0.91
CST	Average in 2007	0.93	0.92	0.92
	Average in 2008	0.94	0.91	0.92
	Average in 2009	0.93	0.91	0.91
	Average in 3 years	0.93	0.91	0.92
Uni-President	Average in 2007	0.99	0.99	1.00
	Average in 2008	1.00	1.00	1.00
	Average in 2009	1.00	1.00	1.00
	Average in 3 years	1.00	1.00	1.00
Dachan	Average in 2007	0.89	0.87	0.88
	Average in 2008	0.87	0.86	0.85

	2008			
	Average in 2009	0.87	0.87	0.87
	Average in 3 years	0.88	0.87	0.87
Formosa Plastics	Average in 2007	1.00	1.00	1.00
	Average in 2008	1.00	1.00	1.00
	Average in 2009	0.99	1.00	1.00
	Average in 3 years	1.00	1.00	1.00
Nan Ya Plastics	Average in 2007	0.90	0.87	0.86
	Average in 2008	0.87	0.86	0.85
	Average in 2009	0.86	0.84	0.85
	Average in 3 years	0.88	0.86	0.85
Far Eastern	Average in 2007	0.85	0.82	0.81
	Average in 2008	0.82	0.80	0.77
	Average in 2009	0.81	0.76	0.76
	Average in 3 years	0.83	0.79	0.78
Formosa Taffeta	Average in 2007	0.84	0.82	0.83
	Average in 2008	0.83	0.83	0.80
	Average in 2009	0.83	0.82	0.79
	Average in 3 years	0.83	0.82	0.81
TECO	Average in 2007	0.88	0.86	0.84
	Average in 2008	0.87	0.85	0.83
	Average in 2009	0.87	0.87	0.85
	Average in 3 years	0.87	0.86	0.84
PEWC	Average in	0.83	0.80	0.79

	2007			
	Average in 2008	0.81	0.79	0.80
	Average in 2009	0.82	0.78	0.80
	Average in 3 years	0.82	0.79	0.80
Total	Average in 2007	0.90	0.88	0.88
	Average in 2008	0.89	0.88	0.87
	Average in 2009	0.89	0.87	0.87
	Average in 3 years	0.89	0.88	0.87

performance (1.00), followed by CST (0.92), and Far Eastern the worst (0.76) in 2009.

Obviously, Uni-President and Formosa Plastics showed the best performance in the three years, while Far Eastern the worst.

### (2) Sensitivity Analysis

By gradually deleting the investment and the yield in DEA, this study tended to understand the sensitivity of the efficiency. From Table 2, when fixed total asset and operating revenue were deleted, two relatively efficient DMUs were remained, showing the little effect of the two variables on the efficiency. When number of employee and operating cost were deleted, the number of relatively efficient DMU was reduced, presenting the importance of the two variables, which could affect the relative efficiency in DEA.

### (3) Slack Analysis

Table 3 showed that each investment could improve number of employee 2,825, operating cost 4,209,932 dollars, fixed total asset 2,517,706 dollars so that the yield could improve turnover 818,347 dollars. Among the investment, operating cost could be largely

improved (4.99%), followed by number of employee (1.92%), and fixed total asset the least (1.27%).

Table 2. Sensitivity Analysis of Gradually Deleting The Investment And The Yield

DMU	Original relative efficiency	Deleting number of employee	Deleting operating cost	Deleting fixed total asset	Deleting operating revenue
TCC	0.92	0.71	0.86	0.88	0.74
CST	0.93	0.63	0.72	0.86	0.83
Uni-President	1.00	0.90	1.00	1.00	1.00
Dachan	0.88	0.73	0.42	0.84	0.81
Formosa Plastics	1.00	0.86	0.98	1.00	1.00
Nan Ya Plastics	0.88	0.64	0.51	0.85	0.62
Far Eastern	0.83	0.52	0.38	0.80	0.67
Formosa Taffeta	0.83	0.67	0.56	0.81	0.80
TECO	0.87	0.76	0.63	0.86	0.83
PEWC	0.82	0.48	0.44	0.80	0.70
Effective DMU number	2	0	1	2	2

Data source: Self-sorted in this study.

### Conclusions and Suggestions

Based on the years of 2007-2009, the companies in traditional industries were investigated in this study. Total ten valid samples were selected for performance evaluation with Data Envelopment Analysis. According to the research outcomes, Formosa Plastics outperformed the other companies on Overall Efficiency, Pure Technical Efficiency, and Scale Efficiency. The reason is regarded as the operation ideal of diligence and plainness. Diligence refers to distinct connotation based on objective environment changes in different eras; and,



plainness pays attention to simple living habits and factual working attitudes. With the factual attitude and the questioning spirit, businesses need to continuously review and improve; or,

Table 3. Improvement Values Of Companies In Traditional Industries

Decision Marking Units ( DMU )	Improvement value with investment			Improvement value with yield
	Number of employee	Operating cost	Fixed total asset	Turnover
TCC	-181	248,136	0	0
CST	-348	-53,517	-173,561	0
Uni-President	0	0	0	0
Dachan	-458	-673,252	-214,573	0
Formosa Plastics	0	0	0	0
Nan Ya Plastics	0	-641,322	-149,348	0
Far Eastern	0	-1,678,816	-679,581	-818,347
Formosa Taffeta	0	0	-276,567	0
TECO	0	-371,426	-206,422	0
PEWC	-1,838	-1,039,735	-817,654	0
Total of original data	146,735	84,351,200	197,433,159	26,483,381
Total of improved value	2,825	4,209,932	2,517,706	818,347
Improvement %	1.92%	4.99%	1.27%	3.09%

Data source: Self-sorted in this study.

training employees to present correct attitudes and relevant competence requires careful considerations, planning, and implementation. Besides, the internal personnel and the external environment changes should be well-adjusted so as to stabilize the basis. As a result, rational management requires endless effort to strive for excellence as well as to promote the performance. To cope with the environment changes and to enhance the performance, businesses could precede reformation aiming at the directions of 1.industry transformation, 2.product transformation, 3.market transformation, 4.business transformation, and 5.managment

transformation. For instance, when TAIYEN faced the impact on the operation, it transformed into diverse salt products, researched and developed new products with higher added values, and actively proceeded strategies for product diversification to enhance the performance. In this case, the idea of striving for excellence in Formosa Plastics would become the basis of competition in the next century. Traditional industries therefore have to endeavor to cope with the environment changes for sustainable management.

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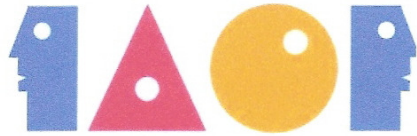
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## CONSUMER DECISIONS: THE EFFECT OF WORD-OF-MOUTH

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### Abstract

This research regarding the word of mouth has shown that the positive effect of the word of mouth has surprised the negative effect and has been comprehensive in perusing the customers decision-making while purchase. Results from the study have shown that the consumers who have been a customer of the organizations products and services have added more value to the firm in the long run than the conventional customers. The online word of mouth has also been significant in influencing the purchase decisions in a positive way. The study has provided with a detailed understanding of the word of mouth and found to be highly significant in influencing the purchase decision of the consumers. It has been obtained from the study that the use of word of mouth has yielded promising results for the organizations as a marketing tool Word of mouth has been successful in perusing the customers to act positively. The study of word of mouth can thus be said to be an important contribution in the marketing aspect of an organization and have been a profitable solution for the success of different companies.

Keywords: word-of mouth, consumer behaviour, purchase decision

### Introduction

Word of mouth deals with the process of transferring of information from one person to the other through oral communication. The concept of word of mouth has become an important term in the marketing activities conducted by various organizations. Interpersonal communication or the word of mouth has gained importance in the decision making of the

consumers. Word of mouth is gaining importance among the societal changes observed in the environment and has become one of the most important and effective communication channel. The paper studies the various aspects of the word of mouth and its influence on the consumer decision making relating to purchase of products. The negative aspect and the positive aspect of word of mouth have been studied in the paper. The paper discusses the online word of mouth which has been the latest trend in the present technological era and the effective role played by the social networking sites. The study also focuses on the factors affecting the word of mouth.

### Literature Review and Development of Propositions

#### *Word of Mouth*

##### *Positive and negative word of mouth*

Word of mouth has been an age old concept where a person shares his view with another person. The views of the person can be related to a product or the service he have received. The studies in consumer behavior suggest that words of mouth have a strong influence on the psychology of the person. The influence of word of mouth can have both positive and negative aspects. Relating word of mouth to the consumer behavior, it can be interpreted that the positive word of mouth increases the likelihood of the consumers in opting for the product, whereas the negative word of mouth does the reverse. The overall effect of the word of mouth is dependent on two factors. The total number of people being exposed to positive word of mouth or negative word of mouth helps in judging the final influence. (Romanuik, 2007)

The individual influence of word of mouth also determines its overall effect. People like to share their negative experiences more than the positive ones and so negative word of mouth is much more in abundance in comparison to the positive word of mouth. The high presence of negative word of mouth often strikes a major problem for the marketers. Institutional word of

mouth deals with the influence of the corporate in providing views relating to their products or services. The concept of positive word of mouth has been largely used by marketing professionals as it can serve both the purpose of measuring the effectiveness of the marketing tools like advertising and also at the same time be used as a credible source for gaining information relating to the product (Li and Zhan, 2011). The word of mouth involves the major brand organizations. Research has reflected that each days Americans take part in over 3.5 millions Word of mouth conversations which involves the brand names of 92 organizations. The spread of word of mouth involves different media. Television is the major source of the word of mouth which accounts for 16 percent of the total media. The other important media source comprises of the internet, and newspaper which has 12 percent and 7 percent contribution respectively. (Keller, 2007)

#### *Motivation and cultural factors affecting the word of mouth*

A careful study on the research conducted by Berger and Schwartz (2011) reflects that popular or more interesting products are generally most talked about and creates a motivation among the people to be discussed about it more in public thus giving rise to the word of mouth. During the sharing of the Word of mouth it has been found in the research that consumers not only talk about the products but also about themselves. The research also highlights that one of the major factors driving ongoing word of mouth is the factor of accessibility. Other than the factor of interest word of mouth is also motivated by the amount of accessibility a product has with the common mass of people (Berger and Schwartz, 2011). Cultural values of the customers also play a significant role in the communication process of the word of mouth. The action of the consumers who receives the customer's word of mouth is often guided by the value of the culture from which they belong. Research carried out in the context says that the respondent with more

value for individualism has a tendency to spread more positive word of mouth among the out groups but not to their in group (Lam et al., 2009). The effect of the word of mouth is stronger in the process of the evaluation of the customers who are in high uncertainty avoidance cultures. The results also reflected that people belonging from a culture which has high uncertainty avoidance gives much more importance to the words of mouth before the onset of the purchase or any service. (Schumann, et al., 2010)

### *The Effects Of Word-Of-Mouth On Purchase Decision Making*

#### *Influence of word of mouth on the purchase behaviour of consumers*

It has been accepted in the present market scenario that word of mouth has become a powerful strategy for the marketing professionals. The effect of the word of mouth has a huge significance in influencing the purchase making decision of a consumer. It has been found that the word of mouth has a significant role to play in influencing the customers to purchase a product; it has been found that often organizations induce their views in the word of mouth. Research conducted by Villanueva et al tried to find out the effect that the word of mouth induced customers have on the firm's value. The long term results show that purchasers who are influenced to be the customers of the organization under the influence of word of mouth adds more value to the firm and adds a lot to the overall customer equity of the firm. The VAR model used for the research process also concludes that words of mouth has become one of the major tool for the customer acquisition of the organizations and also remains loyal to the firm in the long term (Villanueva, et al., 2008). Research conducted by Godes and Mayzlin (2009) tried to focus on the ways a firm should try to use the exogenous word of mouth to foster the sales. The research result showed that exogenous word of mouth accounts for the higher level of sales for the organizations. The concept of word of mouth acts a solution to the difficulties associated

worth the promotional problems and word of mouth appears to be a rational and overall profit maximization solution. The research also reflects the fact that products which have not gained much awareness on the initial stages have no effect on the campaigns taken by the loyal customers. The result of such lesser effect can be referred to the fact that the network of the loyal customers already knows his view regarding the product ad pays no further attention to the words of mouth. It has been suggested in the research that the less loyal customers should be used more in the word of mouth campaigns.

Further research was carried by Trusov et al. (2009) to find the difference between the impact of the traditional, marketing and the word of mouth. The impact of the word of mouth was studied from the rise in number of member referrals in an internet based social networking site. The effects of the inconsistent word of mouth also have a striking significance in influencing the purchase decision of the customers. A study conducted by Wang (2011) involved six scenarios to measure the effect of the inconsistent word of mouth. The participants in the research involved were the students of a major university located in China. The final outcome of his research held the conclusion that the buying behavior of the customers and the perception of the consumers regarding the service quality are more guided by the final word of mouth and that the initial word of mouth has significant role to play to play in influencing the customers. The results also suggest that the positive word of mouth has more influence among the customers.

#### *Online Impact of Word of Mouth*

A research conducted by Cheng et al. (2011) tried to find out the impact of the word of mouth and the online social interaction on the sale of products, and their overall effect considering the time period of the product life cycle. The research also aimed to study the effect



of the word of mouth interaction among the consumers. The result of his research focused on the fact that the influence of the negative Word of mouth is more among the customers. Sales are found to increase as a result of the positive online interaction whereas no significant effect of the negative online interaction was observed. Finally the study of the research also pointed out that both word of mouth and online interaction tends to decrease as the product reaches the last stages of its life cycle.(Chen, et al, 20011). The word of mouth has gained its importance and the effects of the word of mouth in the virtual space have also become important over the years in changing the perception of the consumers. The offline behavior of the word of mouth can also be implemented in the online mode to fetch benefits for the organization. A research carried out among the consumers in Hong Kong mall shows that the similar views of the customer's interest and the topics discussed in the online forum regarding the service of products of an organization can strongly predict the purchase intention of the product. The attitudes towards the forum also have a significant effect on the purchase intention of the consumers and have an indirect influence through the persuasiveness of the product (Prendergast et al., 2010). Research by Cheema and Kaikati (2010) studies the difference of the words of mouth expressed by the consumers who gives more value to the unique products. On this context it has been understood that the consumers who have their high inclination towards the unique products will express lesser amount of the positive word of mouth. The uniqueness of the product expressed through positive word of mouth provides more validity among the consumers. The studies also reflect the fact though the high unique product users hardly have any willingness among them to provide recommendation but they are often found to discuss about their products.

*Development of Propositions:*

*Positive and negative word of mouth influences the customers differently*

The effect of the word of mouth has a huge significance in influencing the purchase making decision of a consumer. Positive word of mouth influences the consumers to get inclined towards a particular product or service whereas negative word of mouth creates a level of suspicion among the consumers to purchase a product and keeps them away from certain products.

*Motivation and cultural factors have positive effect towards the word of mouth*

Culture and motivation has a positive effect on the words of mouth. Accessibility and similar level of interest creates a motivation among people to spread positive word of mouth. Persons with high individualism also contribute significantly towards the positive build up of word of mouth.

*Word of mouth has a positive effect on the purchase behaviour of consumers*

It has been found that the word of mouth has a significant role to play in influencing the customers to purchase a product. The effect of the negative word of mouth has considerable lesser influence towards the customers. The success of word of mouth has become so popular that it has evolved as the major marketing tools by the professionals and often they induce positive word of mouth to gain increased amount of sales. Word of mouth has a positive relation to the consumer decision making process. Word of mouth appears to be a rational and overall profit maximization solution.

*Online impact of word of mouth has a positive effect on the customers*

The word of mouth has gained its importance and the effects of the word of mouth in the virtual space have also become important over the years in changing the perception of the consumers. The outlooks of the customers for the online forum also have a significant effect on

the purchase intention of the consumers and have an indirect influence through the persuasiveness of the product.

### Conclusions

The study has provided with a detailed understanding of the word of mouth and found to be highly significant in influencing the purchase decision of the consumers. It has been obtained from the study that the use of word of mouth has yielded promising results for the organizations as a marketing tool. Word of mouth has been successful in perusing the customers to act positively. The concept of the word of mouth has been significant for the organizations that provide intangible service benefits to the customers (Ng. et al., 2011). In the latest generation of technology enhancement the online reviews and the word of mouth has high significance and the social networking sites has huge role to play in the building up a positive effects upon the psychology of the consumers. The study of word of mouth can thus be said to be an important contribution in the marketing aspect of an organization and have been a profitable solution for the success of different companies.

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## A DYNAMIC MODEL OF ASSIMILATION-CONTRAST THEORY: AN EXPERIMENTAL STUDY ON RECYCLING RATE

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### Abstract

This study explored topics on communication issues, especially focusing on the audience's attitude to scale-assimilation and the contrast theory. Based on the assimilation and contrast theory, the researchers of this study further developed a dynamic process model for the assimilation and contrast theory. This unifying framework encompasses both static and dynamic perspectives, combines established theory, such as the assimilation and contrast theory, the adaptation level theory and anchoring effects and, from a time sequence point of view, discusses the displacement of latitude of acceptance and rejection. The findings of this study are as follows: (1) Latitude of acceptance and rejection at time  $t$  partially affected the displacement of latitude of acceptance and rejection from time  $t$  to  $t+1$ . (2) The given anchor message significantly affected the displacement of latitude of acceptance. (3) A dynamic model of the assimilation and contrast theory was built.

Key words: Dynamic model, assimilation-contrast theory, anchoring effect, adaptation level theory, communication effect, social marketing.

## Introduction

Social marketing entails the application of commercial marketing technologies with the intention of influencing the voluntary behavior of target audiences in order to improve their personal welfare and that of their society (Kotler and Zaltman, 1971; Kotler and Andreasen 1996; Cismaru et al., 2009)

Currently, organizations adopt a strategy of idea marketing to change the behavior of individuals. The goal they want to reach is to communicate with individuals. However there still exist problems over how to communicate well in idea marketing and, further, how to let individuals accept the idea promoted and undertake the actions that are consistent with the idea. So, in this study, communication issues were highlighted, especially with reference to the assimilation and contrast theory.

Communication is the transmission of information from one person to another (Beach, 1970). Fishbein and Ajzen (1975) discussed the communication persuasion theory. Advertising is persuasive mass media communication used to achieve or help with the objectives of marketing (Berkman and Gilson, 1986). Adopting different message strategies, the audience will produce different reactions to different advertising effects (Laskey, Fox and Crask, 1995). Ducoffe (1996) viewed advertising as a potential “communication exchange”. Peter and Olson (2001) pointed out that consumers’ cognition and understanding, which is aroused by marketing information, not only affects attitude and intention but also influences actual follow-up actions.

In complex social communication, the introduction of reference points may produce two opposing effects. One is to move the audience toward the new position; the other results in a stronger entrenchment in the audience’s original position (Hovland, Harvey and Sherif, 1957). Fraser et al. (1988) found that donations increase as an anchor grows from a lower to a higher

position (i.e., request for a large donation) included in a solicitor's presentation, but the probability of contribution decreases. The locations of anchors change the behavior of people. Subjects will adjust their estimates toward self-generated anchors if they lack context (Epley and Gilovich, 2001).

The Adaptation Level theory (Helson, 1964) discusses the psychophysical mechanism that describes human responses to changes of external stimuli. Assimilation and contrast theory (Sherif, 1963) suggested that when a message falls into the latitude of acceptance, it is accepted, but if it falls into the latitude of rejection, it is rejected. Monroe (1990) applied the theory to explain studies of reference price but researchers did not provide a good reason for the results. Lin and Wang (1996) contended that assimilation effects and contrast effects are not mutually exclusive; they occur simultaneously but the magnitude differs.

A considerable number of empirical studies have applied the assimilation and contrast theory in order to explain their findings, but less attention has been given to the theory itself.

This study attempts to develop a dynamic model which can reinterpret the assimilation and contrast theory from a dynamic perspective and further provide a basis for comprehensive empirical research in the area.

### Literature Review

Psychologists have found that people autonomously adjust their estimates from given initial points toward uncertain quantities and named the initial points as anchors (Tversky and Kahneman, 1974). People usually make higher estimations from a high anchor and lower estimations from a low anchor and communicating a message with an anchor will have a significant positive effect on the estimates of a target audience. (Yang and Ma, 2010)

Helson's (1964) Adaptation Level theory is, essentially, a psychophysical theory. It explores the mechanism by which humans respond to changes of external stimuli. Monroe (1990) applied it to explain that a consumer's internal price cognition is adjusted with various price stimuli. Sherif (1963) claimed that we hear a message and immediately judge where it should be placed on an already existing scale in our minds. We categorize the message in either latitude of acceptance, rejection, or no comment. The latitude of acceptance is defined as the range of stimulus values judged acceptable by members of a group, while the latitude of rejection refers to the range found objectionable (Sherif and Hovland, 1961; Sherif and Sherif, 1965).

Sherif et al. (1965) applied it to predict assimilation-contrast effects on the 1960 presidential election (a controversial issue). Assimilation effects were found for less-involved persons; the contrast effects that occurred involved highly committed persons in each instance. Hovland et al. (1957) proposed that, if the discrepancy between a person's own opinion and the external message is big, respondents will think more strongly that their own stand and the external message are significantly different; that is to say, a contrast effect. If the message is close to the respondents' own opinion, they will tend to adjust their internal viewpoint toward the external message; that is, an assimilation effect. However, Hovland and Pritzker (1957) manipulated a similar kind of experiment but made a different finding. The bigger the discrepancy between the external message and the respondents' own opinion, the more they will change their opinion. This means that assimilation effects occur but contrast effects do not. Why are the findings so contradictory in these two cases?

From the viewpoint of ego-involvement, this study will try to explain these two cases. Generally speaking, controversial cases (e.g. the former case) mean highly-involved persons; non-controversial cases (e.g. the latter case) mean less-involved persons. In this way, the latitude



of acceptance for controversial cases is smaller than the uncontroversial ones. As a result, if the discrepancy between the external message and the respondent's own opinion is bigger, it falls into the latitude of rejection and contrast effects occur. However, uncontroversial cases still fall into the latitude of acceptance and assimilation occurs but no contrast effects occur.

According to the adaptation level theory, if the discrepancy between the advertised reference price and the internal reference price is bigger, the effects of the advertising will be stronger. But it seems to be unrealistic. For example, when the advertising reference price is up to ten thousand dollars for one bag, and the discount price is one hundred, the consumer will not adjust the internal reference price to ten thousand. Obviously, it is not so appropriate to explain these cases from the perspectives.

In order to explain why an exaggerated reference price will not influence a consumer's internal reference price, Monroe (1990) and Lichtenstein et al. (1991), according to the assimilation-contrast theory, predicted that if the advertising reference price is plausibly high, the change in the consumers' internal reference price will be the biggest. However, the findings said that the audience's perception will be higher when the reference price is more exaggerated. If one attributes these kinds of results to the problems of exaggerated price (manipulated to a double high price), it will be hard to explain why respondents doubt the credibility of those exaggerated prices. Obviously, the assimilation-contrast theory still can not provide a good explanation.

The assimilation-contrast continuity theory was provided by Lin and Wang (1996). It explains this contradictory case. They argued that assimilation and contrast effects are not mutually exclusive and proposed that assimilation and contrast effects should occur simultaneously. They suggested that if the advertised reference price (ARP) is plausible,

respondents will adjust their own opinion close to it but not completely replace it. If the ARP is exaggerated, respondents will discount it to an acceptable level. This argument extended the assimilation-contrast theory. It described how assimilation and contrast effects will occur solely at the two ends of the assimilation and contrast continuity (see figure 1). However, this theory cannot explain bipolar reject situations by the audience; that is, if the ARP or the reference point of the message is extremely high or low, the audiences cannot accept or believe it.

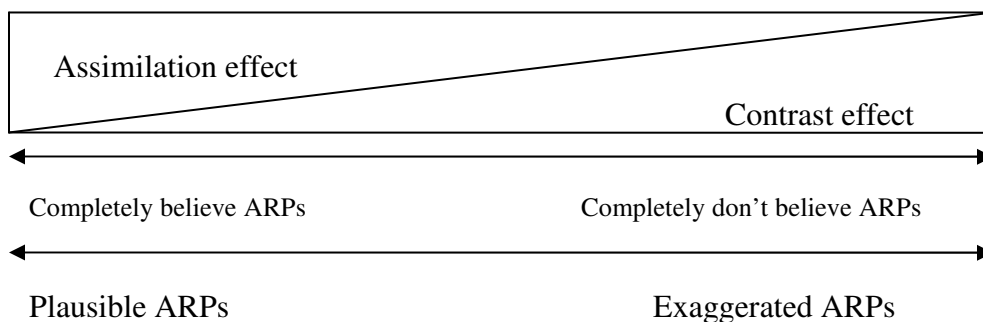


Figure 1. Assimilation-Contrast Continuity  
Source: Lin, C. H., and Wang, S. M. (1996)

Relevant numbers or numeric values, which influence a particular offer's value, are called anchors. Especially in situations of great ambiguity and uncertainty, people tend to estimate unknown values by starting from an initial value, or anchor, that is then adjusted to arrive at a final estimate. This process is called anchoring (Slovic and Lichtenstein, 1971; Tversky and Kahneman, 1974). Whyte and Sebenius (1997) suggested that as potential numbers of anchors increase, the probability of people relying on the anchoring process decreases.

From the adaptation-level theory, the assimilation-contrast theory to the assimilation-contrast continuity, the previous studies all presented a kind of static analysis. It is not enough. Owing to the absence of a dynamic viewpoint, the discussion in this area seems to be

incomplete. The development of a framework that can encompass both static and dynamic perspectives is needed. In this way, there will be a basis for comprehensive research in this area.

This study integrated assimilation-contrast theory, anchoring effect, and adaptation level theory to reinterpret the assimilation-contrast theory from a dynamic viewpoint. At the core of the model was the assumption that an individual's initial attitude is a blend of one's initial latitude of acceptance and contrast. Furthermore, an individual's updated attitude or judgment is a mix of one's updated latitude of acceptance and contrast. These are both influenced from two sources, including an individual's updated latitude of acceptance and rejection, and current messages. Specifically, this dynamic model was a relentless process. Time such as time  $t$  and  $t-1$  played an important role. The initial latitude of acceptance and rejection influenced the updated latitude of acceptance and rejection was highlighted. A dynamic model was developed as follows. (see figure 2) The audience to judge the message at time 1 is influenced by three variables of  $LA_0$ ,  $LR_0$  and  $M_1$  and these three variables would affect the  $LA_2$  and  $LR_2$  at time 2.

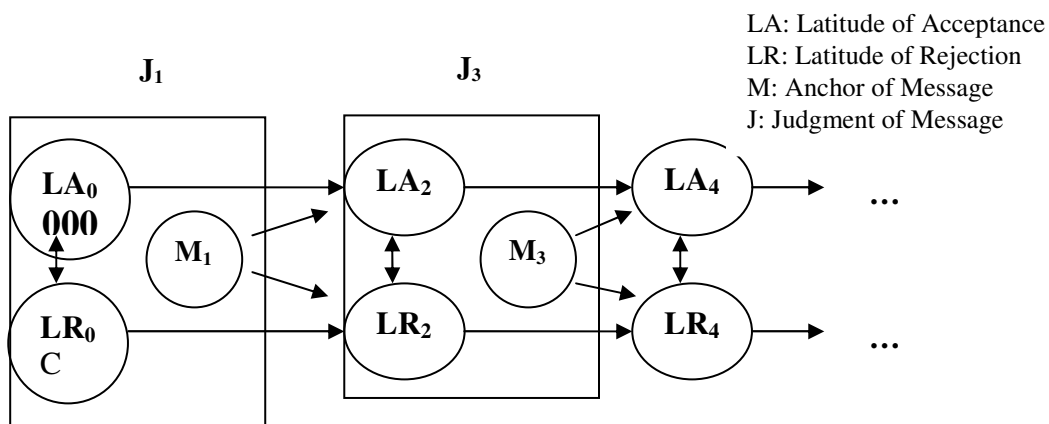


Figure 2. A Dynamic Model of Assimilation and Contrast

On the basis of prior studies, the same construct was applied in the model. However, unlike both literatures, these constructs were treated as static and the dynamic process of these

constructs was focused upon. In the study, the researchers combined prior studies to form a dynamic process model. Following the description of this process model, a hypothesis of this study was stated.

Berwoitz (1990) proposed that attitude is the evaluation of people, things and objects and a method of sustaining likes and dislikes. It is an emotional feeling and includes behavioral intention, and ranges from positively accepting to negatively rejecting. Attitude is essentially information we have obtained about someone or something, following which we form an opinion or predisposition about (Fishbein and Ajzen, 1975). Sherif and Hovland (1961) suggested that people's attitude is scaled from extremely agree to extremely disagree, and the latitude of acceptance and rejection varies from person to person.

Dealing with things in regard to attitude measurement is not an easy thing, so through the latitudes of acceptance and rejection, observations of the changes in attitude are much easier. Furthermore, three factors including initial attitude, message and message credibility will cause changes of attitude. So, the study concludes this section by postulating that an individual's initial attitude is a blend of one's initial latitude of acceptance and rejection. Furthermore, an individual's updated attitude is a mix of one's updated latitude of acceptance and contrast.

More formally, let  $A_t$  be an individual's attitude at time  $t$ ;  $LA_t$  an individual's latitude of acceptance at time  $t$ ;  $LR_t$  be an individual's latitude of rejection at time  $t$ ;  $M$  be the anchor point of the message. In this study, we adopted non, low and high anchor as the manipulated message.

We then start our discussion by noting that the latitude of acceptance and rejection can change over time. In this study, the concept of the assimilation-contrast theory, anchoring effects and adaptation-level theory are used in a new way of interpretation. According to adaptation-level theory, it is said that people's response to the stimuli is influenced by previous adaptation

levels and people will take the existing interior information ranges as the basis to judge the exterior information. This study adopted this theory to explain the dynamic process of the latitude of acceptance and rejection. In the process of judgment, an individual uses initial latitude of acceptance and rejection as a basis to decide their updated latitude of acceptance and rejection.

Latitude of acceptance at time  $t$  is influenced by latitude of acceptance at time  $t-1$ , given message at time  $t$  and latitude of acceptance. The displacement of latitude of acceptance from time  $t$  to time  $t+1$  is directly influenced by a latitude of acceptance at time  $t$  and indirectly influenced by a latitude of acceptance at time  $t-1$  and given message at time  $t$ .

Taking a time sequence into account, the study postulated that between time  $t$  and time  $t-1$ , the updated latitude of acceptance is affected by the initial latitude of acceptance. An individual will form their new latitude of acceptance based on their previous latitude of acceptance. In addition, the latitude of acceptance at time  $t-1$  will affect the displacement of latitude of acceptance between time  $t-1$  and  $t$ . It can be accounted for by the anchoring effects. Here we take two hypotheses; H1 and H2 are A (center of acceptance's latitude) and LA (latitude of acceptance). With time  $t-1$  as an anchor, the displacement of the latitude of acceptance will be influenced in the process at time  $t$ .

From a viewpoint of anchoring effects, people tended to estimate unknown values by starting from an initial value or anchor which was then adjusted to arrive at a final estimate. The same concept applied to the study. The researchers believe that displacement of latitude of acceptance occurs as reference anchor is given. This leads to hypothesis H3; the given M (anchor of message) will affect the displacement of A, LA and LR (latitude of rejection).

## Research Methods

### *Research Design*

This study employed a two situation design and gave a sequence rate of recycling (non, low, and high or non, high and low) and an empirical experiment was adopted.

#### *Pretest*

A pretest was carried out with 36 sampled undergraduate students from I-Shou University of Taiwan. The researchers asked participants to write down a rate of recycling without referencing. The two peak estimates are located at 21% - 30% and 61% - 70%. Hence, the researchers chose the manipulated recycling rate (anchor) of 27% (2006 Annual Report for Recycling published by Taiwan's Environmental Protection Administration) and 75% as the low and high recycling rate. (Yang and Ma, 2011)

#### *Sampling Design*

To avoid the interference of other factors, convenient sampling was used in this research. The sample consisted of a total of 90 juniors from I-Shou University of Taiwan, who provided data for the empirical part of the study. In addition to increase the internal validity, subjects volunteered to take part in the study. 45 subjects were randomly assigned to one of four treatment conditions. In order to increase the quality of the measurements, after finishing the questionnaire, volunteers were rewarded with gifts and 40 valid subjects were selected in each situation.

#### *Procedures*

Subjects viewed an advertising for one of the chosen situations (non, low, and high or non, high and low) in class weekly. They were then asked to provide information about their latitude of acceptance and rejection. Subsequently, the researchers gave them an advertising that contained the same description as the subjects had seen earlier. In addition, the advertising contained a high anchor (rate of recycling is: 75%). After seeing the text advertising, the researchers asked subjects

to write down their latitude of acceptance and rejection again. Lastly, the same procedure was implemented in the situation for providing a low anchor (27%).

### Data Analysis And Results

Table 1. presents cell means for latitude of acceptance and rejection from the data collected. The cell means that the time sequence, that is,  $t_0$ ,  $t_1$  and  $t_2$ , enabled the researchers to prove the dynamic model postulated above. From the viewpoint of time sequence, the researchers ascertained the changes among time  $t$  and  $t+1$  the crucial factor that causes a dynamic process of latitude of acceptance and rejection.

This research tried to use relation and trend analysis to prove the assimilation-contrast dynamic model. Table 2. Relation analysis showed that  $LA_{t-1}$  would affect  $LA_t$  and  $LR_{t-1}$  would affect  $LR_t$  significantly in A and B situations. Trend analysis of MLA showed that MLA is quadratic polynomial trend and the results are coincided that this experiment given low/high anchors sequence would affect MLA trend. (see Table 3.) These two analyses proved the assimilation-contrast dynamic model and H1, H2 and H3 were supported.

As a anchoring is given, the most a respondent can change his or her latitude of acceptance is to that given anchor. However, a respondent can actually change his or her latitude of acceptance to a certain point but not up to the given point. The range from the initial latitude of acceptance to the updated one is the so-called anchoring effect; the range from the updated latitude of acceptance to the given point has been named by the researchers as an inertia phenomenon. Due to the initial latitude of acceptance, a respondent is not completely influenced at that given point. This is more clearly shown in Figure 3.

Table 1. Statistics of assimilation-contrast latitude from  $t_0$  to  $t_2$

Time Sequence	Manipulation anchoring	MLA	LLA	ULA	LLR	ULR
$t_0$	Non	46.500	35.125	62.375	17.875	81.250
$t_1$	Low	38.550	62.375	56.750	15.375	75.750
$t_2$	High	53.250	42.375	67.750	20.625	80.500
$t_0$	Non	49.875	39.375	66.250	18.250	80.250
$t_1$	High	60.000	66.250	73.750	22.875	84.875
$t_2$	Low	50.125	39.500	66.000	19.625	79.750

Note: MLA= Means of Latitude of Acceptance. LLA = the mean of lower limit where participants would believe real mortalities may be located. ULA = the mean of upper limit where participants would believe real mortalities may be located. LLR = the mean of lower limit where participants wouldn't believe real mortalities may be located. ULR = the mean of upper limit where participants wouldn't believe real mortalities may be located.

Table 2. LLA, ULA, LLR and ULR correlation from  $t_0$  to  $t_2$  in A and B situations

	A situation		B situation	
	t0-t1	t1-t2	t0-t1	t1-t2
LLA <sub>0-1-2</sub>	0.671***	0.523***	0.738***	0.708***
ULA <sub>0-1-2</sub>	0.582***	0.478**	0.711***	0.744***
LLR <sub>0-1-2</sub>	0.602***	0.620***	0.757***	0.841***
ULR <sub>0-1-2</sub>	0.581***	0.637***	0.765***	0.785***

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

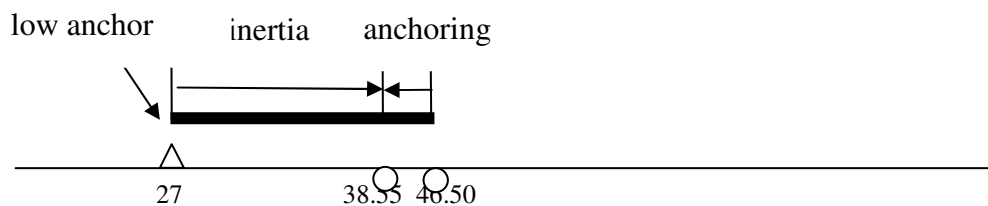
Turning to the anchoring effect, that is, the move in latitude of acceptance and rejection with anchors, here the researchers manipulated the non anchoring, low anchor and high anchor. Looking at changes in values between  $t_0$ ,  $t_1$ , and  $t_2$  (see Table 4-1.), significant support for H3 can be found. That is, as a low anchor was given, the latitude of acceptance and rejection will shift to



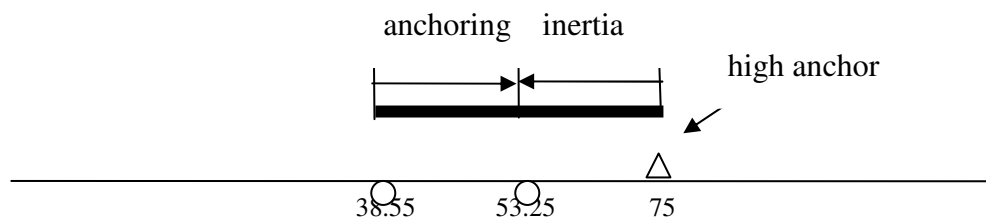
the left. When a high anchor was given, the latitude of acceptance and rejection will shift to the right (see Figure 4.).

Table 3. Trend analysis of MLA from  $t_0$  to  $t_2$  in A and B situations

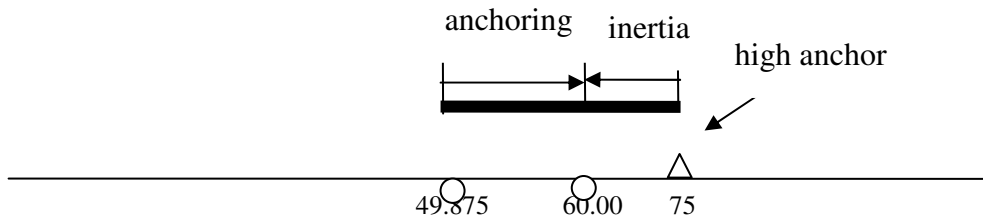
	MLA from $t_0$ to $t_2$ in A situation				MLA from $t_0$ to $t_2$ in B situation			
	SS	df	F	P	SS	df	F	P
Between groups	4331.4	2	9.420	0.000	2667.9	2	5.835	0.04
Linear contrast	911.25	1	3.964	0.049	1.250	1	0.005	0.941
deviation	3420.1	1	14.87	0.000	2666.7	1	11.66	0.001
Quadratic contrast	3420.1	1	14.87	0.000	2666.7	1	11.66	0.001
Within groups	26897.4	117			26748.7	117		



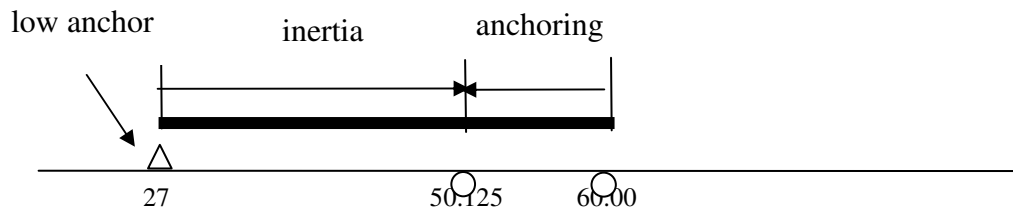
A1. Inertia and anchoring phenomenon as given by low anchoring



A2. Inertia and anchoring phenomenon as given by high anchoring

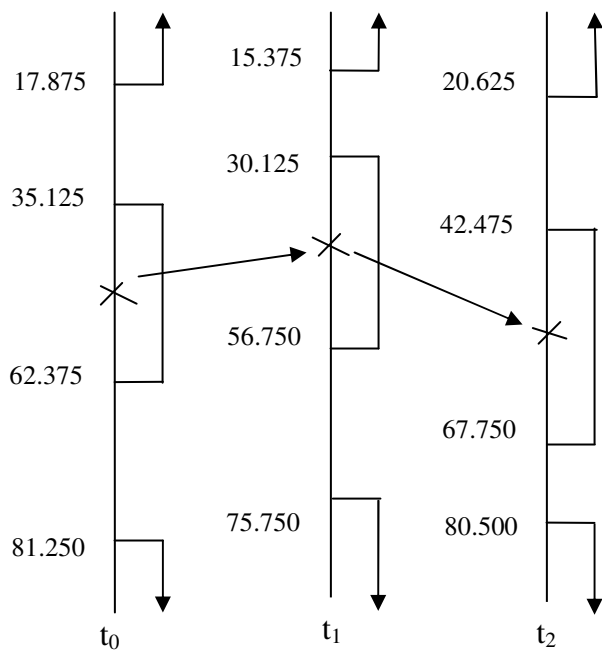


B1. Inertia and anchoring phenomenon as given by high anchoring

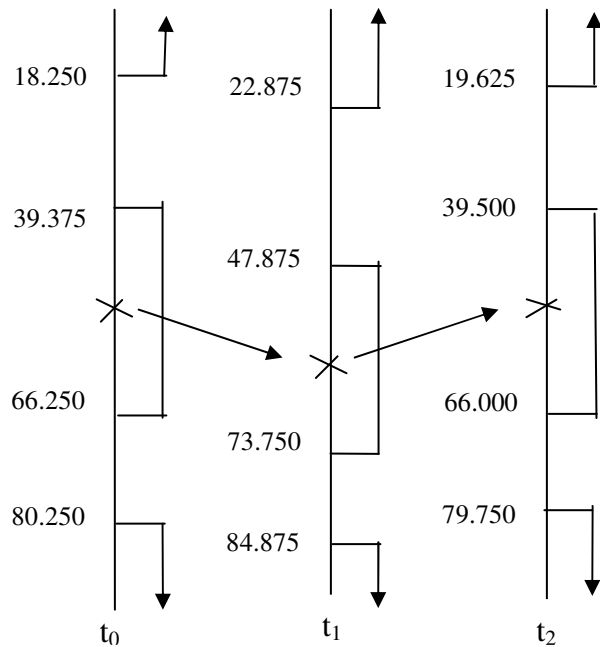


B2. Inertia and anchoring phenomenon as given by low anchoring

Figure 3. Inertia and anchoring phenomenon



a. Latitude of Acceptance and Rejection from  $t_0$  to  $t_2$  in A situation



b. Latitude of Acceptance and Rejection from  $t_0$  to  $t_2$  in B situation

Figure 4. The replacement of Latitude of Acceptance and Rejection from  $t_0$  to  $t_2$

### Conclusion And Suggestions

First, this study demonstrated that the initial latitude of acceptance influenced the updated latitude of acceptance. It is compatible with the idea postulated that latitude of acceptance can change over time. Although, this kind of effect declined with the time sequence, it did exist. Second, this study supports the idea that latitude of acceptance at time  $t$  influences the displacement of latitude of acceptance from time  $t$  to  $t+1$ . It is consistent with the idea postulated that, when taking latitude of acceptance as an anchor, the process of anchoring occurs. Similarly, this kind of effect declines with the time sequence. Third, this study showed that a given anchoring message significantly influences the displacement of the latitude of acceptance. This is in line with the process of anchoring effects that the literature established.

This dynamic model explains precisely why audiences do not perceive given ideas or messages initially that locate in the contrast (rejection) region while accept later after frequent communicating so that the ideas or message sit in the assimilation (acceptance) region. In other words, audiences' latitudes of assimilation-contrast move from contrast toward assimilation owing to numerous message exposures.

### Implications

The study has implications for academics. To advance the theory of assimilation and contrast, the researchers attempted to reinterpret a dynamic process of ranges of assimilation and contrast. Prior literature was combined, including adaptation level theory and the anchoring effect, to explain the proposed model. In the future, model can be tested with the data collected from the empirical studies. This will establish the framework, which encompasses both static and dynamic points of view, and will provide a more reasonable and broad interpretation of the communication process and effect.

The study also provides managerial implications. It provides an insight into how it is best to communicate with the audience. In the process of communication, the researchers noted that:

(1) The latitude of acceptance and rejection can change over time, not in a static way. An audience forms an updated latitude of acceptance and rejection on the basis of their initial one. It is said that initial latitude of acceptance and rejection cannot be ignored. Getting to know the initial latitude of acceptance and rejection of audiences, helps with communication strategy and communication is better and more effective.

(2) With regards to the message, in this study the researchers used an anchor message and this can be manipulated to change the opinions of the audience. It will help to communicate with the audience and promote the idea for social marketing effectively and efficiently.

## Limitations

This study used just 80 valid cases to implement three times experiment on recycling issue to interpret and explore the dynamic model of assimilation-contrast theory. The dynamic model needs further research to prove and test it again in the future.

## Acknowledgements

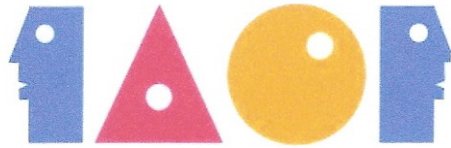
The authors thank the I-Show University of Taiwan for research support (ISU97-03-07) and W.C. Lin and J.H. Chen for their assistance with the data collection.

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SALES PEOPLE'S PERFORMANCE AND CHANGE IN CAREER  
IN THEIR MAINTENANCE STAGE

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Abstract

The purpose of this article is to develop a comprehensive theoretical framework, represented by a mathematical model for maintenance-career stage of a salesperson. Firstly, a literature review is carried out for maintenance-career stages. For a better understanding of salespeople's developments in maintenance stages, a framework is proposed. The proposed development framework is based on career-change research and Walker–Churchill–Ford behavioral model (1977). Secondly, the proposition is established and defined. Thirdly, based on the critical propositions, the four models are developed using Bagozzi's (1978) basic model. Finally, this model is discussed briefly, and the article is concluded with future research. Through this theoretical study, we will be able to understand the sales people's performance, how change in career effects in their maintenance stage. Based on these understanding, the "Sales Performance – Change in Career" new model has been proposed and can be used for sales driven industries.

Keywords: salesperson, career change, maintenance stage, performance, job satisfaction, rewards



## Introduction

“Sales” is entry-level position in which people may remain over an entire career. A salesperson generally faces an upstaged career (Van Maanen and Katz 1976), that is, one in which advancement into the management hierarchy is, generally, limited. The position of a salesperson was characterized as a young person’s occupation because of the travel, energy level and physical stamina that is frequently required for a person to be effective (Waldrop 1991). Not only may older people be less able or inclined to endure the physical hardships of life on the road (Dalrymple and Strahle 1990), but performance improvement and enhancement of personal–professional development skills may no longer be of critical importance to this cohort of people. Furthermore, a number of studies have found the performance of senior salespeople to be lower than that of younger salespeople (Dalrymple and Strahle 1990; Hafer 1986).

Salespeople are one of the major contributors to a firm’s survival by virtue of their role as a nexus between the firm and its customers (Simintras et al., 1996). Salespeople’s traditional function, a duty mainly to sell, is being reoriented toward achieving longer term objectives on the basis of relationship marketing (Pullins 2001). A sales career is a life-long process that includes the preparation for and choice of an occupation. One’s present job is therefore just one of a sequence of work experiences encompassed by a career. Hall (1976) defines career as “the individually perceived sequence of attitudes and behaviors associated with work-related experiences and activities over the span of the person’s life”. The many subjective aspects of a lifetime of work—such as developing a professional self-identity (Schein 1980), continuing personal growth, meeting personal needs, setting and meeting professional goals, and resolving conflicting demands from other areas of one’s life (for example, family, friends, health)—are important (Hall 1976).

Research in sociology, clinical psychology, and vocational psychology suggests that one's career can be viewed as a series of four stages (Cron 1984, Schein 1971)—exploration, establishment, maintenance, and disengagement. The stages were labeled “exploration” (ages 20–30); “establishment” (ages 30–45); “maintenance” (ages 45–60); and “disengagement” (beyond 60 years of age) (Cron 1984).

The stage of a general downfall in the career graph of a salesman, which usually happens in the mid-fifties, is termed as the maintenance stage (Super 1957). This term might be somewhat misleading and a reassessment of their lives at the beginning of this stage may even lead to a change in their career path. The salesperson will try to retain and maintain what he has achieved earlier in the establishment stage (Super 1957) and for the others, the rate of career moves decreases even further, accompanied by a reduced desire for interest in competition (Schein 1980).

This is a challenging stage in the career. While otherwise a person would have explored an opportunity, achieved something and established himself, here, he goes forward with a decrement in desire in his career. But at the same time, it is very much a concern for most due to its “generativity,” that is, a concern for guiding the next generation. Also, in the initial or middle phase of this career life, a salesperson may change his career. Nevertheless, there is reason for exercising some caution before concluding, “Maintenance stage people are a significant management.”

There have been very limited empirical studies and little conceptual developments available to sales professionals and researchers about how sales people react in maintenance stage. This research article is to examine how the sales performance and job satisfaction vary in the maintenance stage, and what decisions do salespeople take according to their career stage.

Firstly, a literature review is carried out for maintenance stages. Then, for better understanding of salespeople's developments in maintenance stages, a framework is proposed. Secondly, the proposition is well established and defined. Thirdly, based on the critical propositions, the four models were developed. Finally the brief discussion had on this model, and concluded with future research.

## Literature Review

### *Maintenance Career Stage*

Once salespersons establishes in a career, individuals start reassessing their choices and what they have accomplished. This career stage may sound like a fairly tranquil period but may pose several difficult personal challenges. First, a change in self-image is usually required, and one experiences a variety of physiological, attitudinal occupational and family changes (Hall 1976). Movement into the maintenance stage is frequently associated with the cessation in upward mobility (FERENCE et al. 1977).

One way to confront the challenge is to maintain an acceptable level of performance and motivation in the face of a more realistic set of present and future reward expectations. A second challenge is that the difficulties associated with adjusting to these changes manifests itself are through a rise in physical health problems (Near 1980), a reduced set of possible reward results, accompanied by more of a present orientation. This frequently manifests itself by an increasing desire for immediate monetary reward (Hall 1976, Rabinowitz and Hall 1981).

For some people, this stage is a time of holding their own and maintaining what they have already achieved. Movement into the maintenance career stage is frequently associated with organizational plateauing (Slocum and Cron 1985). Competition from younger employees, technological innovations, and new job assignments may pose threats to a person's position and

status within the organization. Along with these threats, people experience a variety of physiological changes associated with aging (baldness, changes in skin and muscle tone, etc.). For other people, this stage occurs with change of career. This is due to low performance and job dissatisfaction.

### *Maintenance Career Development Framework*

A maintenance career development framework is proposed herein as an initial step towards organizing ideas about how salespeople change over time. This framework is based on research in vocational psychology and sociology, indicating that what one wants and needs from a job will depend on the person's particular career situation—that is, the jobs they have held, their current position, and the direction in which they are moving (Dalton et al. 1977; Ference et al. 1977; Super 1957). This research has found that individuals progressing in maintenance career stages are characterized by unique career concerns and needs. These determinants and concerns dominate and support a particular period of one's life and are, therefore, considered to be fundamental to understanding individual behavior and attitudes (Levinson et al. 1978). The concept of maintenance career stages is offered as the basic framework, therefore, for understanding and exploring development issues.

Figure 1 indicates that each of the three personal determinants of performance (that is, motivation, sales resources, and role perceptions) is influenced by an individual's career stage. This concept is developed based on Walker et al. (1977) behavioral model, which suggests that a variety of personal, company, and environmental characteristics influence these three individual performance determinants. The propositions offered herein modify those that have been proposed and tested in previous research. Further, the studies on sales performance and change of career, sales rewards and job satisfaction take on new interpretation and meaning when

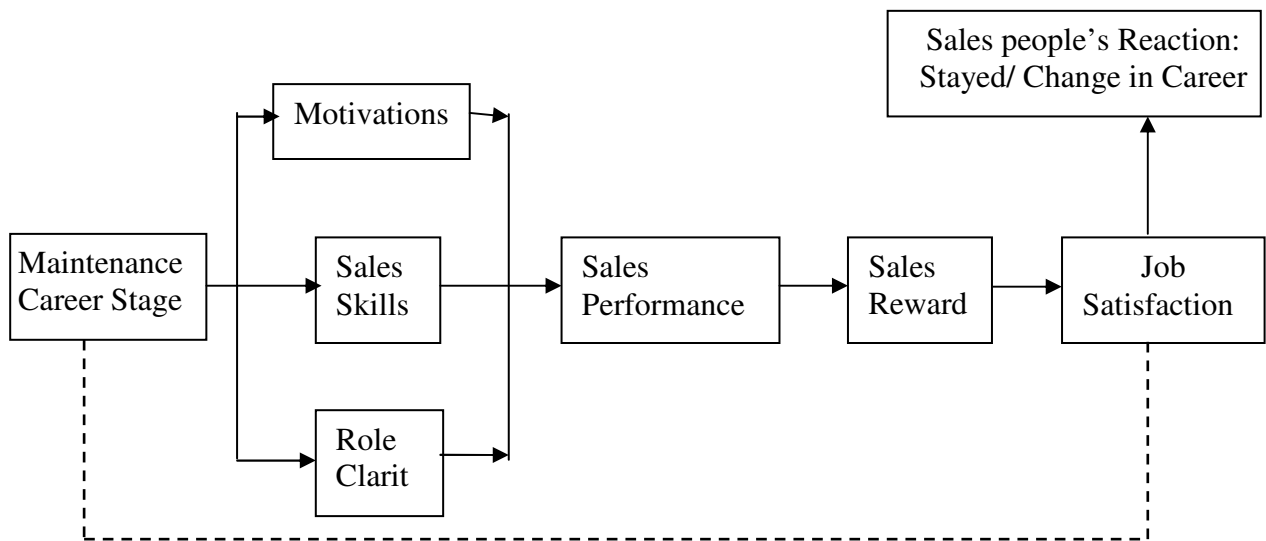


Figure1. Framework for Maintenance Career Stage Development of a Salesperson

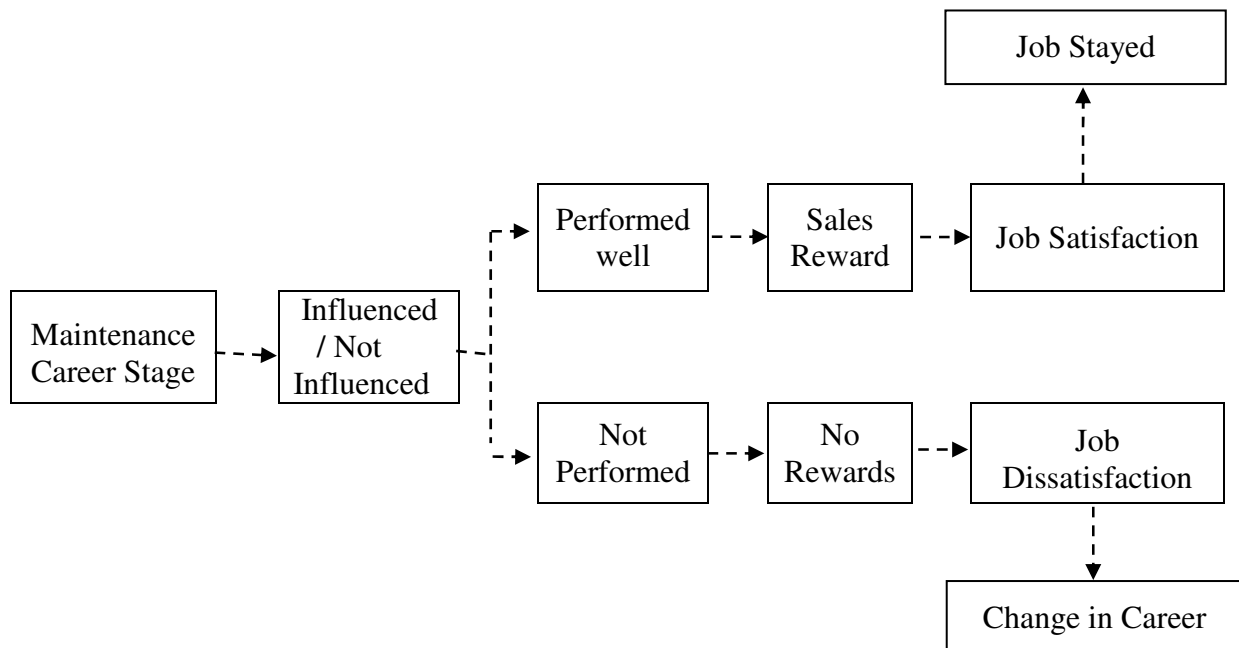


Figure 2. Decision Process for Maintenance Career Stage Development

viewed from a maintenance career stages perspective. Also, the Figure 2 explains how salesperson's reaction in decision process, in maintenance career stage. Propositions

### *Performance Determinants*

Previous research on the relationship between performance and salespeople's individual characteristics has not been very inconclusive. In the meta-analysis of the literature, which spanned 75 years and 116 articles, Churchill et al. (1985) found that no single determinant (for example, demographic characteristics, skill levels, aptitude, role perception, and motivational factors) accounted for more than 10 percent of the variation in performance. They suggest these results may be due to differences in research methods, measures, and type of sales jobs being examined. Another explanation may be that the determinants of salespeople's performance differ among career stages.

Age is a variable that has been included as a discrete data element in many studies, but when age and performance relationships were studied, they generally provided disappointing results (Cron 1984). Cron (1984) has suggested career stages represent a fundamental difference in how salespeople react and behave on the job. A salesperson with greater commitments to a sales career is more likely to take full advantage of opportunities and to meet the challenge of selling new products in growing markets. Thus, the performance determinant is very important for sales performance and is discussed in brief.

For the purpose of this research, seven variables were selected to be independent variables. The variables selected to be dependent variables were job satisfaction, skills, role, motivations, rewards, sales performance and change in career. The first three were selected because of their obvious interest to salespeople and next five because it was felt that the life-cycle phenomenon is a significant factor in explaining salesperson's reactions.

### *Sales Motivation*

Walker et al. (1977) developed propositions concerning the influence of job tenure on all three variables in the motivation process: valences, expectancies, and instrumentalities. A career stages perspective, however, would suggest some modifications of these propositions. Walker et al. proposed that a salesperson's valence for internally mediated rewards (for example, feelings of self-fulfillment, personal growth, and career development) will increase with tenure, while one's valence for externally mediated rewards (for example, pay, job security, and recognition) will decrease.

During the maintenance stage, however, lower order needs become more important as an individual's career concerns change and focus on preserving one's present position and organizational role (Schein 1971). As a result, these people have been found to place greater value on job security and monetary rewards (Rabinowitz and Hall 1981) and have less interest in competition and promotion (Hall and Mansfield 1975). This may help explain why Churchill et al. (1979) observed a positive relationship between job tenure and pay valences. Likewise, Ingram and Bellenger (1983) may have found no significant relationship because over 75 percent of the salespeople in their sample were in the maintenance stage.

According to expectancy theory, estimates of expectancy (that is, estimates of the probability that effort will lead to performance) and instrumentality (that is, estimates of the probability that higher performance will lead to greater rewards) will also influence motivation levels. Walker et al. (1977) have proposed that both estimates will increase with experience in a linear fashion. Career stages also suggest a positive-experience relationship for both estimates; however, the nature of developing career concerns indicates that the major increases in these estimates should occur during the first two stages—exploration and establishment.

Comparatively little learning of basic job skills takes place during the maintenance stage, though there may be increased learning of related skills and broadened work perspective (Baird and Kram 1983). Although the timing of career stages has been found to differ across occupations (Hall 1976), people are usually in the maintenance stage for about half to one third of their adult working life. The argument here is that Salespeople's valences like pay, promotion, job security, and recognition for lower order rewards will be highest during the maintenance career stage, even though motivation may be less. Depending on this discussion of motivation, the following general research proposition is offered:

***P1: Salespeople's valences for lower order rewards will be highest during the maintenance career stage.***

#### *Sales Skills*

Sales resources are defined here to include both natural selling ability and the selling skills required for territory management and customer interaction. Studies of salespeople's satisfaction and performance (Churchill et al. 1976) have proposed that experienced salespeople will have a better understanding of their jobs, company policies, and customers. The correlational design of these studies, however, assumes that learning will continue at a steady pace throughout a salesperson's career.

A career stage suggests that the majority of effective resource development is likely to occur during the exploration and early establishment stages. A desire to master the job and to establish oneself during this time will likely cause these people to be more open to training and new ideas. There is some support for this in the sales training literature, where Withey (1975) reported that salespeople with a lesser job tenure achieved high post-training examination scores.



It is argued that maintenance sales people will increase sales skills, when he or she stays in their same or similar career, which is unlikely to vary significantly.

The following proposition is predicted:

***P2: The major advances in selling skills will be less for the salesperson that changes his career than for the one who stays during the maintenance career***

### *Role Clarity*

Career stages also offer insight into when and how sales experience will cause less role ambiguity and conflict, as proposed by Walker et al. (1977). The relationship between role ambiguity and experience will also be moderated by the technical complexity of the product being sold and the complexity of the selling process itself. Despite these factors, however, the overall ambiguity levels should be fairly low during this stage for most people and should continue at a low level during the later maintenance career stage. This perspective on role ambiguity helps to explain why Ford et al. (1975) observed fairly low uncertainty among industrial salespeople regarding what they were expected to do and how their performance was evaluated. The change of career for sales people is that changing their functional job for any reasons for career growth and whereas stayer is whom they continue with the same jobs for a longer time. There was some uncertainty, however, regarding company policies.

Most salespeople perceived some conflicts between company policies and customer demands, while more than half of the salespeople indicated that demands of customers and superiors were in conflict with the desires of their family. The issue causing the most disagreement was the amount of time for which the salesperson should be available for customers.

Therefore, the proposition regarding the relationship between career stages and role perceptions is:

***P3: Salespeople's role, ambiguity will be much lower for the salesperson, who are changing in career than Stayers, during the maintenance career stage.***

*Sales Performance and Job Satisfaction*

Arguments have been presented that generally suggest that as people approach retirement and focus on disengaging they contribute less to their organization. This indeed may be true when, in particular, the job requires physical abilities and energies that older people no longer possess (Sheppard 1976).

Sales performance is considered to be an antecedent of job satisfaction (Peters and Jackofsky 1979; Sager et al. 1989), that is, lower performance will lead to lower job satisfaction and a greater propensity to changing the career.

It has been found, for example, that people who leave an organization are less satisfied with their jobs and have less favorable work attitudes than those who stay (Mobley 1982). Low performance has also been found to be related to salespeople's intentions to leave their organizations (Futrell and Parasuraman 1984; Johnston et al. 1988). In fact, Johnston et al. found that performance plays an even greater role than propensity to leave in the salespeople's decision to leave an organization when the decision is made. As a result, the following will be tested:

***P4: The level of job satisfaction will be lower for change in career than for the one who stays at the initial maintenance career stage.***

***P5: Sales performance will be lower for change in career than for those who stay in maintenance career stage.***

***P6: Higher the sales performance will result to higher-level of sales skills, sales motivations, role clarity, job satisfaction, sales rewards.***

***P7: Higher the job satisfaction will result to higher sales performance and role clarity, sales skills, motivations.***

### *Sales Rewards and Job Satisfaction*

As reported in a laboratory study conducted by Cherrington et al. (1971), performance and satisfaction are not inherently related; rather, reward-level determines job satisfaction. Therefore, it is postulated that performance will be related to job satisfaction when a person receives valued rewards for high performance and the level of reward is perceived to be equitable. On the other hand, high performance will result in job dissatisfaction when valued rewards are perceived to be unrelated to performance and inequitable. Steers and Mowday (1981) suggest, when individuals perform well, they raise their expectations with regard to outcomes.

The main aim of remunerating salespeople is to reward the effort for the outcome of their work. Traditionally compensation for salespeople has been closely linked to concepts such as control and effectiveness. Thus, Churchill et al. (1994) consider that one of the main aims of any sales compensation program is to stimulate and influence the salespeople to do what management wants them to do, in the way management wants and in the required time. Thus, a compensation program can reward both the desired activities and performance outcome. These efforts will influence both individual and company outcome.

***P8: If the level of reward for the higher sales performance is equitable, and then the salesperson will have job satisfaction.***

***P9: If the level of reward for the higher sales performance is not equitable, and then the salesperson will have dissatisfaction.***

***P10: If the sales peoples having higher the chances for changing the career then the sales performance, sales reward, job satisfaction will be at lower level.***

### Development of Maintenance Career Model

Bagozzi (1978) has developed his general model based on empirical effort to test at least a portion of the general conceptual model proposed by Walker et al. (1977) and the subsequent

studies regarding the relationship between sales performance, job satisfaction, and their antecedents or correlates. The behavioral model proposed by Bagozzi (1978) hypothesized that sales performance and job satisfaction would be a function of individual characteristics (personal variables), interactions with significant others in their sales roles (interpersonal variables), and the environment in which these interactions take place (situational variables). Formally stated, Bagozzi's general model was presented as follows:

$$\mathbf{B}_{ij} = f(\mathbf{P}_{ik}, \mathbf{I}_{il}, \mathbf{E}_{im})$$

where,

$\mathbf{B}_{ij}$  = Behavioral outcome of person  $i$  on criterion,

$\mathbf{P}_{ik}$  = Person  $i$ 's individual difference score on characteristic  $k$ ,

$\mathbf{I}_{il}$  = The nature of relationship  $l$  for person  $i$ ,

$\mathbf{E}_{im}$  = Situational condition  $m$  in person  $i$ 's environment affecting  $\mathbf{B}_{ij}$

By way of the represented model and the hypothesized specific relationships, Bagozzi proposed four models for empirical testing based on the hypothesis that sales performance and job satisfaction would be a function of individual characteristics (personal variables), interactions with significant others in their sales roles (interpersonal variables), and the environment in which these interactions take place (situational variables).

To further operationalize, Bagozzi's (1978) four models have been modified based on the variables of the proposition developed in this research article.

$$\mathbf{S}_1 = \mathbf{a}_{11} + \mathbf{b}_{12} \mathbf{SM}_{2i} + \mathbf{b}_{13} \mathbf{SS}_{3i} + \mathbf{b}_{14} \mathbf{RC}_{4i} + \mathbf{b}_{15i} + \mathbf{u}_i \quad (1)$$

$$\mathbf{JS}_1 = \mathbf{a}_{21} + \mathbf{b}_{22} \mathbf{S}_{2i} + \mathbf{b}_{22} \mathbf{RC}_{3i} + \mathbf{b}_{23} \mathbf{SR}_{4i} + \mathbf{u}_i \quad (2)$$

$$\mathbf{SR}_1 = \mathbf{a}_{31} + \mathbf{b}_{32} \mathbf{S}_{2i} + \mathbf{b}_{33} \mathbf{JS}_{3i} + \mathbf{u}_i \quad (3)$$

$$CC_1 = a_{41} + b_{42} S_{2i} + b_{43} JS_{3i} + b_{44} SR_{4i} + u_i \quad (4)$$

## Discussion

Several propositions have been well defined with literature. These entire propositions will be hypothesized and tested for research result and model validation. However, for conceptualizing the model, the important variable propositioned has been selected mainly for sales performance, job satisfaction, sales rewards and change in career.

It is more important that proposition 1 to 6 (P1 to P6) is hypothesized so that these proposition form the basics understanding to test the model validation using propositions 6 to 10(P6 to P10).By testing the proposition 1 to 6,the research arguments will be become strong indictor to test the conceptual model.

Based on proposition 6 (P6), Model 1 hypothesized that sales performance (S) is a function of Sales Motivation (SM), Sales Skills (SS), and Role Clarity (RC). The findings for Model 1 showed a significant impact on sales performance (S) in both the original research conducted by Bagozzi and the replication sample. The significance of this finding is reduced, however, when the Reward Performance for Bagozzi's first sample and the replication sample are compared. Bagozzi found in his study that 54 percent of the variability in S was explained by the influence of all variables. In contrast, the level of explained variability in the replication was only 2.6 percent.

Based on proposition 7 (P7), Model 2 hypothesized that job satisfaction (JS) is a function of S, RC, and sales reward (SR).In this model, Bagozzi reported that role ambiguity and self-esteem do not enter the equation. However, for this research study, this variable has been included as it will play an important role.

Based on proposition 7 (P7), Model 3 hypothesized that SR is a function of S, and JS. For this study, SR is equitable to performance. Bagozzi found in his study that 54 percent of the variability in S was explained by the influence of all variables. In contrast, the level of explained variability in the replication was only 2.6 percent. When the Bagozzi tested this model, he further found that sales performance is directly influenced by rewards.

Finally, based on proposition 10 (P10), Model 4 hypothesized that change in career (CC) is a function of S, JS, and SR. Further, for a person who is at a lower level in all variables, it can lead to change of career. In this research, sales determinants are positively influenced to produce sales performance. However, it can be other ways also for a few changes, that any one or more variables will have a negative influence, but does not affect the sales performance.

#### Conclusion and Future Research

Bagozzi (1978) has adopted the Walker et al. behavioral model (1977) and modified it, which suggests that a variety of personal, company, and environmental characteristics influence these three individual performance determinants. The replication of the original research reported by Bagozzi (1978) provided no evidence to support the conclusion that a salesperson's job satisfaction is directly related to job performance, as measured by annual sales. When a relationship was evidenced in the replication, sales performance was found to have a negligible, negative correlation with job satisfaction. The comparison of Bagozzi's original research and the hypothesis report need to be compared, that may indicate that determinants of sales performance are not universal across selling environments.

The model goes beyond these previous frameworks by making more comprehensive the variables that impact on sales performance and change in career. The strengths of the model, in addition to the flexibility just described, include its reflection of previously tested theory, its

comprehensiveness in terms of variables, and its specificity in explaining sales performance, job satisfaction and career change.

In initiating such a longitudinal study, a number of concerns need to be addressed. First, the timing of the questionnaire administration certainly is a cause for concern. As Kimberly (1976) pointed out, too frequent administrations may result in testing effects, but the process may not be captured if intervals between administrations are too lengthy. Of course, the use of other forms of data gathering will address this concern in part. Second, subject dropout may pose threats to the internal validity of the study. Third, the population for the study will need to be selected carefully in order to obtain sufficient variance on the dependent variable of career change.

Through this theoretical study, we will be able to understand the impact of sales people's performance in their maintenance stage and how change in career effects reacts. Based on these understanding, the "Sales Performance – Change in Career" new model has been proposed. This model can be implemented and tested for sales driven industries like FMCG and Real-estate.

To conclude, it is hoped that this article will serve to stimulate research testing the sales performance and change in career model. Testing will yield refinements in the model and clarify the relative influence of sales performance factors on the decision to change careers. Finally, comparative studies of the determinants and process of change in career and job change may be undertaken using the model.

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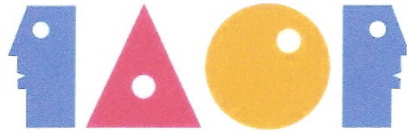
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TRAINEES' PERCEPTIONS ON USING MICROBLOG TO  
SUPPORT FORMATIVE EVALUATION: A Q-METHODOLOGY STUDY

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Abstract

The purpose of this study is to identify the perceptions of trainees on using the Web 2.0 application Twitter for formative evaluation. Twitter was integrated in a Research Methodology classroom at a continuing education center of a private university in Taipei for twelve weeks. Q-methodology was used for this study. Thirty-nine participants were surveyed and asked to rank-order 30 statements about the integration of Twitter in the classroom. Correlation, centroid factor analysis, and judgmental rotation were employed to derive significant factors. Two factors that represent groups of participants with similar perceptions were extracted. The results of this research have illustrated the following: (1) all of the participants agreed on the importance of online formative evaluation, (2) trainee opinion types can be differentiated into Factor I (Full-Range Adopters) and Factor II (Twitter-Critical Adopters), and (3) Factor I and Factor II participants agreed that the integration of Twitter into the classroom enhanced learning through the use of critical reflections, privacy settings, prompt responses, and writing without restraint due to the anonymity of the evaluation. The findings indicate that perception on using Microblog to support formative evaluation is a multidimensional construct rather than a uni-dimensional one. It concludes that the usage of Web 2.0 application in the classroom is no longer "one size fits all," but rather multiple social media tools should be used in order to meet different learners' needs and preferences.

Keywords: Summative Evaluation, Formative Evaluation, Microblog, Social Network, Twitter

## Introduction

Numerous studies have focused on using Web 2.0 technologies in teaching and learning (Churchill, 2009; George, & Dellasega, 2011; Meyer, 2010; Siemens & Conole, 2011; Tekinarslan, 2008; Williams & Jacobs, 2004). Although there has been growing interest in using various Web 2.0 tools for student assessment tasks in tertiary education (Waycott, & Sheard, 2011), significantly less attention has been paid to exploring participants' views of using Web 2.0 applications for formative evaluation. It should be noted that formative assessments are used to monitor trainee progress during the learning process; whereas formative evaluation is the periodic evaluations which are used for providing feedback to inform instructors, trainees and educational stakeholders about the teaching and learning process (Noe, 2008; Swanson, & Holton, 2009). In my previous study, emphasis was given to the practical experiences of trainers and trainees using Twitter for formative evaluation (Chen & Chen, in press); however, it has not yet revealed participant opinion types. It would seem, therefore, that further investigations are needed in order to uncover different patterns of thought. The purpose of this study was to identify and categorize the perceptions of trainees regarding the use of the Web 2.0 application Twitter for formative evaluation. The research questions that guided the study are as follows:

1. What are the subjective opinions of trainees on using Twitter for formative course evaluation?
2. What are the factors that represent groups of trainees who share similar patterns of thoughts in the group?

## Methodology

### Measuring Subjectivity

Q-methodology, a quantitative analysis of subjective data, was chosen for this study. The instrument, called Q-sample (viz., a set of opinion statements to be sorted), was developed based on the in-depth interviews. Participants, known as P-sample, sorted the statements along a continuum of preferences (see Figure 1). Factor analysis was used to identify the number of factors, and the correlation study attempted to identify the individuals who were highly correlated with one another in each specific factor (Brown; 1993; Brown, 1994-1995; Brown, 1996).

### Participants

The P-sample included 39 adults ranging in age from 26 to 50 years old. All of them had full-time jobs. Twenty-two (56.4%) of the respondents were males; the other 17 (43.6%) were females. The respondents spent time online ranging from one to eight hours daily (see Table 1). The small sample size is quite common and acceptable in Q-methodology. This method focuses on the subjective viewpoints of a few people using many questions, rather than the reactions of a large number of people to a smaller number of questions (Brown; 1993; Brown, 1994-1995; Brown, 1996).

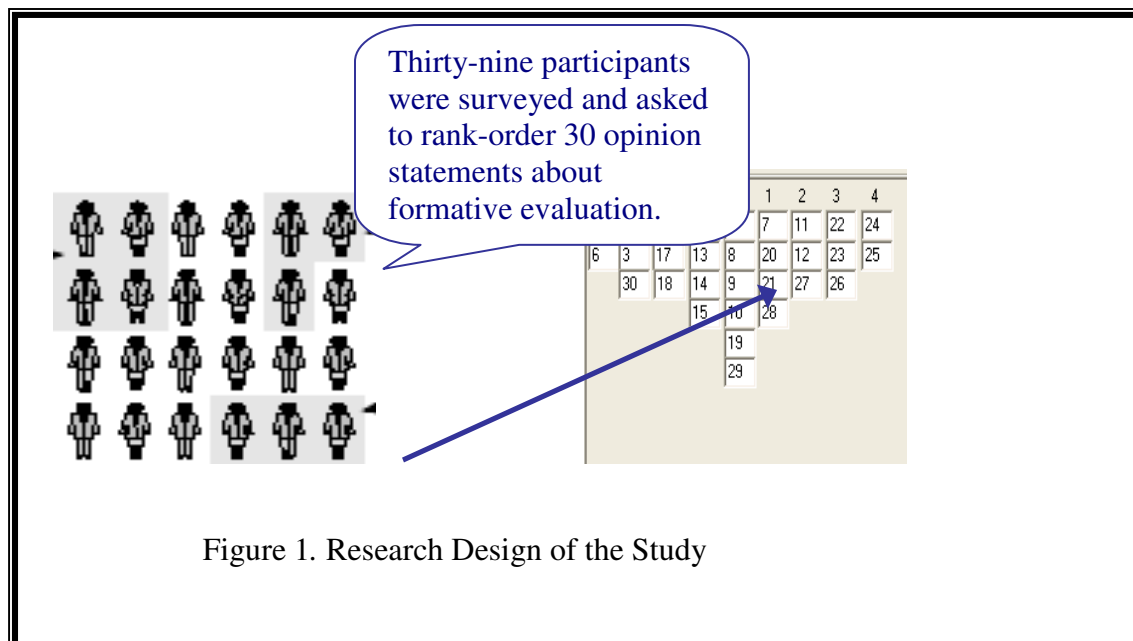


Figure 1. Research Design of the Study

## Procedures

Twitter was applied in a Research Methodology classroom at a continuing education center of a private university in Taipei for three months in 2011. The training program, which consisted of three one hour sessions per week, was conducted in a traditional classroom; however, the formative evaluation was implemented via Twitter. The trainees attended the course on a voluntary basis. Participation in the online formative evaluation on a weekly basis was mandatory. The author was involved in this project as the trainer and the curriculum designer. The formative course evaluation was carried out directly after each session on weekly-basis. The trainees were asked to send evaluation messages (i.e., the most interesting points, the most confusing points, and things they wanted to ask/discuss during each training session) via “Direct Messages” in Twitter.

## Data Collection

The research instrument was developed based on the results of the nominal group interview. The Q-sort design consisted of 9 piles (-4 through +4, with frequencies 2-3-3-4-6-4-3-3-2). The Q-sort design regulated the exact number of statements that a respondent was able to put into each pile in the continuum. Each trainee rank-evaluated the 30 statements along a continuum ranging from “-4” (strongly disagree) to “+4” (strongly agree) on the sorting answer sheet (see Figure 1).

## Data Analysis

Thirty-nine trainees were interviewed and 39 Q-sorts were collected. The Q-sorts were processed and analyzed following the usual steps of Q-methodology by using the PQMethod software. Correlation, centroid factor analysis, and judgmental rotation (hand rotation) were employed to derive significant factors. In Q-methodology, interpretations are based on factor

arrays and factor scores rather than loadings, typically used in factor analysis. Thus groups were formed based on common viewpoints (Brown; 1993; Brown, 1994-1995; Brown, 1996).

Overall, two operant factor types were identified.

## Results

Two operant factor types were also identified: (1) Factor I: Full-range Adopter and (2) Factor II: Twitter-Critical Adopters. The correlations between the participants and factors are given in Table 1. Thirty-one of the 39 trainees' Q-sorts were divided into these two operant factors. The other eight Q-sorts were not considered to be statistically significant, i.e., loadings of less than 0.36 on these two factors.

### *Factor I: Full-range Adopters*

Group I was comprised of eight participants. There were five females and three males in this group. Seven of these 8 participants (87.5% of the Group I participants) spent more than two to three hours online daily. Responses in this profile exhibited generally positive attitudes toward using Twitter to support formative evaluation. Group I participants agreed most with Statement 1, Statement 2, Statement 14, Statement 15, and Statement 16 (see Table 2): "Because of this course, I get to know a popular social platform (+3)," "Twitter use limited word characters. It's brief, short, and easy to communicate (+4)," "I send private messages via Direct Message and that protects my privacy (+4)," "Because of the online connectivity, I am much more involved in this program (+3)," and "I write course reflection via Twitter in this program (+3)."; on the other hand, they disagreed most with Statement 18, Statement 19, Statement 27, Statement 28, and Statement 30 (see Table 2): "Twitter is less popular in Taiwan. I may not use it after this course (-3)," "Some classmates ask questions just because they have to submit weekly required

Table 1. Factor loadings by participant and opinion type

ID.	Gender	Age	Hours spend online daily	Rotated Factors	
				Factor I	Factor II
04	M	2	4	48	
07	F	2	5	82	
13	F	5	3	81	
15	M	5	4	57	
18	M	4	4	73	
24	F	3	2	53	
30	F	5	4	46	
37	F	4	3	52	
01	F	4	1		47
02	M	4	1		42
03	F	5	1		63
05	M	5	1		59
06	F	4	1		46
08	M	4	5		76
10	F	4	2		51
11	M	4	3		50
12	F	3	4		75
14	M	2	5		58
20	F	2	2		50
21	F	4	2		57
22	F	3	5		72
23	M	4	2		77
25	M	3	4		80
26	M	3	1		38
28	M	4	4		64
29	M	5	1		58
31	M	4	2		41
34	F	4	2		64
36	F	2	5		46
38	M	6	1		38
39	M	5	1		50

(\*) only significant loadings shown ( $p < .01$ ), decimals omitted; 8 undefined Q-sorts are not included.

M: Male; F: Female.

Age 1: 21-25 years old; Age 2: 26-30 years old; Age 3: 31-35 years old; Age 4: 36-40 years old; Age 5: 41-45 years old; Age 6: 46-50 years old.

Hours spent online daily 1: Less than 1 hour ; Hours spent online daily 2: 1-2 hours; Hours spent online daily 3: 2-3 hours; Hours spent online daily 4: 3-4 hours; Hours spent online daily 5: above 4 hours.



assignments (-3),” “If I do not write the commentaries immediately, I will easily forget what types of questions I should ask (-3),” “If I didn’t get the individual course feedback from the trainer, I was stressed (-4),” and “Writing weekly evaluation messages is quite demanding (-4).” Full-Range Adopters embraced a wide range of uses for the Web 2.0 application Twitter in the classroom.

#### Factor II: Twitter-Critical Adopters

Group II, the largest factor group extracted, was comprised of 23 participants. There were 10 females and 13 males in this group. Nine of the participants (39.1% of the Group II participants) spent less than one hour online daily. Group II participants agreed strongly with Statement 14, Statement 16, Statement 17, Statement 23, and Statement 25 (see Table 3): “I send private messages via “Direct Message” and that protects my privacy (+3),” “I write course reflections via Twitter in this program (+3).” “Because of trainers’ prompt and personal support, I feel that peer-to-peer interaction is less frequent via Twitter during the training (+3),” “The instructor can modify the course on a weekly basis (+4),” and “People who do not want to ask questions in public are less inhibited in this e-evaluation environment (+4).”; in contrast, they disagreed most with Statement 4, Statement 5, Statement 9, Statement 10, and Statement 11 (see Table 3) “Twitter is easier to use than email an MSN (-4),” “I get a chance to practice English (-3),” “Twitter implements good web design and easy functionality (-3),” “The system is stable and fast (-4),” and “I have to work and I do not often have time to access a computer (-3).” Twitter-Critical Adopters also saw benefits from the use of online formative evaluation, but they were highly concerned about the use of Twitter in the classroom. The striking difference between the perceptions of these two profiles is that the Twitter-Critical Adopters explained that they cannot fully express ideas in less than 140 characters (statement 8, +2); on the other hand, the

Full-Range Adopters perceive it in the opposite way (statement 8, -2).

*Consensus statements between Factor I and Factor II*

The consensus statements between these two trainees are Statement 16, Statement 11, Statement 14, Statement 22, Statement 24, Statement 25, and Statement 26 (see Table 4).

Table 2. Statement Scores by Factors/Opinion Types

NO	Statements	Factors (*)	
		I	II
1	Because of this course, I get to know a popular social platform.	3	0
2	Twitter use limited word characters. It's brief, short, and easy to communicate.	4	-2
14	I send private messages via "Direct Message" and that protects my privacy.	4	3
15	Because of the online connectivity, I am much more involved in this program.	3	-1
16	I write course reflection via Twitter in this program.	3	3
18	Twitter is less popular in Taiwan. I may not use it after this course.	-3	0
19	Some classmates ask questions just because they have to submit weekly required assignments.	-3	1
27	If I do not write the commentaries immediately, I will easily forget what types of questions should ask.	-3	-1
28	If I didn't get the individual course feedback from the trainer, I was stressed.	-4	-1
30	Writing weekly evaluation messages is quite demanding.	-4	1

Discussion and Conclusion

The results of this research have illustrated the following: (1) the findings reaffirm the importance of online formative evaluation in underpinning course pedagogy, (2) trainee opinion types can be differentiated in those who appear largely self-motivated and will

likely need only minimal training interventions (Full-Range Adopters) and those who saw a wide range of uses of online formative evaluation, but were highly concerned about the use

Table 3. Statement Scores by Factors/Opinion Types

NO	Statements	Factors (*)	
		I	II
4	Twitter is easier to use than email an MSN.	1	-4
5	I get a chance to practice English.	0	-3
8	Sometimes I cannot fully express ideas in less than 140 characters.	-2	2
9	Twitter implements good web design and easy functionality.	0	-3
10	The system is stable and fast.	-1	-4
11	I have to work and I do not often have time to access a computer.	-2	-3
14	I send private messages via “Direct Message” and that protects my privacy.	4	3
16	I write course reflections via Twitter in this program.	3	3
17	Because of trainers’ prompt and personal support, I feel that peer-to-peer interaction is less frequent via Twitter during the training.	-1	3
23	The instructor can modify the course on a weekly basis.	2	4
25	People who do not want to ask questions in public are less inhibited in this e-evaluation environment.	1	4

of the Web 2.0 application Twitter (Twitter-Critical Adopters), and (3) Factor I and Factor II participants agreed that the integration of Twitter into the classroom enhanced learning because of critical reflections, privacy settings, prompt responses, and the way in which anonymity enabled them to write without restraint. This preliminary study confirms Chen, Liu, Shih, Wu, & Yuan’s (2011) findings that the anonymity of blogs/microblogs encourages students to write without restraint. Unlike George & Dellasega’s (2011) study which suggests that concern for privacy and lack of facility with technology are the potential hindrances of using social media in education, the current study indicates that the Factor I and Factor II participants believe that

Twitter protects their privacy (Statement 14) and that they can access computer/information technology easily (Statement 11).

Table 4. Consensus Statements Between Factor I and Factor II

NO	Statements	Factors (*)	
		I	II
16	I write course reflections via Twitter in this program.	3	3
11	I have to work and I do not often have time to access a computer.	-2	-3
14	I send private messages via “Direct Message” and that protects my privacy.	4	3
22	I feel good because of the quick responses from the trainers.	2	2
24	The system maintains personal records of learning.	0	2
25	People who do not want to ask questions in public are less inhibited in this e-evaluation environment.	1	4
26	Because of the weekly e-evaluation, I am more engaged in deep personal reflections.	0	1

The value of Q-methodology lies in uncovering opinion clusters among participants who inject statements with their own understandings. The results of this Q-methodology research, consequently, can be used to design various hypothesis-testing research for future studies. The findings, particularly, uncover two distinct factors: Full-Range Adopters and Twitter-Critical Adopters. This indicates that perception on using Microblog to support formative evaluation is a multidimensional construct rather than a uni-dimensional one. It, therefore, concludes that the usage of Web 2.0 application in the classroom is no longer “one size fits all,” but rather that multiple social media tools should be used in order to meet learners’ different needs and preferences. The findings of this study can help us to decide which strategy to select, what project and policy to execute and, most importantly, what outcome to expect if we plan to use Twitter as the evaluation media in training programs. By understanding trainees’ needs and

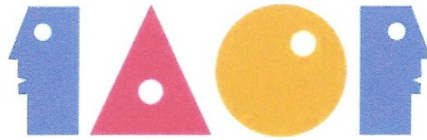
interests, trainers and instructional designers can develop better strategies for using online technology more efficiently.

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A STUDY ON THE PROPAGANDA EFFECTIVENESS OF DRUG ABUSE  
PREVENTION POLICY IN CHUN HEI PROJECT: THE CASE  
STUDY ON SENIOR AND VOCATIONAL HIGH  
SCHOOLS IN PINGTUNG COUNTY

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Abstract

Anti-drug campaigns in schools are regarded as the basis of anti-drug movement. In the past years, various anti-drug campaigns have been promoted in schools. However, the evaluation of the effectiveness is rather insufficient. This study aims at understanding the present implementation, the contents, and the effectiveness of Drug Abuse Prevention propaganda in schools as well as analyzing the effects of family relationships and social factors on the propaganda effectiveness. With purposive sampling, 320 students in six senior and vocational high schools in Pingtung County are selected as the research subjects. With Propaganda Scale, Family Relationships Scale, Social Factors Scale, and Propaganda Effectiveness Scale as the research tools, descriptive statistics, reliability tests, factor analyses, Pearson product-moment correlation coefficient analysis, and hierarchical regression are proceeded analyses. The research outcomes show that 1. Propaganda and Propaganda Effectiveness appear significant effects, where Propaganda and Consequence Awareness of Drug Use in Propaganda Effectiveness present remarkable correlations; 2. Family Relationships and Propaganda Effectiveness appear significant effects, where Parental Communications, Problem Communications and Management, and Consequence Awareness of Drug Use reveal notably positive correlations as well as Behavior Prevention presents remarkably positive correlations with Rejection Determination and Consequence Awareness of Drug Use; and 3. Social Factors and Propaganda Effectiveness appear significant effects, where Community Interaction and Leisure Activities

reveal notably positive correlations with Consequence Awareness of Drug Use. Finally, the research outcomes are expected to provide suggestions and reference for the policy revision of anti-drug campaigns in schools.

Key words: Chun Hei Project, Drug Abuse Prevention policy, Pingtung County, senior and vocational high school students

## Introduction

In order to effectively prevent and control student drug abuse, Ministry of Education proclaimed Practice of Student Drug Abuse Prevention Project on December 11, 1990; Drug Abuse Prevention, Tobacco Elimination, and AIDS Prevention were further combined as Chun Hei Project. After Alcohol Abuse and Betel Nut Chewing being integrated into Chun Hei Project in 1995, the project has been preceded till now. Furthermore, in consideration of student clubs being the interactive core between classes, club peers were applied to affecting peers and promoting and encouraging students to participate in Chun Hei Project. In this case, Ministry of Education have counseled schools on establishing Chun Hei Clubs since the academic year of 1991, aiming at combining the power and the resources of other student clubs to handle various educational propaganda in Chun Hei Project and expecting the schools being the anti-drug foundation which could further affect the citizens in communities. Because of the planning and the data collection being in Anti-drug Year by the Executive Yuan, this study was restricted in the years 2005-2007. Moreover, in regard to the tendency of juvenile drug abuse in recent years, Drug Abuse Prevention in Chun Hei Project was considered as the major study. For the convenience and the correctness of data collection, students in 19 public and private senior and vocational high schools in Pingtung County were selected as the research subjects. Since schools are regarded as the key place for affecting the determination and the behaviors of juvenile anti-drugs, the Drug Abuse Prevention propaganda has been promoted in schools for years.



However, there has not been significant effectiveness. In present educational environments, student consciousness is rising that students with low internal control of external enticement and low family support tend to material abuse (Lee, 1998). For this reason, the effects of Family Relationships and Social Environment on the propaganda effectiveness of Drug Abuse Prevention are worth discussing and studying. It therefore became a key motivation for this study. The evaluation of effectiveness aims to understand whether a policy or project has achieved the predetermined objective or purpose as well as if appropriate modification and evaluation are required after a period of time (Hsueh, 2003). Drug Abuse Prevention in Chun Hei Project has been implemented in schools for years. Aiming at effectively controlling the drug problems in schools, this study tended to understand the present situation and the anti-drug effectiveness in schools by inspecting drug problems and planned appropriate anti-drug strategies by examining the anti-drug policies and measures. Based on the research outcomes, suggestions for the propaganda effectiveness on Drug Abuse Prevention would further proposed.

#### Literature Review

##### *Discussions On Juvenile Drug Abuse And Family Relationships*

Liu (2005) regarded family as a key role for children and juvenile. When a person was completely cared by the parents, his/her behaviors were likely to correspond with social norms. On the contrary, the loss of family functions could cause ill-development of a person and further result in deviation or criminal behaviors. Werch et al. (1991) found the effects of parents on children drug abuse behaviors, including (1) drinking and drug use of parents, (2) attitudes of parents, (3) communications between parents and children, and (4) family management skills. Family risk factors, such as medication behaviors of family, trainings of family management, family conflict, and low family connection, were closely related with juvenile drug abuse

behaviors (Huang, 1994). Tsai & Yang (1997) indicated that the negative factors of drug abuse experiences of parents or siblings, insufficient parental care or the reception of prejudice, bad parent-children relationships, and the improper discipline of parents appeared great challenge on juvenile drug abuse. Peng & Li (2001) mentioned that the better family atmosphere was revealed, the better parent-children relationships and communications were presented that the dependence on parents would be enhanced. Parents with high awareness and strong disagreement of drug abuse were likely to take prevention measures on children drug abuse. According to the above findings, a family with good atmosphere and communications would present strong connection on parent-children relationships that the children tend to take family opinions and expectations into account before engaging in deviation behaviors.

#### *Discussions On Juvenile Drug Abuse And Social Factors*

Thomas (1992) pointed out six factors in juvenile drug use, including economic and social deprivation, lack of employment, easy access of drugs, community norms, and law. Chiang (2003) indicated that poverty areas with high population density, migration rate, and concealment were likely to appear juvenile playing and deviation behaviors (such as drug abuse and dealing) because of the disorder caused by weak social control and sparse interpersonal interaction. Lin & Ko (2003) regarded the effects of neighborhood environment on juvenile drug abuse, particularly in poverty areas with high population density, migration rate, and concealment of interpersonal interaction, as the disorder caused by weak social control and disperse interpersonal interaction resulted in juvenile deviation behaviors and drug abuse. Drug abuse could physiologically reduce pressure, anxiety, and threat; and such behaviors might appear the symbolic meaning of experience sharing and sense of belonging (Wang, 1992; Wang, 2005). Tsai (2001) indicated that amphetamine became popular as dealers often provided

juvenile with free drugs or money for selling, delivering, or promoting amphetamine. From the above findings, the factors of social environments in juvenile drug abuse could contain mass media, friends making situation (enticement of peers, drug abuse of friends, pressure and incitement from peers, and peer identity), community environment, getting in improper places (such as Pub, KTV, or drug parties), not being accepted by the society, and the network (acquiring drug information or purchasing drugs from the Internet).

#### *Discussions On The Propaganda Effectiveness Of Drug Abuse Prevention Policy*

With the great effects of drugs on the society and juvenile, the Government has implemented comprehensive anti-drugs. In general, the argument on drug policies focused on the feasibility of the actions and the achieved effectiveness. Li & Chiu (2000) pointed out the Top-down approach of the policy which emphasized the superiority of policy makers and the loyalty of policy executors that some anti-drug policies failed in cooperating with the locals. Wu (2003) classified the policy evaluation into pre-evaluation, process evaluation, and outcomes evaluation. Hsueh (2003) regarded policy evaluation standards as the effects or the success in evaluating the policy. Generally, the evaluation of policies could apply policy indicators which could apply public statistical values to the measurement of public problems, as it utilized the public statistics for formulating appropriate policies (MacRae , 1985). Lo (2003) indicated that the evaluation of material prevalence and the prevention effectiveness mostly depended on self-reports. Nevertheless, some research questioned the reliability of self-reports. For example, juvenile could under-report the material use so that the comparison results would be interfered. Aiming at the research on anti-drug campaigns in 127 schools during 1968-1977, Schaps (1981) discovered that the performance of anti-drug campaigns was often evaluated by use attitudes of students, use behaviors, knowledge of material use, emotional change, and

school performance. In regard to prevention strategies, the following dimensions were sequenced by the use in propaganda, including the consequence knowledge of material use, persuasion, emotional control skills, emotional experiments, consultations, substitute options, and the identity of peer pressure.

## Research Methods

### *Research Framework*

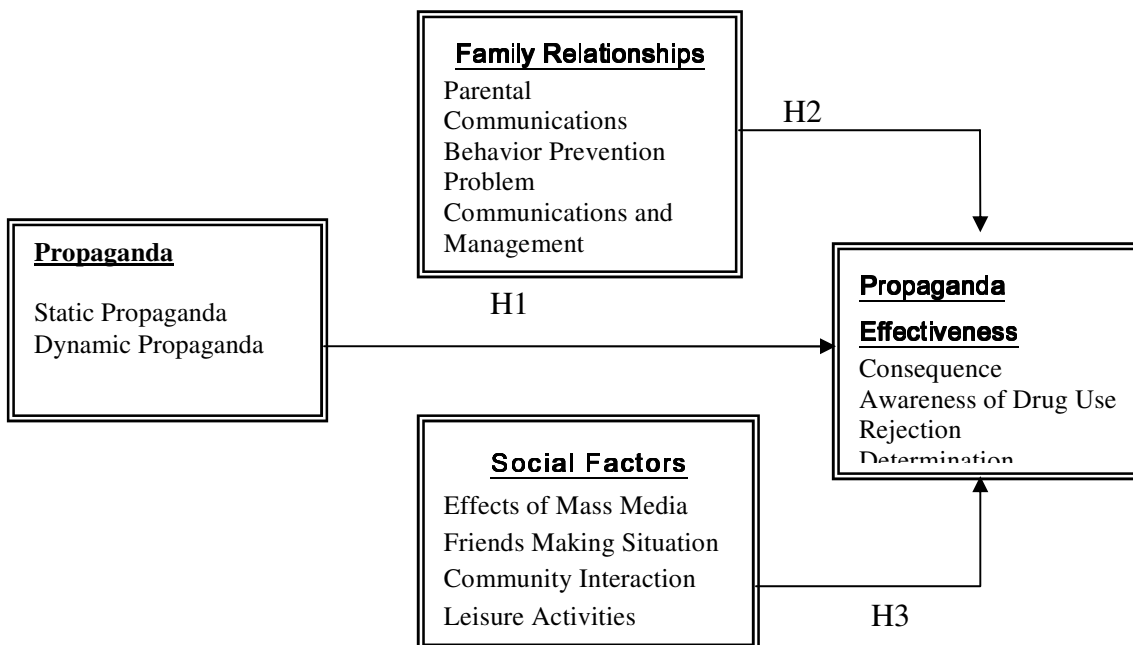


Figure 1. Research Framework

### *Research Hypotheses*

**Hypothesis 1: Drug Abuse Prevention propaganda appears significant effects on Propaganda Effectiveness.**

**Hypothesis 2: Family Relationships shows notable effects on Propaganda Effectiveness.**

**Hypothesis 3: Social Factors present remarkable effects on Propaganda Effectiveness.**

### *Research Subjects and Tools*

With the senior students in the senior and vocational high schools in Pingtung County as the research subjects, four public and two private schools from 19 senior and vocational high schools in Pingtung County were selected by non-random sampling. The structural questionnaire was utilized as the research tool, which was divided into five parts, namely Prevention Propaganda Scale, Family Relationships Scale, Social Factors Scale, and Effectiveness Evaluation Scale. They were compiled with Likert scale.

### *Research Implementation*

#### (1) Pretest

After completing the revision of questionnaire, 20 students each (including 10 males and 10 females) from four public and private senior and vocational high schools were proceeded the questionnaire survey from September 1-5, 2011 in order to test the reliability. Having deducted 6 invalid copies, the reliability coefficient of Prevention Propaganda achieved .909, Family Factors .967, Social Factors .858, Effectiveness Evaluation .869, and the overall reliability .943.

#### (2) Distribution of formal questionnaire

Aiming at juvenile students in Pingtung County, total 320 senior students, with 160 each (including 80 males and 80 females) from public and private senior and vocational high schools, were non-randomly sampled for the questionnaire survey during October 1-15, 2011. Having deducted 15 invalid ones (4.7%), total 305 valid copies were retrieved (95.3%).

#### (3) Reliability and factor analyses

The popular Construct Validity and Convergent Validity, Principal Component Analysis in factor analyses, and Varimax Rotated Solution were applied to abstracting the key factors. With factor analyses, none of the original questions in Propaganda needed to be deleted; the

explained variance achieved 55.139%; the dimensions were named Static Propaganda and Dynamic Propaganda. With factor analyses, Family Relationships were classified into three dimensions of Parental Communications, Behavior Prevention, and Problem Communications and Management; the explained variance showed 65.074%. With factor analyses, Social Factors were divided into four dimensions, namely Effects of Mass Media, Friends Making Situation, Community Interaction, and Leisure Activities; the explained variance reached 71.854%. With factor analyses (Varimax Rotated Solution), Effectiveness Evaluation was classified into Consequence Awareness of Drug Use and Rejection Determination; the explained variance appeared 72.808%. Cronbach's  $\alpha$  test was further proceeded for reliability analyses that the overall reliability  $\alpha=.928$ , showing it as a favorable questionnaire.

### Data Analyses And Statistics Results

#### *Correlation Analyses Among The Variables In Various Dimensions*

From Pearson Correlation Analysis, Table 4-2-1, the research framework presented certain correlations.

Table 4.2.1. Pearson Correlation Coefficients of the Variables

	Mean	Standard Deviation	Static Propaganda	Dynamic Propaganda	Parental Communications	Behavior Prevention	Problem Communications and Management	Effects of Mass Media	Friends Making Situation	Community Interaction	Leisure Activities	Rejection Determination
Static Propaganda	3.66	.716										
Dynamic Propaganda	3.43	.764	.646**									
Parental Communications	3.46	.913	.423**	.370**								

Behavi or Preven tion Proble m Comm unicati ons and Manag ement Effects of Mass Media Friend s	3.93	.776	.520**	.391**	.597**							
Makin g Situati on Comm unity Interac tion	3.56	.816	.548**	.489**	.578**	.728**						
Leisur e Activit ies	3.11	.927	.218**	.147*	.148**	.119*	.158**					
Rejecti on Deter minati on Conse quence Aware ness of Drug Use	3.56	1.088	.242**	.199**	.215**	.315**	.307**	.187**				
	3.68	.952	.331**	.236**	.264**	.386**	.358**	.285**	.260**			
	4.12	.809	.360**	.292**	.276**	.380**	.346**	.169**	.324**	.294**		
	4.25	.993	.065	.011	.066	.219**	.036	-.049	.153**	.047	.181**	
	4.27	.929	.211**	.110	.186**	.331**	.215**	.059	.145*	.200**	.249**	.336**

\*\* When the significance appeared 0.01 (double-tailed), the correlations were notable.

\* When the significance showed 0.05 (one-tailed), the correlations were remarkable.

With Hierarchical Regression, Propaganda (Dynamic Propaganda and Static Propaganda) did not achieve significance when Rejection Determination was the dependent variable, but

*Regression Analyses Among The Dimensions In The Research Framework*

(1) The Effects Of Drug Abuse Propaganda And Propaganda Effectiveness

Table 4.3.2. Regression Analyses of Propaganda and Propaganda Effectiveness

Dependent variable	Rejection Determination				Consequence Awareness of Drug Use			
	Model I		Model II		Model I		Model II	
Independent variable	$\beta$	p	$\beta$	p	$\beta$	p	$\beta$	p
Control variable								
Gender	.098	.097	.098	.096	.001	.981	.003	.963
Age	.008	.896	.009	.881	-.021	.728	-.015	.798
School type	-.227	.000	-.232	.000	-.117	.051	-.136	.024
Father's education background	.038	.577	.041	.554	-.058	.409	-.047	.501
Mother's education background	-.154	.027	-.154	.027	-.133	.063	-.134	.059
Parents' marriage	-.088	.124	-.087	.126	-.113	.055	-.112	.056
Predicted variable								
Static Propaganda			.028	.619			<u>.179**</u>	<u>.002</u>
Dynamic Propaganda			.025	.512			<u>.125*</u>	<u>.033</u>
R <sup>2</sup>	.105		.106		.068		.084	
Adjusted R <sup>2</sup>	.086		.084		.048		.061	
F Change	5.554		.355		3.429		4.616	
Sig. of F	.000		.552		.003		<u>.003*</u>	

Note: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

reached significance when Consequence Awareness of Drug Us was the dependent variable, shown in Model II.

(2) The Effects Of Family Relationships And Propaganda Effectiveness

With Hierarchical Regression, Behavior Prevention in Family Factors achieved significance, but not Parental Communications and Problem Communications and Management, when Rejection Determination was the



dependent variable. However, Family Factors (Parental Communications, Behavior Prevention, and Problem Communications and Management) reached significance when Consequence Awareness of Drug Use was the dependent variable, shown in Model II.

Table 4.3.3. Regression analyses of Family Relationships and Propaganda Effectiveness

Dependent variable	Rejection Determination				Consequence Awareness of Drug Use			
	Model I		Model II		Model I		Model II	
Independent variable	$\beta$	p	$\beta$	p	$\beta$	p	$\beta$	p
Control variable								
Gender	.102	.081	.100	.088	.002	.976	-.012	.844
Age	.019	.740	.020	.730	-.017	.769	-.011	.853
School type	-.233	.000	-.231	.000	-.118	.049	-.106	.072
Father's education background	.039	.572	.042	.544	-.060	.394	-.035	.613
Mother's education background	-.151	.030	-.153	.028	-.133	.062	-.146	.037
Parents' marriage	-.088	.123	-.088	.123	-.114	.051	-.116	.045
Predicted variable								
Parental Communications			.024	.676			<b>.172**</b>	<b>.003</b>
Behavior Prevention			<b>.159**</b>	<b>.005</b>			<b>.279***</b>	<b>.000</b>
Problem Communications and Management			.001	.985			<b>.187**</b>	<b>.001</b>
R <sup>2</sup>	.107		.107		.069		.098	
Adjusted R <sup>2</sup>	.088		.085		.050		.076	
F Change	5.694		.175		3.501		8.927	
Sig. of F	.000		.676		.002		<b>.003**</b>	

Note: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

### (3) The Effects Of Social Factors And Propaganda Effectiveness

With Hierarchical Regression, Social Factors (Mass Media, Friends Making Situation, Community Interaction, and Leisure Activities) did not achieve

significance when Rejection Determination was the dependent variable. Nevertheless, Community Interaction and Leisure Activities reached significance, but not Mass Media and Friends Making Situation, when Consequence Awareness of Drug Use was the dependent variable, shown in Model II.

Table 4.3.6. Regression analyses of Mass Media and Propaganda Effectiveness

Dependent variable	Rejection Determination				Consequence Awareness of Drug Use			
	Model I		Model II		Model I		Model II	
Independent variable	$\beta$	p	$\beta$	p	$\beta$	p	$\beta$	p
Control variable								
Gender	.096	.100	.104	.078	-.001	.985	-.010	.871
Age	.021	.719	.020	.735	-.016	.789	-.014	.808
School type	-.236	.000	-.231	.000	-.123	.040	-.128	.033
Father's education background	.040	.559	.041	.551	-.059	.398	-.060	.391
Mother's education background	-.150	.031	-.150	.031	-.132	.063	-.132	.063
Parents' marriage	-.085	.137	-.087	.126	-.112	.055	-.110	.060
Predicted variable								
Mass Media			-.058	.309			.065	.265
Friends Making Situation			.108	.062			.116	.053
Community Interaction			.022	.692			<b>.184**</b>	<b>.001</b>
Leisure Activities			.089	.129			<b>.189**</b>	<b>.002</b>
R Square	.106		.110		.070		.074	
Adjusted R Square	.088		.088		.050		.051	
F Change	5.673		1.040		3.538		10.090	
Sig. of F	.000		.309		.002		<b>.002**</b>	

Note: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

## Conclusion and Suggestion

### *Conclusions*

(1) Both drug abuse Propaganda and Propaganda Effectiveness presented remarkable correlations. All the research outcomes were controlled with demographic variables. Overall speaking, present Drug Abuse Prevention propaganda by Ministry of Education appeared notable effects on Consequence Awareness of Drug Use. In this case, it could be inferred that the Drug Abuse Prevention propaganda showed the effectiveness on preventing student drug abuse.

(2) Family Relationships revealed certain effects on Propaganda Effectiveness. Both Parental Communications and Problem Communications and Management appeared notable correlations with Consequence Awareness of Drug Use; besides, Behavior Prevention also presented remarkable correlations with Prevention Determination and Consequence Awareness of Drug Use. It therefore proved that Family Relationships showed significant effects on student Drug Abuse Prevention.

(3) Family Relationships in Social Factors appeared effects on Propaganda Effectiveness. In particular, both Community Interaction and Leisure Activities displayed notable effects on Consequence Awareness of Drug Use. Nevertheless, this study did not prove the proposal of Tsai (2005) and Lin & Ko (2003) that Mass Media and Friends Making Situation presented remarkable correlations with student drug abuse. In general, Social Factors still appeared certain effects on student Drug Abuse Prevention.

### *Suggestions*

Based on this study, both Static Propaganda and Dynamic Propaganda in the Drug Abuse Prevention propaganda in Chun Hei Project did not present remarkable assistance in Rejection Determination. For this reason, it is suggested to design

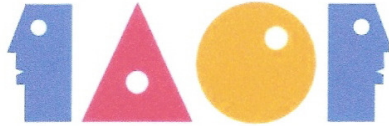
various teaching contents and subjects for different students; besides, students without drug abuse should be reinforced Rejection Determination. In practice, the Drug Abuse Prevention units, such as Academic Affairs Management Section in County Governments, County Police Station for Juvenile, Drug Prevention and Control Center, Prosecutors Office, and Public Health Bureau, should continuously conduct multiple promotions, invite experts to practice anti-drug campaigns in schools, and evaluate the propaganda effectiveness for adjusting future propaganda and contents. Present Drug Abuse Prevention education focuses more on knowledge instruction, without overall planning. The content design of Drug Abuse Prevention should be diverse, active, interactive, and in a small group. Moreover, most families are two incomes in such an industrial society. Educational sectors therefore are suggested to communicate with parents, as the emphasis of Family Relationships could effectively prevent juvenile from deviation behaviors and stop drug abuse. As the factors in anti-drug campaigns, schools are suggested to understand the living environment and the interaction with neighbors through family visit and parent communications. Besides, correct use of network and proper leisure activities could present positive effects on Propaganda Effectiveness.

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USING TOPSIS AND MODIFIED DELPHI METHOD BUILD  
A UNIVERSITY OF TECHNOLOGY STUDENTS  
RECRUITING MODEL IN TAIWAN

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Abstract

In Taiwan, private technology universities face more challenges than ever due to educational policy changes, decline of birth rates, and competition with national universities. It is necessary for private technology universities to recruit prospective students from vocational high schools. However, it will cost a lot of human and financial resources to make recruitment at 491 vocational high schools nationwide. Selection of prospective students from vocational high schools is a complex process, which consists of multiple criteria, alternatives, and opinion factors. Consequently, it is hard for a university to come up with the best decision. To establish an evaluation model of preference selection, therefore, is a pressing issue that is rarely studied in decision making research. In this paper, we utilize a modified Delphi process to extract experts' tacit knowledge as the criteria of selection. Then we employ TOPSIS to evaluate the advantages and disadvantages of the alternatives as well as to sort the alternatives' rank. Finally, we present the whole evaluating process by using a local university as an example.

Keyword: Modified Delphi Method, TOPSIS, Multi-Criteria Decision Making,  
School Marketing

## Introduction

With the rise of the knowledge economy, the Taiwanese government has in recent years relaxed its educational policies to encourage the establishment and operation of vocational colleges of science and technology by non-government institutions. Hence, the number of colleges and universities in Taiwan has increased from 105 in 1986 to 164 in 2011. However, the birth rate in Taiwan has been falling over the past few decades, from 309,230 births in 1986, to less than 20,000 in 2008. It is thus estimated that the vocational colleges and universities of science and technology in Taiwan will face significant challenges with regard to student recruitment and enrollment in 2016 (Hsiung, 2009). Marketing strategies, which have generally been applied mainly in for-profit organizations, are increasingly being used by non-profit ones. In order to achieve better student recruitment rates, non-government vocational colleges must make effective use of their manpower, finances, time and other available resources. To begin with, a college should make a list of recruitment preferences based on the integration of information from all of its departments. Strategically, the college may proceed to organize a high school campus tour for recruitment promotion. By doing so, a vocational college will be able to not only integrate the resources of all its departments, but also satisfy the needs of each department.



Earlier studies concerning school marketing tended to focus on the key factors in the choice of college by high school students. Vocational colleges therefore used to place research emphasis on the promotion of self-value and the SWOT analysis. In contrast, this study intended to establish a classification and ranking list of vocational high schools through an integrated analysis of the distinctive characteristics of such schools and the recruitment preferences of vocational colleges. This list is expected to serve as a reference for vocational colleges to locate their targeted high schools and better execute their marketing strategies in the hope of achieving more effective recruitment promotion.

#### Literature Review

Originally the term of marketing referred to all commercial activities involved in the course of the transfer of a product or service from the producer/provider to the consumer/user. In 2004, marketing was redefined as a kind of organizational function/program serving to create, communicate and deliver values for/to customers as well as to manage customer relationship to the interests of the organization and the beneficiaries. Academic Hsu (1997) presents three major aspects of marketing as follows:

1. Marketing functions to introduce a product or service effectively into the market.

2. Marketing is a variety of strategies, changeable and dynamic, formulated for demands.

3. Marketing represents the creation of market potentials for a product or service.

In general, marketing is applied by a for-profit organization to its business operation to generate greater profits. Shapiro (1973) considers that marketing for a non-profit organization means providing services to users. Before any services are provided, the organization needs to understand its social function and mission. It would help the organization to address and confirm the questions of who should be served and what kind of service should be offered.

This study was conducted with an emphasis on target market segmentation. To facilitate a proper target market evaluation, it began with the employment of the modified Delphi method to extract tacit knowledge from a panel of experts as criteria for evaluation. Then the expert panel gave grades in the evaluation of each feasible alternative and its criteria. Subsequently, the fuzzy TOPSIS method was used to establish a ranking list of all alternatives which would help those concerned to select their subjects and decide their order of priority for the administration of marketing.

#### *The Delphi Method*

The Delphi method is a kind of group decision-making approach intended mainly to acquire reliable and consistent opinions. It serves to gather tacit knowledge

through interviews with experts to evaluate the importance and existence of proposed criteria. First of all, researchers have to decide a panel of experts according to the questions to be answered. Secondly they continue to conduct a preliminary round of interview with each expert. The data collected are then integrated into a preliminary questionnaire. Using the questionnaire, researchers proceed to conduct a second round of interview with each expert. In consideration of linguistic/semantic variables of an expert during each round of interview, researchers have to conduct multiple rounds of interview until the questionnaire reaches the level of reliability, validity and consistency.

The Delphi method is generally characterized with the following features: anonymity, repetition, objectivity and feedback. In recent year, the Delphi method has been modified and extended to be applied to the studies in a variety of disciplines. As far as the old Delphi method is concerned, it takes longer time to collect expert opinions from interviews in the formation of a preliminary questionnaire. Besides, the old method, both time and cost consuming, tends to lead an interview off the right track of communication. The modified Delphi method helps to facilitate the operation of a study. Researchers begin with the establishment of a preliminary questionnaire and proceed to conduct expert interviews. In so doing, the study can not only progress

efficiently in terms of time and resources, but also have each interview focused on the proposed issues.

### *Group Multiple Criteria Decision Making and TOPSIS*

Group Multiple Criteria Decision Making (GMCDMA) refers to a decision making process in which a group of people assess multiple criteria to decide the best alternative. The TOPSIS method is used to find from the normalized weighted matrix a composite of the best performance values as the positive ideal solution and a composite of the worst performance values as the negative ideal (or anti-ideal) solution. By measuring the distance between an alternative and each ideal solution, a ranking list of alternatives can be established. The TOPSIS method is frequently applied to the assessment of performance criteria and the establishment of a ranking list of alternatives for marketing strategies.

The procedure, notion and logic of the TOPSIS method have been recognized and accepted by a majority of scholars. Deng et al. (2000) describe the TOPSIS method as an easy-to-understand approach for evaluation. Tsai (2007) considers that with the notion of positive and negative ideal solutions taken into consideration, the TOPSIS method helps to produce more objective overall results. Feng (1995) thinks that the advantage of the TOPSIS method to rank alternatives by distance measure serves to deal with the replacement problem. Shih et al. (2007) argue that the TOPSIS

method is the most precise and best approach for multiple criteria decision-making.

Abo-Sinna and Amer (2005) indicate that the TOPSIS method is an effective approach to solving the ranking problem of alternative preference and that the method is widely used by decision makers because it is easy to understand.

Zanakis et al. (1998) have found that the TOPSIS method performs better on the ranking reverse problem than other multiple criteria decision-making methods.

Parkan and Wu (1999) have observed that the TOPSIS method is much more accurate than the Data Envelopment Analysis in the verification of medium-level statistical correlation tests.

While the TOPSIS method has been widely used in recent years by many scholars in a variety of disciplines, a number of experts look at the TOPSIS method differently and some of them hold doubts about the overall decision-making structure.

Wu et al. (2007) propose a new method to solve the fuzzy multiple criteria decision-making problems. Shih et al. (2007) propose that the TOPSIS method sets the values in the interval between 0 and 1 in the standardization process. A slightly different process will result in a quiet different decision. Olson (2004) considers that it is inappropriate to use Euclid distance to calculate separation problems in the practice of the TOPSIS method because the problem of same distances may occur during the course. Lin et al. (2008) propose that using the TOPSIS to measure separation

distance will overly raise the effectiveness of attribute weights. Shin et al. (2007) also considers that the separation measure in the initial stage of the TOPSIS method will overlook the possible amplification of attributes.

In recent years, as the decision-making problems have become increasingly complicated, experts are usually unable to use numerical values to fully express their opinions in the preliminary evaluation. Hence, many experts use linguistic variables to represent evaluation values. Without precise values as a basis of calculation, the TOPSIS method is not applicable. Negi (1989) introduced the fuzzy theory into the traditional TOPSIS and proposed the fuzzy TOPSIS method to perform calculations in the context of uncertain, vague or linguistic information. Liang (1999) used degrees of closeness and separation to calculate the distance different alternatives versus the positive solution and negative solution. Chen (2000) has further simplified the fuzzy TOPSIS method with the calculation of triangular fuzzy numbers instead of trapezoidal fuzzy numbers and adopted the vertex method to calculate the distance different alternatives versus the positive solution and negative solution.

### Research Methods

The study was conducted in two stages. In the first stage, researchers began to work on the definition of the scope of research issues and the selection of a panel of experts. Using the modified Delphi method, researchers proceeded to conduct

multiple rounds of interview with experts to achieve the consistency of expert opinions. In the second stage, researchers assessed the criteria of each alternative and established a ranking list by using the fuzzy TOPSIS method. The two stages will be described in the following context.

### *1. Modified Delphi Method*

The modified Delphi method was used in the first stage of analysis. As our researchers have been involved in the campaign for student recruitment, they proposed a draft of criteria based on their experience. The draft was further modified through the in-depth interviews with the few experts who have been involved in the operation of student recruitment for more than five years. With the preliminary draft of criteria established, researchers conducted a semi-opened questionnaire survey in the first round of interview with each of a number of experts (incumbent personnel for student recruitment). Following the first round of interview, researchers examined expert opinions to have the all-agreed criteria retained and the all-disapproved criteria removed from the draft with those failing to reach consistency or stability set to be raised in the second round of interview. In each round of interview, researchers would provide expert opinions expressed in a previous round. Multiple rounds of interview were conducted until expert opinions reach consistency and stability. After the

existence of each criterion was confirmed, the weight of each criterion was evaluated in terms of importance graded by experts in the questionnaire survey.

## *2. Fuzzy TOPSIS Method*

In the second stage, linguistic variables were used to evaluate feasible alternatives and the fuzzy TOPSIS method was conducted in the following eight steps for ranking alternatives:

1. Constructing membership functions for fuzzy data.
2. Constructing a decision matrix.
3. Calculating a standardized decision matrix.
4. Calculating weighted standardized decision matrix.
5. Calculating fuzzy positive ideal solution and fuzzy negative ideal solution.
6. Computing the distance of different alternatives versus the fuzzy positive ideal solution and negative ideal solution.
7. Computing the relative approximation value of different alternatives versus positive ideal solution.
8. Ranking the alternatives.

## *Examples*

This study intended to establish a ranking list of marketing preferences for two universities of science and technology in the same neighborhood in Tainan. First of



all, researchers launched an in-depth interview with three experts who have been involved in the administration of student recruitment for more than five years (including first-rank and second-rank administrative chiefs and staffer) for the establishment of a preliminary draft of criteria. The study proceeded with the modified Delphi method to extract tacit knowledge from six department heads who engage personally in the administration of student recruitment for the establishment of evaluation criteria and weights. Subsequently, an interview was conducted with the chair or faculty members from the Department of Business Administration in either of the two universities who have been personally involved in the operation of student recruitment to evaluate feasible alternatives (upstream vocational high schools) and criteria weights. Finally, the TOPSIS method was used to integrate grades given by experts to establish a ranking list of feasible alternatives as a reference for student recruitment.

#### *1. Modified Delphi Method*

A total of eleven items are designated as evaluation criteria including academic level of students from upstream schools, scale of upstream schools, department attributes of upstream schools, cooperation and exchanges between upstream and downstream schools, category of upstream schools, year-by-year peer preference, distance of this school from its upstream schools, convenience in

transportation between the school and its upstream schools, and open recruitment models of upstream schools. Researchers compiled the first draft of evaluation criteria into a semi-opened questionnaire for the first round of interview.

This study has set two standards of definition for the consistency and stability of criteria. By the first standard, a single item which was more than 80 percent approved by experts and which was modified less than three times by each expert should be considered approved by experts and retained. An item which was less than 80 percent approved by experts should be deleted. An item which was more than 80 percent approved by experts and was modified more than three times should be further discussed to decide its existence. By the other standard, an item considered by experts with less than 30% of importance should be excluded. An item considered by experts with 30% to 50% of importance should be further discussed to decide its existence. An item considered by experts with more than 50% of importance should be retained. If inconsistency occurred between approval and importance percentages, a new questionnaire survey should be conducted to decide the existence of the item. Accordingly, the procedures were conducted until the questionnaire reached the level of consistency and stability.

In this study, after researchers held the first round of interview with six experts, only Distance of this school from its upstream schools and Convenience in

transportation between the school and its upstream schools are disqualify, others are reaching reserve standard. After second round no revision or doubt was raised by experts for the questionnaire. Please look Table 1.

Table1. Round 2 - Expert Questionnaire

Measure Criteria	Approved by Experts (%)	Significance level
1. Academic level of students from upstream schools	6/6(100%)	46(76.7%)
2. Scale of upstream schools	6/6(100%)	34(56.7%)
3. Department attributes of upstream schools	6/6(100%)	41(68.3%)
4. Cooperation and exchanges between upstream and downstream schools	5/6(83.3%)	47(78.3%)
5. Category of upstream schools	6/6(100%)	46(76.7%)
6. Year-by-year peer preference,	6/6(100%)	46(76.7%)
7. Distance of this school from its upstream schools	6/6(100%)	36(60.0%)
8. Convenience in transportation between the school and its upstream schools	6/6(100%)	43(71.7%)
9. Open recruitment models of upstream schools	6/6(100%)	49(81.7%)

## 2. Fuzzy TOPSIS Method

According the evaluation criteria, we select night variant high schools and Industrial high school to test feasible plan by following Table 2.

We selected the business school of two technology universities located in the same neighborhood in Tainan as subjects for empirical studies. Y school performs academically better than X school. We defined experts as the chairman or staff in charge of student admissions. We used code names XE1, XE2, XE3, XE4, YE1, YE2, YE3 ,YE4 respectively for those experts. We measured feasible plan in Table 3 and measure parameter of linguistic values in Table 4.

Table 2. Feasible Plan

Plan	School Catalog	Students of Total Amount	Graduating Student	Location
A1	National High School	2,340	784	Tainan City
A2	National Industrial High School	2,256	755	Tainan City
A3	National Industrial affiliate High School	1,143	351	Tainan City
A4	Private Industrial affiliate High School	5,104	1,724	New Taipei City
A5	Private high school affiliate Industrial	2,286	744	Hualien City
A6	Private Industrial High School	631	206	Kaohsiung City
A7	Private school	2,408	797	New Taipei City
A8	Private high School affiliate Industrial	4,403	1424	Taichung City
A9	National Industrial High School	2,210	726	Changhua City

Symmetric fuzzy numerical data and their ranges belong to the closed interval [0, 1]. Then, we can define the fuzzy Ideal solution and fuzzy negative Ideal solution. Experts give average weight for each plan and variables of linguistic value. We use variables of symmetric fuzzy numerical data to calculate average weight. The

Table 3. Measure Feasible Plan Scale Use Fuzzy Numbers

Measure Standard Scale	Symmetric Fuzzy Numerical Data
Strongly disagree (SD)	(0, 0, 0.2)
disagree (D)	(0, 0.2, 0.4)
Minor disagree(MD)	(0.2, 0.4, 0.5)
Neither agree nor disagree (N)	(0.4, 0.5, 0.6)
Minor agree(MG)	(0.5, 0.6, 0.8)
Agree(G)	(0.6, 0.8, 1)
Strongly agree(VG)	(0.8, 1, 1)

Table 4. Measure Parameter of Linguistic Values and Symmetric Fuzzy Numerical Data

Parameter of Linguistic Values	Symmetric Fuzzy Numerical Data
Very low(VL)	(0, 0, 0.3)
low(L)	(0, 0.3, 0.5)
Neither agree nor disagree (N)	(0.3, 0.5, 0.7)
high(H)	(0.5, 0.7, 1)
Very high(VH)	(0.7, 1, 1)

distance measure was proposed in this paper to calculate the distance of each fuzzy number from both fuzzy Ideal solution and fuzzy negative ideal solution.

According the distance we calculate, this research builds a ranking list of marketing preferences. Therefore, school marketing can tend to focus on the key factors.

Table 5. Distance Of Ideal And Negative-Ideal Solution For X School

Plan	Distance of negative-ideal solution	Distance of ideal solution
A1	1.461807	4.801745
A2	4.805393	1.476853
A3	5.251336	0.984807
A4	3.942090	2.309048
A5	3.794311	2.467076
A6	4.521200	1.783333
A7	2.329756	3.915532
A8	4.553987	1.694384
A9	3.874274	2.398192

Table 6. Distance Of Ideal And Negative-Ideal Solution For Y School

Plan	Distance of negative-ideal solution	Distance of ideal solution
A1	1.091722	4.12472
A2	4.857448	0.348441
A3	4.606251	0.627750507
A4	2.447872	2.778278
A5	2.07418	3.135538
A6	2.803909	2.402178
A7	1.997751	3.770421
A8	3.287626	2.084244
A9	3.199187	2.019623

In this paper, TOPSIS Model demonstrated feasibility and validity of this method. It can avoid subjective judgments and provide a scientific approach to the problem. Simultaneously, TOPSIS model can be testified by using minimum resource to evaluate preference selection. Please see Table 7.

Table 7. Two School Relative Distance Between Ideal And Negative-Ideal Solution

Plan	X School		Y School	
	Relative Distance	Rank	Relative Distance	Rank
A1	0.233383	9	0.209285	9
A2	0.764916	2	0.933068	1
A3	0.842081	1	0.880063	2
A4	0.63062	5	0.468389	6
A5	0.605986	7	0.398137	7
A6	0.717135	4	0.538583	5
A7	0.373042	8	0.34634	8
A8	0.728828	3	0.612008	4
A9	0.617664	6	0.613011	3

In recent years, non-government colleges and universities of science and technology have suffered from a shortage of student enrollment for a variety of reasons. Experts predict that these schools will encounter an extremely critical challenge of student recruitment in 2016. Therefore, with two non-government universities of science and technology in the same neighborhood in Tainan as the subjects, this study intended to use the modified Delphi method to extract tacit knowledge from experts as criteria and the TOPSIS method to establish a ranking list of nine feasible alternatives as a reference for colleges and universities of science and

technology to select their priority target markets in pursuit of the maximal effectiveness of student recruitment.

The ranking list of nine feasible alternatives for the two universities of science and technology are given as follows:

X school :  $A_3 \rightarrow A_2 \rightarrow A_8 \rightarrow A_6 \rightarrow A_4 \rightarrow A_9 \rightarrow A_5 \rightarrow A_7 \rightarrow A_1$

Y school :  $A_2 \rightarrow A_3 \rightarrow A_9 \rightarrow A_8 \rightarrow A_6 \rightarrow A_4 \rightarrow A_5 \rightarrow A_7 \rightarrow A_1$

Although Alternative 1 (A1) has an advantage on geographical location, it falls short considerably of other criteria, receiving lower grades from experts and ranked bottom on the list.

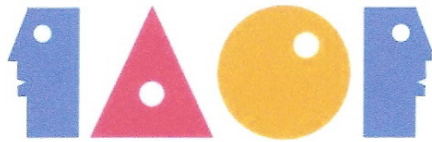
According to the results of the study, we suggest that a decision-making support system be established to perform an analysis of market segmentation and construct a ranking list of recruitment preferences for universities of science and technology in order to achieve greater effectiveness of student recruitment.

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THE EFFECT OF STUDENT LEARNING MOTIVATION  
ON LEARNING SATISFACTION

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Abstract

This paper studies how college students' learning satisfaction is affected by their learning motivation and data collected from questionnaires filled out by students of Tainan University are used as samples. Three hundred questionnaires were sent and, among responses received, 172 are valid. The valid rate of recovery is 57.3%. This research used Statistical Package for the Social Sciences (SPSS) 14.0 to analyze collected data and perform factor analyses, reliability and validity analyses, and regression analyses. The analytic results indicated that (1) learning motivation and learning environment of learning satisfaction have partially significant positive correlation, (2) learning motivation and teachers and teaching of learning satisfaction have partially significant positive correlation, (3) learning motivation and content and materials of learning satisfaction have significant positive correlation, (4) learning motivation and administrative services of learning satisfaction have significant positive correlation. Results are discussed to provide guidance for researchers and practitioners. Directions for future studies are also provided.

Keywords: learning motivation, learning satisfaction, learning attitude

## Introduction

As the number of colleges and universities in Taiwan increase, college education and its equivalent become general education. School learning is no longer the traditional way, i.e., centers around entering the next school; instead, school learning is now developed primarily based on students' learning needs and such needs come from their learning motivation. The purpose of learning is not only to increase students' knowledge but to cultivate their temperament. Results such as academic performance, acquired skills, and nurtured attitude are immediately revealed after students have received their education. Other results, usually with lasting influence, change their personality and increase their occupational knowledge. Other than entering the next school, the ultimate goal of learning is to prepare and nurture workforce that can quickly adapt to fast changing environment in accordance with knowledge, economic and technological development for different industries. Education is no longer about any particular skill. Education should focus on training students for lifetime learning, multifaceted learning and innovation capabilities as well as global perspectives. Students' learning satisfaction of their school learning plays an important role. Learning satisfaction is an index to evaluate students' learning results and it is also one of the most important indicators of teaching quality. Knowledge, skills, attitude, capabilities and emotion are all involved in the delivery of education and they are also basic factors affecting learning results. Another factor

affecting learning results is students' learning motivation; learning motivation is the driving force of learning and active and strong learning motivation leads to better learning results.

## Literature Review

### *Definition of Learning Motivation*

Individuals' needs to actively engage in learning stem from changes in social structure because they see the needs to be equipped with better competitive advantage (Miller, 1967). Intrinsic motivation and extrinsic motivation are common motivation types used in the field of motivation research (Brief & Aldag, 1977 & Deci & Ryan, 1985). Brief and Aldag (1977) pointed out that intrinsic motivation is formed due to and affected by the nature of work and intrinsic reward; extrinsic motivation, on the other hand, is formed due to and affected by self expectation and external resources and has no reward associated to work. Deci and Ryan (1985) mentioned that intrinsic motivation encourages individuals to perform associated activities and is linked to individuals' emotion, instinct and desire. On the other hand, they showed that extrinsic motivation drives individuals to show certain behavior and is stimulated by external stimuli and purposes and incentives of external incidents. Intrinsic motivation and extrinsic motivation influence learning differently and therefore lead to different learning behaviors. Intrinsic motivation focuses on the fact that individuals show extra

effort in order to satisfy their curiosity. Extrinsic motivation, on the other hand, focuses on the fact that stimuli and attraction in external environment, such as tangible or intangible reward and recognition, encourages individual' to perform certain behavior. When individuals realize that the change in environment brings threats to their work, they start to question their own capabilities. Consequently, they actively look for solutions and learning motivation is therefore formed.

Needs lead to motivation (Weiner, 1990). Danis and Tremblay's (1987) study showed that learning motivation of adults comes from intrinsic factors such as interests, challenges and curiosity. Chang and Lin (1989) mentioned that learning motivation triggers individuals' interest in learning and engaging in a series of internal process toward identified goals. Learning motivation is a psychological stimulus which triggers individuals' behavior toward a specific direction. Pintrich and Degroot (1990) believed that the level of learning motivation affects learning results. More significantly learning is achieved with more significantly learning motivation. Chang (1991) thought that learning motivation derives from psychological and social factors such as achievement motivation, affiliation motivation and cooperation motivation. Huang (1992) indicated that how adults select education activities is easily affected by intrinsic psychological factors and external environment. Change in external environment encourages individuals to show effort for identified goals. Danis

and Tremblay (1987) thought that individuals learning motivation is a complex psychological process which is affected by factors such as individuals' goals, belief and expectation and environment. Lai's (2002) study showed that motivation is a continuous process which begins and progresses toward identified goals. Tsai and Chang (2007) defined learning motivation as: intrinsic learning motivation is the representation of individuals' behavior and it is to satisfy internal self needs; extrinsic learning motivation is the representation of behavior to gain benefits such as incentives, recognition and orders that are irrelevant to work. Motivation leads to individuals' participation and continuous learning until individuals' internal and external environment balance each other or goals are achieved. Although there are many factors affecting learning, motivation is the only one that stimulates learning effectively.

Although stimuli leading to learning motivation vary from individual to individual, to most workers, their stimuli are the pressure they face in their work environment. Individuals should choose learning methods and tools based on their motivation. Tools evaluating learning motivation are discussed below:

Lai (2002) used students of the Extension School of Takming University of Science and Technology as study subjects and she categorized learning motivation into four phases in the following order, namely, orientation toward internal objectives,

orientation toward external objectives, faith of self-control over learning, and self-confidence in learning. Her research showed that the primary learning motivation of students is orientation toward internal objectives and the secondary learning motivation of students is orientation toward external objectives. Thus, the value of learning is more important than the expectation of it.

Lin and Lee (2008) used EMBA students of a physical education institution and students of its extension school as the study subjects and they categorized learning motivations into six phases in the following order, namely, the desire to know, the desire to take part in an activity, the desire to comply with formal requirements, the desire to reach a social goal, the desire to escape, and the desire to reach a personal goal. Their study showed that for these students, “the desire to know” takes the first place, followed by “the desire to reach a personal goal” and “the desire to take part in an activity.”

Wang, Lin and Chen (2008) studied EMBA (Executive Master of Business Administration) students and they categorized learning motivation into five phases in the following order, namely, the desire to know, the desire to take part in an activity, the desire to comply with formal requirements, the desire to reach a social goal, and the desire to escape. Their study found that “the desire to know” is the dominant reason for EMBA students’ learning desire. They believed that in the fast changing

and highly complex environment, they had to increase their professional knowledge and other skills to maintain competitive advantage.

Shih (2010) categorized learning motivation into three groups in the following to evaluate learning motivation. Career advancement: learning motivation stems from an individual's future career plan or advancement; self development: learning motivation stems from diversifying an individual's capabilities; learning interests: learning motivation stems from professional development, interests and broadening perspectives.

#### *Learning Satisfaction*

Long (1985) believed that the purposes of learning for adults performing learning activities are learning results and learning satisfaction. Learning satisfaction is the level of joy that students receive after learning activities. Martin (1988) indicated that satisfaction is the level of consistency between individuals' expectation and the actual experience. When the actual experience is equivalent to or better than individuals' expectation, individuals feel satisfied; when the actual experience is worse than expectation, individuals feel dissatisfied. Flammger (1991) defined satisfaction as the realization of needs, the joy of fulfillment, and the feeling of sufficiency.

When Lin (2000) studied the interaction between students and teachers and learning satisfaction, she categorized satisfaction into five groups as follows: institution support, development of educational background, class materials, and peer relationship. Han (2000) studied students of extension schools of junior high schools and analyzed their critical thinking capabilities, sense of teachers' teaching and learning satisfaction. She categorized learning satisfaction into five groups in the following: administrative support, interpersonal relationship, learning activities, learning gain and class materials.

Huang (2002) categorized learning satisfaction into six groups in the following when she studied the learning satisfaction of adults receiving secondary computer skills education and training: teachers' teaching, class materials, learning results, interpersonal relationship, learning environment, and administration. Lee (2002) studied self-driven learning inclination and learning satisfaction of students, she categorized as follows: teachers' teaching, class materials, learning environment, school environment, and student-teacher relationship. Wei (2003) studied the learning satisfaction of a community college in Tainan and he categorized learning satisfaction into four groups as follows: teacher and teaching, course content, learning environment, and administrative services.



Ma (1989) studied teachers' teaching and students' learning satisfaction when she studied short-term training programs and she categorized learning satisfaction into the following three groups: teachers' teaching, learning results, and interpersonal relationship. Hsiao (1998) studied learning satisfaction of students in Kaohsiung and he categorized it into five groups: teacher and course content, development of educational background, interpersonal relationship, attitude and emotion, and institutions. When Wu (1991) studied senior education institutions, she categorized learning satisfaction as class materials, teachers' teaching and interpersonal relationship. Chen (1997) categorized learning satisfaction as teaching methods, course content, learning results, student-teacher interaction, peer relationship, and support when he studies students of National Open University.

Based on Wei's (2003) learning satisfaction categorization, we used "learning environment," "administrative services," "teacher and teaching," and "course content and class materials" in this study. Incorporating definitions of other related studies, details descriptions of each are given below:

#### 1. Learning Environment

Learning environment can be defined in a narrow sense and a broad sense. Narrowly speaking, learning environment refers to the physical space; the broad definition of learning environment refers to all physical and social environment

relevant to students' learning (Education Encyclopedia Commission, 1994). Hiemstra (1991) analyzed researchers' definitions of learning environment from 1972 to 1990 and proposed that learning environment should include all factors affecting learning results, e.g., the state of emotion/society/culture and psychological and physical environment that encourage learning and development. In this study, learning environment is defined in the narrow sense, i.e., physical environment such as space, facilities, seat arrangement, ventilation and noise.

## 2. Teacher and Teaching

Teacher and teaching refer to students' satisfaction toward teachers' qualification, personality, teaching methods, teaching style, and attitude.

## 3. Course Content and Class Materials

Course content and class materials refer to students' satisfaction toward courses arranged by community colleges and class materials chosen by teachers. We can further discuss if class materials suit students' learning desire and provide any help to their daily lives.

## 4. Administrative Services

Administrative services refer to students' satisfaction toward community college staff's attitude and efficiency, registration procedures, and actions taken in response to their comments.

### *Learning Motivation and Learning Satisfaction*

Lin (2000) indicates that self-driven learning is more beneficial than teachers' direct teaching and it helps individuals to understand their needs. Learning is therefore strengthened and learning satisfaction is increased, too. Consequently, learning motivation and learning satisfaction have significant positive correlation. Abrough (2000) believes that learning satisfaction includes internal feeling and attitude toward learning processes and the level of satisfaction and fulfillment toward students' learning desire caused by their learning motivation. Therefore, learning motivation and learning satisfaction have significant positive correlation.

Huang (2002) thinks that learning satisfaction stems from fulfilling the learning needs caused by learning motivation after students engage in learning activities. Consequently, learning motivation and learning satisfaction have significant correlation. Harvey, Locke and Morey (2002) believe that learning satisfaction is developed because students enjoy engaging in activities designed by courses. During the learning process, learning motivation can be fulfilled and learning needs can be satisfied. Therefore, we can see that learning motivation and learning satisfaction have significant positive correlation. However, different students have different learning desire toward their learning motivation and they focus on different learning items and in turn receive different levels of learning satisfaction. As a result, we can

see that learning motivation and learning satisfaction have significant correlation (Harvey, Locke and Morey, 2002). When Shen (2001) studied seniors' community participation and social support, she indicates that seniors' learning motivation, learning attitude and learning satisfaction have significant positive correlation.

### *Research Hypotheses*

After incorporating the above mentioned perspectives, in this study we propose the following hypotheses:

*H1: learning motivation and “learning environment” of learning satisfaction have significant positive correlation.*

*H2: learning motivation and “teachers and teaching” of learning satisfaction have significant positive correlation.*

*H3: learning motivation and “course content and class materials” of learning satisfaction have significant positive correlation.*

*H4: learning motivation and “administrative services” of learning satisfaction have significant positive correlation.*

In addition, research studying learning motivation and learning satisfaction indicated that younger and older ages more likely lead to high learning satisfaction (Day and Landon, 1997; Zaichowsky and Liefeld, 1997; Bearden and Mason, 1984).

Singh's (1990) study showed that demographic variables barely explain learning satisfaction, except age. In this study we propose additional hypotheses as follows:

*H5: the correlation between learning motivation and learning satisfaction is significantly affected by “sex.”*

*H6: the correlation between learning motivation and learning satisfaction is significantly affected by “age.”*

*H7: the correlation between learning motivation and learning satisfaction is significantly affected by “grade.”*

## Methodology

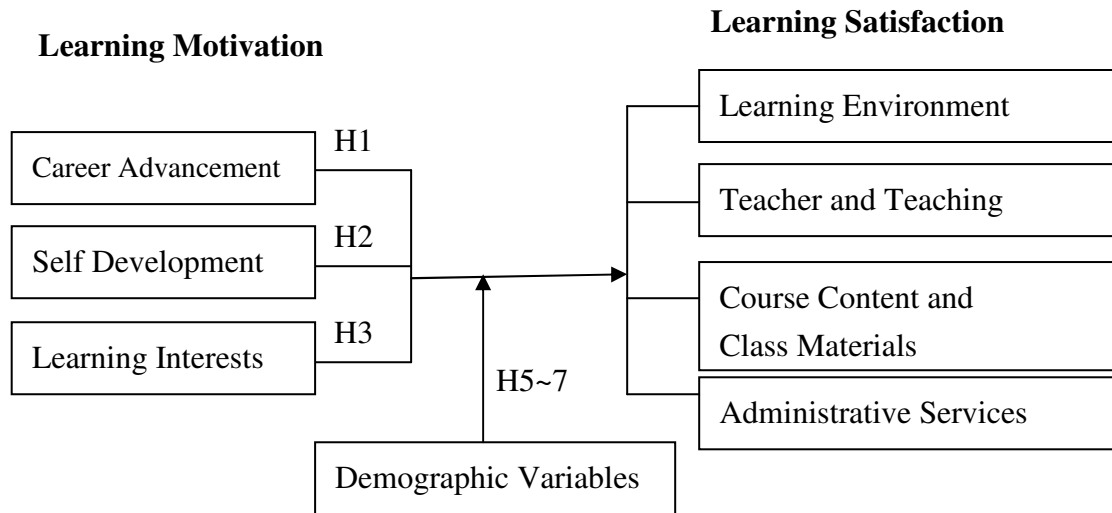
### *Research Settings*

Based on rigorous review of learning motivation and learning satisfaction literature, this research used the following research structure to explore the relationship between learning motivation and learning satisfaction.

### *Subjects*

The study used students studied in National University of Tainan as the study subject. Universities are the foundation and conscience of the society. Although higher education in Taiwan becomes common education along with the rapid economic growth as opposed to elite education in the past, developing specialized research areas and equipping students with humanity, professional expertise, creativity and disciplines in order to bring contribution to the society and humankind are still the primary mission of National University of Tainan. Facing challenges of changes in the society, low birthrate, and international recruitment, one of National University of Tainan’s critical missions is to recruit top faculty and students to increase its competitiveness. This study adopts convenience sampling. Three hundred

questionnaires were sent and, among responses received, 172 are valid. The valid rate of recovery is 57.3%.



### Analysis and Discussion

#### 1. Factor Analysis for Learning Motivation

The learning motivation scale used in this study is developed based on Shih's (2010) categorization and questionnaires. Factor analysis is applied to each of the following group. *Cronbach's Alphas* of career advancement, self development and learning interests are 0.90, 0.88 and 0.92 respectively. Principle Component Analysis is used to analyze the collected data. With the help of Direct Oblimin, 83.091% of the variables are proofed.

Table 1. Factor Analysis for Course Design

Factors	Variable	Eigenvalue	Factor Loading	Total variance (Accumulated Value)	Reliability Coefficient
Factor 1: Career Advancement	04	3.524	0.917	33.463 (33.463)	0.90
	02		0.896		
	03		0.884		
	01		0.875		
	05		0.851		
Factor 2: Self Development	06	2.763	0.903	28.247 (61.710)	0.88
	08		0.876		
	07		0.859		
	09		0.845		
	10		0.833		
Factor 3: Learning Interests	13	2.038	0.891	21.381 (83.091)	0.92
	11		0.886		
	12		0.873		
	14		0.865		
	15		0.814		

2. Correlation Analysis for Learning Motivation and Learning Environment of Learning Satisfaction

Multiple regression is used to test H1 and the results show that self development ( $t = 1.239, p < 0.05$ ) and learning interests ( $t = 1.239, p < 0.05$ ) have significant impact on learning environment. Therefore, H1 is confirmed.

3. Correlation Analysis for Learning Motivation and Teachers and Teaching of Learning Satisfaction

Multiple regression is used to test H2 and the results show that self development ( $t = 1.459, p < 0.05$ ) and learning interests ( $t = 2.069, p < 0.01$ ) have significant impact on teachers and teaching. Therefore, H2 is confirmed.

Table 2. Multiple Regression Analysis for Factors of Learning Motivation and Learning Environment of Learning Satisfaction

Predictor	Unstandardized Coefficient		Standardized Coefficient	t value
	Beta Estimate	Standard Error	Beta Distribution	
Intercept	3.128	0.779	---	6.281
Career Advancement	0.284	0.126	0.261	0.124
Self Development	1.258	0.271	0.354	1.239*
Learning Interests	2.198	0.467	0.618	2.267**

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$

#### 4. Correlation Analysis for Learning Motivation and Course Content and Class Materials of Learning Satisfaction

Multiple regression is used to test H3 and the results show that career advancement ( $t = 1.538$ ,  $p < 0.05$ ), self development ( $t = 2.112$ ,  $p < 0.01$ ) and learning interests ( $t = 2.468$ ,  $p < 0.01$ ) have significant impact on course content and class materials. Therefore, H3 is confirmed.

#### 5. Correlation Analysis for Learning Motivation and Administrative Services of Learning Satisfaction

Multiple regression is used to test H4 and the results show that career development ( $t = 1.652$ ,  $p < 0.05$ ), self development ( $t = 2.236$ ,  $P < 0.01$ ) and learning interests ( $t = 2.615$ ,  $p < 0.01$ ) have significant impact on administrative services. Therefore, H4 is partially confirmed.



Table 3. Multiple Regression Analysis for Factors of Learning Motivation and Teachers and Teaching of Learning Satisfaction

Predictor	Unstandardized Coefficient		Standardized Coefficient	t value
	Beta Estimate	Standard Error	Beta Distribution	
Intercept	3.447	0.671	---	7.156
Career Advancement	0.573	0.138	0.272	0.325
Self Development	1.334	0.307	0.371	1.459*
Learning Interests	1.953	0.432	0.636	2.069**

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$

Table 4. Multiple Regression Analysis for Factors of Learning Motivation, Course Content and Class Materials of Learning Satisfaction

Predictor	Unstandardized Coefficient		Standardized Coefficient	t value
	Beta Estimate	Standard Error	Beta Distribution	
Intercept	2.935	0.834	---	7.618
Career Advancement	1.373	0.351	0.383	1.538*
Self Development	1.986	0.403	0.436	2.112**
Learning Interests	2.388	0.448	0.519	2.468**

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$

## 6. The Impact of Demographic Variables

### (1) The Impact of Sex on the Correlation between Learning Motivation and Learning Satisfaction

After analyzing variables used in the empirical test, the results showed that sex has significant impact on career development ( $p < 0.01$ ), self development ( $p < 0.01$ )

Table 5 Multiple Regression Analysis for Factors of Learning Motivation and Administrative Services of Learning Satisfaction

Predictor	Unstandardized Coefficient		Standardized Coefficient	t value
	Beta Estimate	Standard Error	Beta Distribution	
Intercept	4.260	0.618	---	8.355
Career Development	1.671	0.422	0.407	1.652*
Self Development	2.033	0.503	0.464	2.236**
Learning Interests	2.267	0.591	0.578	2.615**

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$

and learning environment; sex has significant impact on career development ( $p < 0.01$ ), learning interests ( $p < 0.01$ ) and teachers and teaching; sex has significant impact on career development ( $p < 0.05$ ), self development ( $p < 0.01$ ) and course content and class materials; sex has significant impact on career advancement ( $p < 0.01$ ), learning interests ( $p < 0.05$ ) and administrative services. Therefore, H5 is partially confirmed.

## (2) Learning Satisfaction

After analyzing variables used in our empirical test, we found that age has significant impact on self development ( $p < 0.05$ ), learning interests ( $p < 0.05$ ) and

learning environment; age has significant impact on self development ( $p < 0.05$ ),

learning interests ( $p < 0.05$ ) and teachers and teaching; age has significant impact on

Table 6.1 The Impact of Sex on the Correlation between Learning Motivation and Learning Satisfaction

Learning Motivation	Learning Environment	Teachers and Teaching	Course Content and Class Materials	Administrative Services
Career Advancement	$p < 0.01$	$p < 0.01$	$p < 0.05$	$p < 0.01$
Self Development	$p < 0.01$	$p > 0.05$	$p < 0.01$	$p > 0.05$
Learning Interests	$p > 0.05$	$p < 0.01$	$p > 0.05$	$p < 0.05$
Test	H5 is partially confirmed.			

The Impact of Age on the Correlation between Learning Motivation and career development ( $p < 0.01$ ), learning interests ( $p < 0.05$ ) and course content and class materials; age has significant impact on career advancement ( $p < 0.01$ ), self development ( $p < 0.05$ ) and administrative services. Therefore, H6 is partially confirmed.

(3) The Impact of Grade on the Correlation between Learning Motivation and Learning Satisfaction

After analyzing variables used in our empirical test, we found that grade has significant impact on career advancement ( $p < 0.05$ ), learning interests ( $p < 0.01$ ) and

learning environment; grade has significant impact on self development ( $p < 0.01$ ),

learning interests ( $p < 0.05$ ) and teachers and teaching; grade has significant impact

Table 6.2 The impact of Age on the Correlation between Learning Motivation and Learning Satisfaction

Learning Motivation	Learning Environment	Teachers and Teaching	Course Content and Class Materials	Administrative Services
Career Advancement	$p > 0.05$	$p < 0.05$	$p < 0.01$	$p < 0.01$
Self Development	$p < 0.05$	$p < 0.05$	$p > 0.05$	$p < 0.05$
Learning Interests	$p < 0.05$	$p > 0.05$	$p < 0.05$	$p > 0.05$
Test	H6 is partially confirmed.			

Table 6.3 The Impact of Grade on the Correlation between Learning Motivation and Learning Satisfaction

Learning Motivation	Learning Environment	Teachers and Teaching	Course Content and Class Materials	Administrative Services
Career Advancement	$p < 0.05$	$p > 0.05$	$p > 0.05$	$p > 0.05$
Self Development	$p > 0.05$	$p < 0.01$	$p < 0.01$	$p < 0.05$
Learning Interests	$p < 0.01$	$p < 0.05$	$p < 0.05$	$p < 0.01$
Test	H7 is partially confirmed.			

on self development ( $p < 0.01$ ), learning interests ( $p < 0.05$ ) and course content and class materials; grade has significant impact on self development ( $p < 0.05$ ), learning interests ( $p < 0.01$ ) and administrative services. Therefore, H7 is partially confirmed.

### Conclusion and Suggestions

The level of learning motivation directly influences learning satisfaction. To effectively encourage and enhance students' learning motivation, the following initial steps are proposed:

1. Adopt Modern Teaching Styles

In information era, cyber education is rising in an unprecedented manner. An evolutionary change in modern education is that education is now delivered through internet and computers. Cyber education not only satisfies students' need in different environment and situations, but also increases the quality of their learning.

2. Integrate and Optimize Education Resources in a Modern Manner

Along with the adoption of new teaching concept, modernization of teaching methods, and the wider range of education resources, integrating and optimizing education resources in education are not only made feasible, but are necessary actions to be taken. While teachers prepare for their classes, with the help of internet and multimedia, they can extract large amount of teaching related information and materials that can be used in their teaching. Education recourses already residing in

the society should be used and integrated to teachers' teaching based on their need, course content and teaching goals to optimize courses, enhance learning results and fortify students' learning motivation.

### 3. Improve Courses Based on Students' Need and Expectation

Developing education systems on internet becomes more and more prevalent for schools and conducting surveys with online questionnaires become more and more convenient, too, so schools can use online questionnaires to analyze and identify their needs toward teaching requirement, course content and student's expectation to develop courses that can satisfy students' need, increase learning motivation and ultimately increase learning satisfaction.

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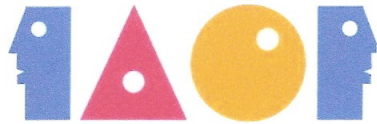
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## ART EDUCATORS' PERCEPTIONS OF FOLK ART IN K-12 ART CURRICULA

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### Abstract

The purpose of the study was to explore the history and background of Folk Art, and to investigate the attitudes and opinions of art educators toward Folk Art. Twenty-seven in-service and nineteen pre-service art teachers participated in the study. The research findings revealed that Folk Art needs to be part of pre-service courses and professional development for art teachers in order to effectively integrate Folk Art into the art curricula. Also, art textbooks and programs that are currently used need to be revised.

Keywords: Folk Art, education, curriculum

### Introduction

In the modern global world, cultural industries and art education are key indicators of national and international status (The NGA Center for Best Practices, 2009). Especially in this information age, exchanges between different cultures and ethnic groups have increased in frequency with the spread of the Internet. As a result

of the globalization trends of the 21st century, how to maintain traditional culture while fostering renewal and how to balance local awareness with a global outlook are important issues facing governments and art educators.

In order to communicate with diverse peoples and cultures, more and more interdisciplinary and multimedia art programs are popping up in university art departments. It is believed that the role of art education is to enlighten students to respect all kinds of art works as well as consider complex social and cultural issues (Kamhi, 2002). Students need to learn how to use critical thinking and how to consider different societal issues. Moreover, teachers must encourage and assist students to engage in general theorizing about real life (Heise, 2010).

Traditionally, academic art historians consider fine art works to be of particular aesthetic value and cultural significance. Folk art or cultural production is an often neglected topic in academic art arenas. In the past, we used the term “folk art” to define art that was naïve and unschooled (Columbia Encyclopedia, 2010). However, within the visual culture paradigm, every kind of art work is looked at equally; all images emerge together and are not limited to one art form (Lauwrens, 2008). This theory has fueled the changing role of folk art in the art field, and it has lead to adopting the view that folk art is cultural production rather than a lower form of artistic expression.

This study aims to investigate the attitudes and opinions of art educators toward Folk Art. It is hoped that the results of this study will help art educators and the public to be aware of the need to emphasize and improve folk art education, which will be beneficial to broaden the students' multicultural point of view and develop their creativity as well as increase their interest in all kinds of art forms.

### *Theories Related to Folk Art Education*

There are several views to support and guide Folk Art education and Fine Art education such as Visual Culture, progressive education, and cultural education. The fundamental standard for teaching art is "to enable students to understand the social and cultural worlds they live in" (Effland & Freedman & Stuhr, 1996, p.73). Sunal and Hatcher (1986) stated that "art illustrates a period in history socially and culturally, helps students link the past with the present, and helps them recognize that cultures use creativity to reflect the society in which they live" (p. 1). All these views support the Folk Arts.

In the term, "Visual Culture" is every visual icon and imagery seen in our culture, and indeed in other cultures that we are exposed to. In addition, it is a concentration on issues arising from the interaction of the viewer and the viewed image. Most importantly, in Visual Culture, no judgment is made regarding the relative merit of the image but rather the effect it has on the culture and the viewer.

Thus, through the lens of Visual Culture, the role of art education is to enlighten students to respect all kinds of art works and to help learners take social and cultural issues into consideration while creating artwork. Visual Culture has fueled the changing role of Folk Art and it has led to adopting the view that Folk Art is a cultural product rather than a lower form of artistic expression. Within the Visual Culture paradigm, every kind of art work is looked at equally. According to the perspective of Visual Culture, Folk Art is no longer considered an abandoned area but is closely associated with Visual Culture.

Progressive education has been used to describe ideas and practices that are designed to make schools more effective. This perspective involves two essential elements as follows: respect for diversity; and the development of critical, socially engaged intelligence (John Dewey Project on Progressive Education, 2002). This theory benefits to promote the application of Folk Art in education.

Moreover, due to globalization and frequent cultural interactions, cultural education is important both economically and educationally. Moreover, it helps to clarify a need for students to understand the world in which they exist. Culture should be viewed as “the people of the culture view themselves” (Cornelius, 1999, p.29). Multicultural education helps to reach the educational needs of students from diverse cultural backgrounds (Garcia, 1982; Grant, 2001; Frazier, 1977). Holding an open

mind for various cultures and heritages is presently an important attitude for art educators. Thus, Folk Art should be a part of art education that supports multicultural education.

## Methods

The design of this study included observation, interviews, a survey, and the collection of artifacts. Interviews included statements and teaching philosophies collected from artists during the interview process. Observations were made in classrooms, in the community, and during interviews. The data were generated from a northwestern state of the United States. Twenty-seven in-service and 19 pre-service art teachers participated in the study. Data were generated from the interviews and explored by asking the two following questions:

What are the critical issues and problems in current folk art education?

What are art educators' experiences on integrating folk art into art education?

In order to increase the credibility of the qualitative data, interview data were transcribed and reviewed by interviewees to ensure the interpretations of collected data were accurate. Finally, data were organized by grouping participants' answers to address the research questions.

## Results

### *Teacher's Ability to Teach Folk Art*

The research data revealed that Folk Art curricula were not appreciated in universities' art education departments. There does not seem to be many opportunities for exploring Folk Art in the educational setting. Two participants complained about the lack of Folk Art programs in the university. One even said the information she received from one college about Folk Art was negative. Then, some participants thought that most teachers and students in the university art departments think Folk Art should not necessarily be taught in the Fine Art curricula. One of the interviewees described her experiences and feelings as follows:

I don't recall ever having learned Folk Art in any formal setting. What experience I have with it has come more in working with crafts. Some information about Folk Art has been taught at the university, but I believe it always seems to have a negative inference. The university does not seem to have an appreciation for "craft" as opposed to "Fine Art". The Folk Art, in that setting, is secondary to the multicultural learning behind it, rather than for the art itself. (W.T.)

Teachers' ability to teach Folk Art is to some degree connected to the curricula that they studied in their university. If there is not a program to teach pre-service teachers about Folk Art, how can we expect Folk Art curricula in the K-12 schools? If pre-service students do not have opportunity to gain knowledge of Folk Art, how can they recognize Folk Art as an important kind of art or be able to teach about it in an educational setting? Where will they get the ideas, the motivation, and

strategies to integrate Folk Art into their art classes if they had not been taught about it during their training?

If there is little opportunity for art teachers to receive educational training in Folk Art, programs will not be developed. Only a few colleges provide Folk Art in art education in graduate studies programs, even though there are many craft classes available at local art supply stores or in the community. Most courses put emphasis on the process of producing Fine Art, not the production, history, and culture of Folk Art. Therefore, most of the art educators did not learn the importance of the methods to teach Folk Art in their art classes. When the participants were asked where they had gone to learn about Folk Art, they gave the following comments:

Not through the University, that I know of, but I have taken private courses in leatherwork, metal-working and calligraphy/illumination.  
(M.E)

I have not taken any specific education courses on making a particular type of Folk Art. (K.J)

#### *Art teachers' experiences of teaching Folk Art*

Some participants have experiences of incorporating Folk Art into their teachings. Two art teachers have taught Folk Art by using various media, foreign art, and Native American art.

[I teach them Folk Art] as often as I can. Other students are usually very impressed and I am excited to do what I love, which is create. I made a wall hanging for a Design II class. I was very successful and



got an A on the project. I incorporated it into the “color” section.  
(G.H.)

[I taught them Folk Art] each semester. As units, I've used fibers and basket-making, clay for sculpting, and handmade paper. Sometimes I have to inform them of what they are seeing. (S.C.)

Some participants combined both Folk Art production in instruction and cultural awareness in their art classes.

There are different styles of painting and bead work. I taught variations of those things in my classes and have guests come in to teach, too. It's a good way to teach about the whole world. (M.S.)

I built an entire quarter-long class around just cultural art. They love all the different projects and seeing where the projects come from.  
(J.B.)

Native American art is a popular Folk Art. Some participants like to include it in their Folk Art because of its particular value and several Native American tribes live in the surrounding area.

I did a lot of Native American arts projects when I taught as an art specialist in elementary school. It was very popular and students learned the history of Native America including the Native American people. I also included lots of Asian art because I had traveled to Japan and China. So I have a personal interest in Asian Art. Those were the two main Folk Art that I included when I taught. (M.S.)

Some participants included Folk Art from other countries to provide students with different cultural experiences and ideas. One participant recognized Folk Art's value and saw it as a foundation for art production techniques.

I try to incorporate art experiences from different cultures, not because they are required through the curriculum, but because they are the best

art-making experiences for many students. The Folk Art is sometimes the basis for many techniques used throughout art production. (B.K.)

[I teach Folk Art] once or twice a semester. We have made masks depicting African and Asian culture. I have also done henna projects and mandalas that deal with Middle Eastern culture. The students always respond positively. (J.B.)

### Discussion and Conclusions

Since the onset of globalization and with there being more frequent cultural exchanges, integrating Folk Art into the educational system could definitely help students broaden their multicultural awareness and reinforce their worldview for life. If we want to raise the role of Folk Art in art education and make it competitive with other subjects, we need to modify our curriculum and foster a change in art teachers' attitudes.

According to John Dewey, the concept of Progressive Education started to become an important idea in the American educational process (John Dewey Project on Progressive Education, 2002, p.1). Progressive Education began to consider the child as the center of focus, with curricula designed to recognize and develop his or her own abilities, interests, ideas, needs, and sense of cultural identity. In addition, the second goal of Progressive Education was to develop the individual child's intelligence and critical thinking abilities as a member of the larger community so that

the person would be better able in the future to make decisions to foster the common good.

Toward the latter part of the 20th century in the United States, with increasing globalization, in terms of international ideas and artifacts (including an enormous intermingling of races, nationalities, and cultural identities) there was a movement toward specific attention being given in the educational system to multicultural education. Multicultural education is now understood to be one of the key elements that contribute to the creation of the cultural industry and clarifies the need for students to be able to understand, in a larger context, the complex world in which they live and where they will grow up to make the decisions influencing the future of all. In addition, multicultural education reaches out to the students who are of a diverse cultural background and allows them to feel included and to feel that they are a viable part of ongoing American cultural tradition.

The understanding of the importance of teaching an awareness of multiculturalism in education has had a direct bearing on art education as well. When, as Delacruz (1995) said, “What multicultural art education teaches is that there is no single universal aesthetic” (p. 59), this has several implications. One is that students and their families should be free to choose whatever cultural images, icons, and

aesthetics from the world's array that they are most comfortable with and secondly, that no particular cultural aesthetic is superior to any other.

According to Visual Culture, all the images and media that we see in our society, and worldwide, are equally important in the broadest sense. In the last few decades of the 20th century, then, it is no surprise that the importance of Visual Culture and Folk Art has become ever more clarified. This is particularly true in the field of art education, where decisions made about appropriate curricula and pedagogy based on political realities, cultural awareness of an area, and the background of the educators are becoming more interwoven and defined. Currently in Idaho, and even across the entire United States, there are a wide variety of opinions regarding the inclusion of Folk Art education using hands-on production of art and art history to help students understand their own cultural heritages, the heritages of other cultures, and to broaden their worldviews and enable them to become capable decision-makers and citizens.

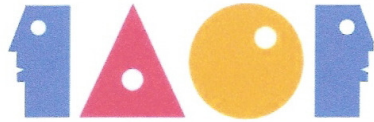
The findings of this study contribute to the understandings of current issues and problems of Folk Art in K-12 art curricula. This study investigated the attitudes and opinions of art educators toward Folk Art, ways that art teachers teach Folk Art and the difficulties that they are presently experiencing teaching Folk Art. Some practical ways to integrate Folk Art in art education have also been described.

From the findings, it was determined that in order to integrate Folk Art into the curriculum, it needs to be included in pre-service courses and professional development for art teacher. Based on the participants' responses, art textbooks and programs that are currently used need to be revised in order to include a much broader spectrum of art activities, including Folk Art. Inclusion of Folk Art could expand the educational base and help students develop wider cultural and world views. In addition, educational programs need to foster more opportunities for teachers to study abroad or to provide more cultural exchange programs with other countries. This would help teachers understand more about the Folk Art in other countries, and thus, its cultural relevancy for providing broader art education for their students.

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## A CASE STUDY ON TRANSNATIONAL E-SUPPLY CHAIN MANAGEMENT FOR A MANUFACTURING INDUSTRY

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### Abstract

The e-supply chain management is an important application of the B2B e-commerce. But extending the e-supply chain to the transnational scalar is not preferable, the transportation, handling and storage costs would decrease profits of the whole chain. Supposed that the manufacturing line was setup overseas, the design detail, intelligence sources, and critical components would be controlled by the core company. It is possible to build the transnational e-supply chain by means of the teleconference and e-mail techniques. (Lee, H. L. 2003)

The e-supply chain must be flexibly constructed near target customers in order to reduce the transportation cost. Once the order is confirmed, the company would carefully formulate the chain. According to the capacitated plant location model, different “layers” of technique information would be sent to every chain members through the internet. Any potential or interested buyers could purchase well-finished products or ideas from the company’s website. A case study operated by Hsieh Hsing Enterprise Organization at its sale point of south-eastern Asia would be discussed. How to manipulate the transnational e-supply chain management would be presented.

Keywords: supply chain management, e-supply chain, transnational

## Introduction

As well known, markets of manufacturing business at the south-eastern Asia and the mainland China areas grow rapidly now-a-day. The Hsieh Hsing Enterprise Organization had built up 6 sale points: 2 at Thailand, 2 at Malaysia, 1 in Indonesia, and 1 in Mainland China, and all of sale networks were fully functional. The business of the company is to export transportation equipments, hydraulic and pneumatic components to these areas, and imports assembling parts of transportation equipments to its manufacturing line at Taiwan. Eventually, the profit is slim, and the market competition is severe. Therefore, how to decrease costs of shipment, handling and storage becomes the main concern of the company. There are two ways to improve the situation: one is to expand product items, and to develop new products. Another is to sale intelligence properties including well-developed and newly designed ones, because the technical level between the Taiwan's and the south-eastern Asia's is not the same. From this point of view, the e-supply chain is no doubt to be the common solution of all of them. (Simchi-Levi, et. al. 2000)

The basic idea is to put all products' detail design, crucial technique, construction procedures, and manufacturing information in the company's server computer. All available products with rough descriptions would be post on its website. Any potential customers and distributors could view the related information from the



website, and give orders by e-mail or phones. Once, the order is confirmed, and the deal contract is signed. The company would activate the nearby supply chain such as sale points, manufacturers, and raw material providers by giving them the necessary working schedules, design sheets, and technical assembling data. Some high-technology parts or customer-built components could be delivered by airmail, and more detail discussions could be held by the teleconference. The company becomes the core to collaborate consulting, manufacturing and managing processes of the supply chain, and the overall profit could be calculated and maximized at the same time, as show in Figure 1.

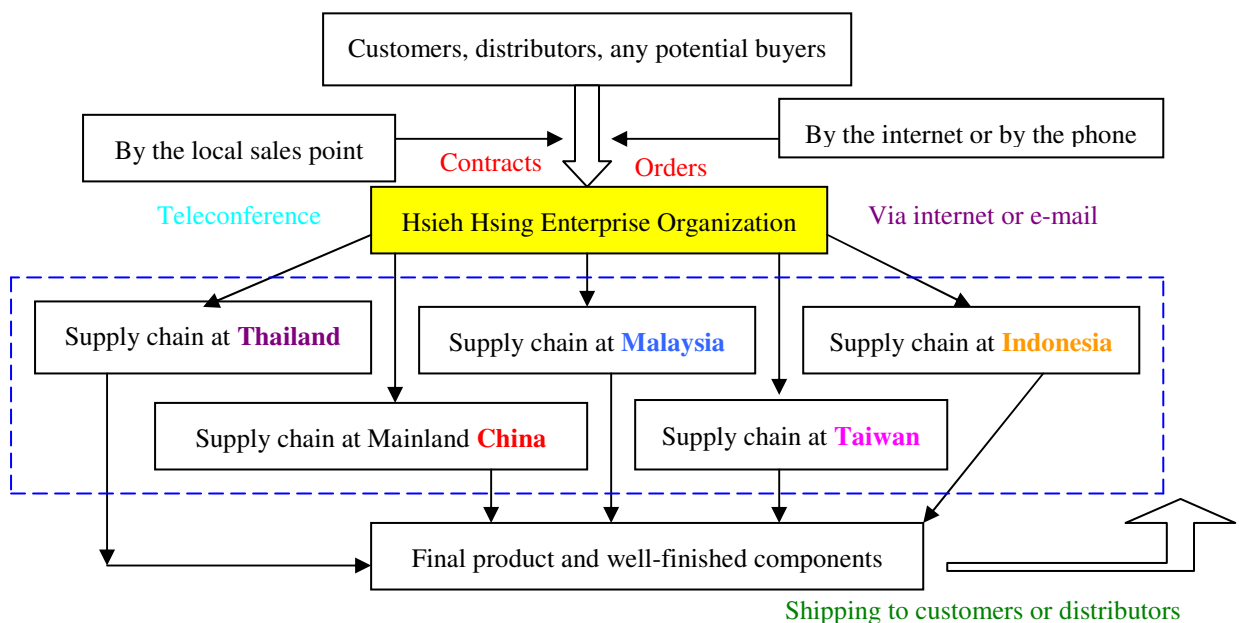


Figure 1. Designing the transnational e-supply chain

## Introduction of the case enterprise

Since established in 1973, Hsieh Hsing Enterprise has been standing on top of the precise mechanical parts manufacturing field. Based on ISO management system, it has been enthusiastically working on producing quality-oriented components of electronic articles. Fully equipped with high-tech Quality Check facility, Hsieh Hsing Enterprise provides the best of best goods of prominent caliber through more than 700 imported Automatic turning machines from Japan and Switzerland. To meet the most intricate and detailed customers' demand, it is also facilitated with the fully comprehensive Second Processing provision to cover most articulate and complicated procedure.

Currently its customers are from all over the world, especially from Japan, Europe, and United States, and most of its products satisfactorily fit into their parts of digital camera, connector, computer parts and electronic high-tech instruments. Along with the world's trend, it believes that the only method to establish the corporate reputation is through improvement in product quality and volume, so as to satisfy customers' demand. It will be adopting flawless system to monitor and control the whole process of production and distribution, and will be building instant and flexible channels of communication and services in the future.

## Design and manipulate the e-supply chain

The core competition ability of the Hsieh Hsing Enterprise Organization is the intelligence property and experiences of manufacturing products. In order to prevent the product or the specially designed technology being duplicated by any potential competitors and individuals, classifications of all the product knowledge to different “layers” is necessary, as shown in Figure 2. (Chung, W., et. al. 2001, Lapide, L. 2001)

The upper layer 1 contains all the production knowledge, ideas and information of products that are controlled by the Hsieh Hsing Enterprise Organization. Customer’s orders are the original motivation of formulating the e-supply chain, and the optimal minimum cost would be calculated by the company along with the chain network design. The flexible sense of the chain results from the mixed combination of transnational suppliers, upstream providers, outsource, and distributors. (Wu, K. H. 2001) Therefore, the capacitated plant location model, the inventory control plan, the procurement policy, and the overall aggregate planning would be selected properly to fulfill the demand of the customer. For examples, the raw material may come from China, and the manufacturing and assembling work could be made at Malaysia. The design and key components are from Taiwan, and the customer may be at Indonesia. The extra-expenditure of shipment and storage must be compensated by the cost down within the chain. The objective of constructing the

flexible e-supply chain is to increase the overall profit. That is to say, give chain members the necessary information and technique to provide the satisfying quality and product to customers, and gain the most benefit of it. Other than the above, the teleconference and the real-time communication through the internet become critical to operate the e-supply chain.

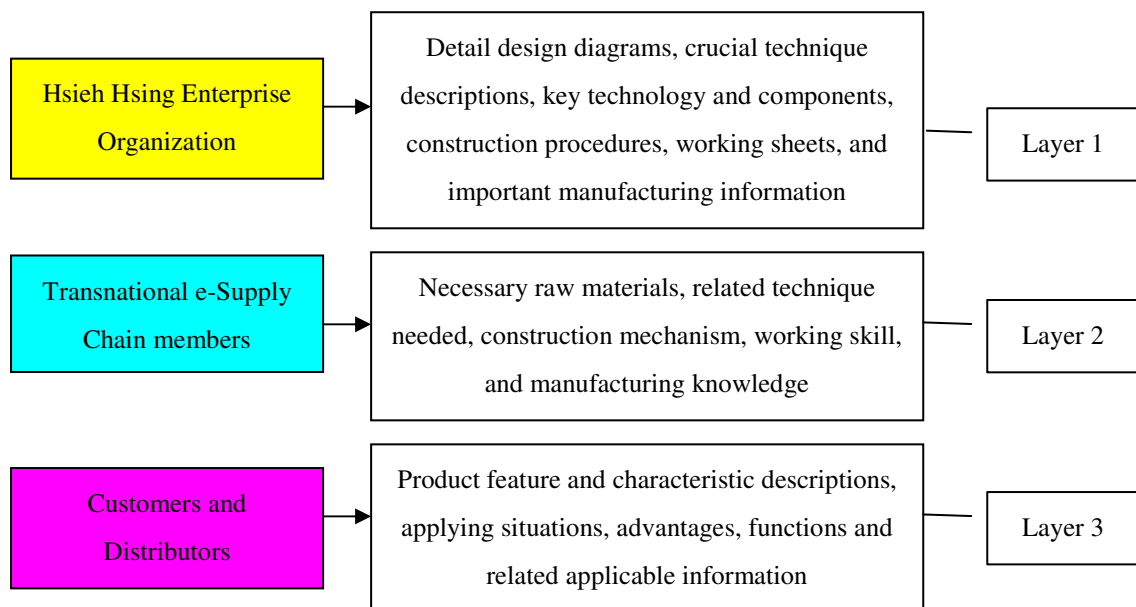


Figure 2. Slicing product knowledge base of the e-supply chain into 3 layers

### Application of the e-supply chain management

A practical application executed by the sale point at Malaysia is the customer from the textile business. (Yeh, K. H. 2001) The textile company with dyeing and finishing facilities uses transportation equipments provided by the Hsieh Hsing Enterprise Organization. Recently, they intend to reduce the number of workers from

5 to 2 at the outlet of each manufacturing lines because it is the critical path of the whole production process. Therefore, the company needs a special designed storage mechanism to maintain the well-dyeing and finishing products with proper tension and straightness automatically, but local manufacturers at Malaysia import expensive and high-technology facilities from Germany and American that is well exceeded the budget that the company could afford. Meanwhile, the Hsieh Hsing Enterprise

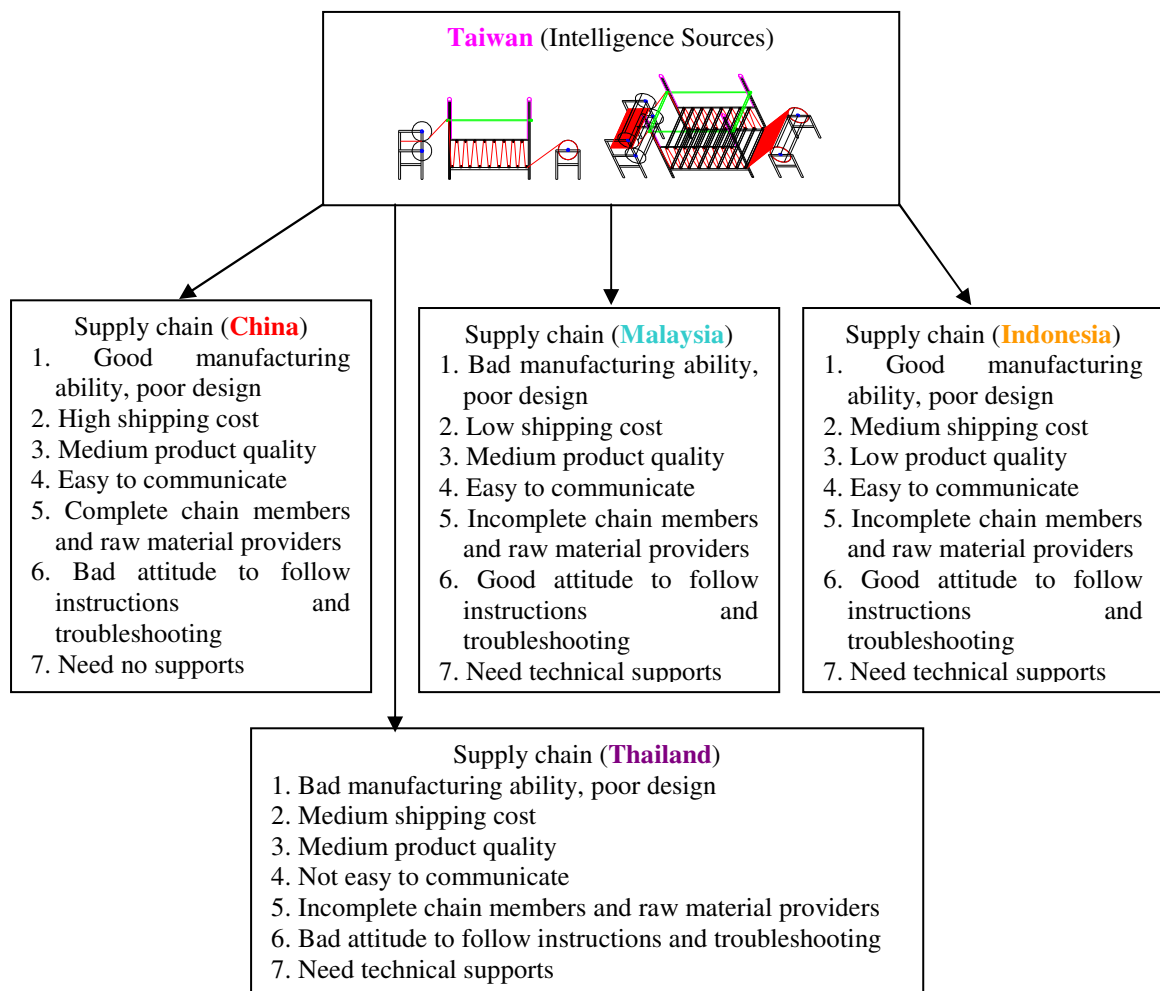


Figure 3. Evaluation of the transnational e-supply chain

Organization could provide the adjustable hanging-weight storage facility to them which is more effective and maintain-free than imported machines, and the price is lower than any importing devices as well. Eventually, the order is preferable for both companies. (Stein, H. 2008, Tu, J. Y. 2008)Once the order from the customer has been confirmed, 4 supply chain networks could be considered that are supply chains at China, Malaysia, Indonesia, and Thailand with their optimal chain designs. Of course, intelligence sources and all related technologies are controlled by the Hsieh Hsing Enterprise Organization at Taiwan. In order to fulfill the customer's satisfaction, there are 7 evaluation factors for each networks should be notified that are the manufacturing ability, the shipping cost, the product quality, the communication ability, the supply chain condition, the attitude, and what kinds of supports are needed, as shown in Figure 3, and every factors imply a certain cost level and the sale price of the final product. (Lee, H. L. 2003)

After the evaluation is completed, the capacitated plant location model, the inventory control plan, the procurement policy, and the overall aggregate planning are calculated and compared to each other in Table 1. In this case, the nearest supply chain at Malaysia could provide the biggest profit for the whole chain system, and the customer's satisfaction could be achieved simultaneously. The Hsieh Hsing Enterprise Organization sold the design detail and manufacturing information to the supply chain

at Malaysia, and a few key components were built at Taiwan. Approximately, costs of design and key components are 40% of the final sale price, and costs of assembling, manufacturing, and handling are 30% of it. The well-established e-supply chain was completely executed with the overall profit near 25% of the sale price. Supposed that the supply chain at China was activated, the manufacturing cost would decrease, but the shipment, storage, and handling costs would increase steeply, and the overall profit would drop down to 15% of the sale price that is not satisfied. All of the considerations were estimated, as shown in Table 2.

Table 1. The cost of every transnational e-supply chains

	The cost of the capacitated plant location model	The cost of inventory control plan	The cost of the procurement policy	The overall aggregate planning
<b>China</b>	Highest		Lowest	
<b>Malaysia</b>	Lowest	Lowest		Lowest
<b>Indonesia</b>				
<b>Thailand</b>		Highest	Highest	

Table 2. Approximate cost distributions of every e-supply chains with the same sale price

	Design and key components	Assembling, manufacturing, and handling	Shipment and storage	Others	The overall profit
<b>Taiwan</b>	32%		8%		
<b>China</b>		20%	20%	5%	15%
<b>Malaysia</b>		25%	3%	2%	25%
<b>Indonesia</b>		28%	9%	3%	20%
<b>Thailand</b>		27%	12%	4%	17%

## Recommendations and Conclusion

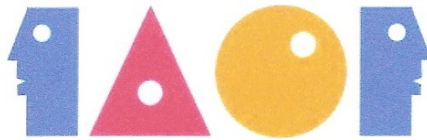
Under the stream of globalization, the final product needs not be manufactured at the same location, and the logistic management becomes the key issue to generate the overall profit. Evaluating the e-supply chain carefully, the Hsieh Hsing Enterprise Organization chooses to control design intelligences and manufacturing experiences as its core competition ability, and leaves the manufacturing line and the assembling work to its associate providers, suppliers, and distributors. Every nodes of the e-supply chain functions properly to fulfill the customer's need as a team commanded by the company, and operates independently on their own business. The customer-driven or order-oriented sense makes the flexible supply chain possible be established by means of the internet technology. This is exactly the practical application of the spirit of the e-supply chain management. Meanwhile, the paper would like to present.

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A STUDY OF THE RELATIONSHIPS BETWEEN SOCIAL CAPITAL  
COGNITION AND TECHNOLOGICAL INNOVATION

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Abstract

Economic globalization has made enterprises confront new challenges to Technological Innovation as well as attracted the academia to the research on networking and organization. With convenient sampling, 360 questionnaires were distributed in Sumiko Electronics Taiwan and 264 valid copies were retrieved, with the retrieval rate 73.33%. The way of SPSS statistical analysis software is used data analysis include factor analysis, relevant analysis and hierarchical regression analysis. Finally, it is hoped that the outcomes of the study can offer suggestions and reference to the corporations that are going to explore the Technological Innovation

Keywords: Technological Innovation, Social Capital Cognition, Strategic Collaboration, Solidarity

Introduction

Since 1980's in the 20<sup>th</sup> century, network and communication technology-oriented Information Technology revolution has led the global economy to the new economy era with information, network, and knowledge that the social economic environment has experienced an enormous change. In the face of the rapid change and

the unpredictable buyer market, enterprises no longer depend on the possession of scarce resources but acquire competitive advantages by continuous learning, knowledge creation, and promoting Technological Innovation capabilities.

Nevertheless, Technological Innovation is considered the process to reform the world with knowledge applications that it would result in complex connections with various dimensions in the society and increase more uncertainty and complexity for Technological Innovation. In this case, enterprises which merely depend on limited internal resources will not be able to satisfy the requirements of various resources for Technological Innovation. With effective utilization of internal and external resources in an enterprise, the original production organization and the resource allocation would be changed that the enterprise would step toward open, cooperative, networking, and dynamic integration.

New Technological Innovation for organizations has been proposed, including enterprise cluster, virtual corporation, and strategic alliance; however, the system to connect Social Capital with Technological Innovation is still insufficient.

Traditionally, research on Social Capital focused on the effects of individuals, such as employees and managers as well as the macro-level of countries and communities (Burt, 1992). Recently, a lot of scholars paid more attention to the effects of Social Capital Cognition on Technological Innovation. Nahapiet & Ghoshal (1998) and Tsai

& Ghoshal (1998) discussed the relations among social structures, enterprise intelligence capitals, and value creation in detail. When the research on Social Capital Cognition was expanded, the research on enterprises was increasing that domestic and international research on enterprise network has been largely emphasized. In order to enhance the level of Technological Innovation, the functions of Social Capital Cognition for enterprises in Taiwan are critical.

#### Literature review

##### *Social Capital Cognition*

Social Capital was clearly defined as an available resource for the actions aid to the social structure. However, it was rather controversial as two points of view were in existence. One regarded the core social structure as the social relationship network from which Social Capital Cognition was the resource and the information advantage brought by the actors. The other considered the meaning of social structures not only including the social relationship network, but some generalized social structures like trust and norms. Social Capital Cognition was a broad concept in social structures which contained many dimensions in the social context, such as social linkage, trust relation, and value system. Social network referred to the sustainable and stable relationship among the people in a social unit (Foss, 1996). Stata (1989) regarded Social Capital Cognition could benefit the cross-sections and

cross-functional teamwork in the enterprise as well as enhance the work efficiency of the team. For this reason, Social Capital Cognition could increase the collective behaviors in the enterprise and the reasonable employment of the enterprise could promote the Social Capital Cognition in the organization (Stock, Greis & Fischer, 2001). Yli-Renko, Autio & Sapienza (2001) found that organizations, as a systematic environment, could benefit the generation of Social Capital and Social Capital Cognition could enhance the formation and the development of the corporate intelligence capital. Grant (1996) mentioned that Social Capital could promote the exchange of internal resources and information in an organization and facilitate innovation. Kalling (2003) divided Social Capital Cognition into Solidarity and Strategic Collaboration from the aspect of Resource-based Theory.

### *Technological Innovation*

“Innovation” was first confirmed as an academic language by Schumpeter, a famous Austrian economist, who regarded innovation as a brand-new combination of production factors and production conditions; such new combination could reduce the cost to yield super-profits or potential profits. He also considered Innovation and Invention as two different concepts and processes that the former was the implementation of new tools and new methods, while the latter was the invention of new tools and new methods. Slater (1995) indicated that innovation contained

solutions which were, for the first time, transformed into science or management processes for social applications in the fixed culture. Innovation was an art, science, or the technology used for creating products or services in the society. Chen (2004) defined innovation as a creative process to plan and implement a new technological system. Besides, necessary functions shall be provided to satisfy customer demands as innovation ultimately aimed to have customers accept and apply it to solving problems.

Maybey & Salaman (1995) classified innovation into 1. Incremental Innovation, which made slight improvements in products, services, or processes, 2. Systematic Innovation, which required more time and cost for specific improvements, and 3. Radical Innovation, which could affect the entire industry or create the innovation of the industry. Simon (1991) indicated that Technological Innovation would affect industrial structures and competitive advantages that technological strategies became the essence of the competition strategy in an enterprise. Moreover, Technological Innovation was considered as a major attack when challenging powerful competitors. The broad applications of technology became the key factors in determining the entire industrial structure and Technological Innovation could also enhance the competitive advantages of certain enterprises that the potential profit of the enterprise could be promoted (Simon, 1991).

### *Correlations between Social Capital Cognition and Technological Innovation*

With the increasing concerns and emphases on Social Capital in the academia and the enhancement of Technological Innovation in industries for competitive advantages, domestic and international researchers have kept studying the success factors in Technological Innovation.

With empirical analyses, Szulanski (2000) found the significantly positive correlations between Social Capital Cognition and Technological Innovation. Roda, Angehrn, Nabeth & Razmerita (2003) indicated that Social Capital Cognition could benefit the share of technology resources among enterprises and accelerate Technological Innovation in enterprises that there were remarkably positive correlations between Social Capital Cognition and Technological Innovation.

Andersen (1999) also pointed out the notably positive correlations between Social Capital Cognition and Technological Innovation. Yli-Renko et al. (2001) believed in the distinguished correlations between Social Capital Cognition and Technological Innovation and considered that Social Capital Cognition could benefit knowledge acquisition and creation as well as affect the international development of emerging manufacturers.

Wang (2003) pointed out the cost of Social Capital Cognition being the maintenance cost and the establishment of social relationship network as well as the

significantly positive correlations between Social Capital Cognition and Technological Innovation. Wang (2005) indicated that the profits of Social Capital Cognition presented on an enterprise acquiring more and better resources, such as physical resources, information, and knowledge, from the cooperation in the social relationship network and the position in the relationship network. In this case, there were notably positive correlations between Social Capital Cognition and Technological Innovation. According to the above literature, the following hypotheses were proposed in this study.

*H1: Solidarity in Social Capital Cognition presented remarkably positive correlations with Technological Innovation.*

*H2: Strategic Collaboration in Social Capital Cognition revealed notably positive correlations with Technological Innovation.*

#### *Demographic Variables*

Research on Social Capital Cognition indicated that people who were younger and had higher educational background and higher income tended to blend into the social relationship structure (Day & Landon, 1977; Zaichowsky & Liefeld, 1977; Bearden & Mason, 1984). Singh (1990) found that demographic variables, except age, did not present any explanations. Chiue (1990) showed no significant relations between demographic variables and Social Capital Cognition. The hypotheses were therefore proposed as below.

*H4: Gender presented outstanding differences on the correlations between Social Capital Cognition and Technological Innovation.*

*H5: Age showed remarkable differences on the correlations between Social Capital Cognition and Technological Innovation.*



*H6: Occupation revealed significant differences on the correlations between Social Capital Cognition and Technological Innovation.*

*H7: Educational background showed notable differences on the correlations between Social Capital Cognition and Technological Innovation.*

*H8: Monthly income appeared distinguished differences on the correlations between Social Capital Cognition and Technological Innovation.*

## Research Methods

### *Research Framework*

The research framework referred to domestic and international research on Social Capital Cognition and Technological Innovation. Technological Innovation was regarded as the dependent variables, while the two dimensions in Social Capital Cognition, including Solidarity and Strategic Collaboration, were the independent variables. This study aimed to discuss the correlations between Social Capital Cognition and Technological Innovation (See Figure 1.).

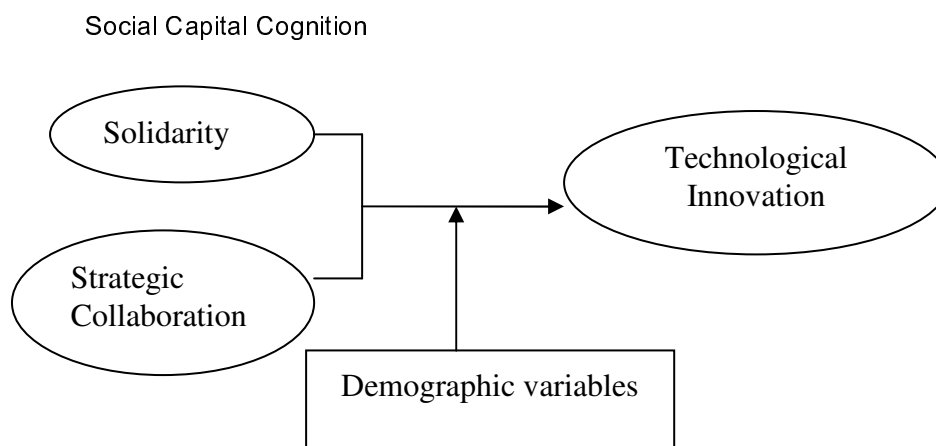


Figure 1. Research Framework

## Research Subjects And Sampling

Sumiko Electronics Taiwan, the third overseas automation factory of Japan SUMITOMO Group, produces lead frames and soft boards. Japan SUMITOMO Group is one of the major suppliers of the lead frames for integrated circuits in the

world that it has established factories in Malaysia, Thailand, Taiwan, Indonesia, Penang, Chengdu, and Shuzhou. With the advanced manufacturing technology, it established the Asia Pacific Regional Operation Center in Singapore in 1997 that the management footholds spread in Asia and aimed to become the most prominent industrial group in Asia. As a result, the staff in Sumiko Electronics Taiwan was selected as the research subjects. With convenient sampling, 360 questionnaires were distributed in Sumiko Electronics Taiwan and 264 valid copies were retrieved, with the retrieval rate 73.33%.

## Analyses and Discussion

### *Factor Analysis of Social Capital Cognition*

According to the dimensions and the questionnaire proposed by Kalling (2003), the Social Capital Cognition scale was proposed. With Factor Analysis, two dimensions were acquired with the Cronbach's  $\alpha$  being 0.86 (Solidarity) and 0.82 (Strategic Collaboration). With Components Factor Analysis and oblique rotation, the results could explain 85.163% variance (See Table 1.).

### *Correlation Analysis of Social Capital Cognition and Technological Innovation*

With Pearson Correlations Test Analysis, the two dimensions in Social Capital Cognition achieved significantly positive correlations ( $p < 0.05$ ) with Technological Innovation, where Solidarity appeared the highest correlations with Technological Innovation.

With Multiple Regression Analysis to test H1 and H2, both Solidarity ( $t=3.064$ ,  $p < 0.01$ ) and Strategic Collaboration ( $t=2.537$ ,  $p < 0.01$ ) showed remarkable effects on Technological Innovation that H1 and H2 were agreed (See Table 2.).

Table 1. Factor Analysis of Social Capital Cognition

Factor	Variable	Eigenvalue	Factor loading	Explained variance (Total)	Reliability coefficient
Solidarity	SC05	3.354	0.846	46.812 (46.812)	0.86
	SC08		0.822		
	SC04		0.802		
	SC01		0.781		
	SC06		0.763		
	SC09		0.737		
	SC02		0.719		
	SC07		0.704		
	SC03		0.692		
Strategic Collaboration	SC12	2.681	0.851	28.351 (85.163)	0.82
	SC13		0.843		
	SC10		0.839		
	SC14		0.824		
	SC11		0.806		
	SC15		0.787		

Table 2. Multiple Regression Analysis of Social Capital Cognition and Technological Innovation

Predicted variable	Unstandardized coefficient		Standardized coefficient	t
	$\beta$ estimate	Standard error	$\beta$ distribution	
Intercept	2.238	0.467	---	9.724
Solidarity	0.815	0.135	0.466	3.064**
Strategic Collaboration	0.573	0.092	0.207	2.537**

Note: \* stands for  $p < 0.05$ , \*\* for  $p < 0.01$ .

#### *Interference Effects Of Demographic Variables*

With Analysis of Variance, gender presented remarkable differences on the relations between Strategic Collaboration ( $F=3.164$ ,  $p < 0.01$ ) and Technological Innovation; age showed notable differences on the relations between Solidarity ( $F=3.846$ ,  $p < 0.01$ ), Strategic Collaboration ( $F=3.164$ ,  $p < 0.01$ ) and Technological

Innovation; occupation appeared outstanding differences on Solidarity ( $F=2.916$ ,  $p<0.05$ ) and Strategic Collaboration ( $F=2.167$ ,  $p<0.01$ ); educational background revealed remarkable differences on Solidarity ( $F=3.061$ ,  $p<0.01$ ) and Strategic Collaboration ( $F=2.834$ ,  $p<0.05$ ); and monthly income displayed distinguished differences on Solidarity ( $F=3.437$ ,  $p<0.01$ ) and Strategic Collaboration ( $F=2.831$ ,  $p<0.01$ ). H3 and H4 were therefore partially agreed and H5, H6, and H7 were agreed.

Table 3. Relations between various demographic variables and Social Capital Cognition, Technological Innovation

Service encounter	Gender	Age	Occupation	Educational background	Monthly income
Solidarity	$p>0.05$	$p<0.01$	$p<0.05$	$p<0.01$	$p<0.01$
Strategic Collaboration	$p<0.01$	$p<0.01$	$p<0.01$	$p<0.05$	$p<0.01$
Hypothesis test	H3 partially agreed	H4 partially agreed	H5 agreed	H6 agreed	H7 agreed

### Conclusions and Suggestions

With the rapid globalization of knowledge and capital flow since 1990's in the 20<sup>th</sup> century, industries are witnessing the transformation of innovative model, the change from Closed Innovation to Open Innovation. The orientation of corporate innovation does not merely appear in enterprises, but combines with the internal and external resources. Besides, both the internal communications and the external cooperation are emphasized. In practice, based on the internal and external integration of knowledge resources, enterprises would increase the knowledge stock from

learning and further obtain enormous Technological Innovation outcomes. The meaning of implementation contains the follows.

*(1) Actively cultivating and developing Social Capital of the enterprise.*

According to the research on the effects of Social Capital and Technological Innovation, countries, enterprises, and individuals in enterprises should actively cultivate and develop Social Capital so as to largely reinforce the autonomous innovation and acquire Technological Innovation outcomes. From the aspects of countries and communities, regulations and policies should be formulated to establish regional economy such as technology parks and industrial communities, to build the hardware constructions like infrastructure, to continuously complete the software systems and norms in the regions, to reduce the transaction cost in the regions, to classify the social interaction conditions, and to well-prepare the foundation work for the core enterprise to undertake the key role in the relationship network. From the viewpoints of enterprises and organizations, definite and major Technological Innovation demands should be confirmed based on the present and the future objectives of the enterprise, develop various objects and forms of social interaction, ensure the position of the enterprise in a cooperative network, selectively develop industrial connections, develop different types and levels of trust with various cooperative objects, and manage distinctive development of common objectives and

reciprocal expectations with cooperative partners. In terms of individuals in enterprises, individual social relationship and Social Capital should be cultivated and developed according to the Technological Innovation objectives and the innovation types and further transformed to the Social Capital of the enterprise in appropriate time and conditions.

(2) *Enterprises should pay attention to the function of organizational learning.*

The source of Technological Innovation knowledge generally comes from internally autonomous research and development and external knowledge. When transforming them to innovation outcomes, organizational learning should be implemented. Domestic industries, particularly the hi-tech enterprises, should pay attention to the dynamic combination of organizations that they should focus on future development and completely utilize and develop new products and services through learning in order to acquire abundance case flow, ensure the present development and constantly cumulate new knowledge and techniques as the broad knowledge background and bases for the next learning. Learning could largely enhance the knowledge stock of an enterprise and reduce specific uncertainties to shorten the differences of positive performance. For this reason, independent research and development or total introduction should be avoided. Instead, it would be the strategic key point for enterprises to establish international competitiveness with autonomous

innovation. With the internal and external resources and the original products and services to cut in the high-value point in the international chain, as well as searching for mature technologies and resources to become the properties of an enterprise, the enterprise could establish the brand and produce innovative products with proprietary intellectual property rights to sustainably acquire the competitive advantages.

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