

# THE INTERNATIONAL JOURNAL OF ORGANIZATIONAL INNOVATION

*VOLUME 5 NUMBER 1 SUMMER 2012*

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INFORMATION REGARDING  
*THE INTERNATIONAL JOURNAL OF ORGANIZATIONAL INNOVATION*

*The International Journal of Organizational Innovation (IJOI)* (ISSN 1943-1813) is an international, blind peer-reviewed journal, published online quarterly. It may be viewed online for free. It contains a wide variety of research, scholarship, educational and practitioner perspectives on organizational innovation-related themes and topics. It aims to provide a global perspective on organizational innovation of benefit to scholars, educators, students, practitioners, policy-makers and consultants.

Submissions are welcome from the members of IAIOI and other associations & all other scholars and practitioners.

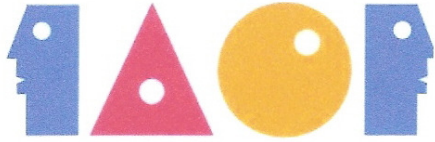
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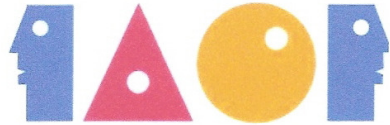
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## CREATIVITY MANAGEMENT TOOLS AND THEIR ORGANIZATIONAL INFLUENCE

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### Abstract

Managing Creativity brings advantages to the organization. Its techniques can enhance ideas and thereby innovate. This study sought to explore 67 creativity techniques and how their use contributed to the smooth progress within organizations. It was concluded that the management of creativity and its tools are essential for organizational development.

Key-words: Creativity, Innovation, Creativity Techniques, Change, Organizations.

*Note: This is an article invited by the International Association of Organizational Innovation, and will also serve as the basis of the Keynote Address at the 2012 International Conference on Organizational Innovation, which will be held July 10-12 in Surabaya/Bali, Indonesia*

### Introduction

Creativity Management is a tool that transforms the working environment into a more productive, dynamic and innovative place, making the workers able to generate ideas which will create an enhanced connection between the developed activities and the achievements.

To enhance Creativity Management, some techniques are useful, to improve its spread inside an organization. With this prospect, and based on affirmations taken from the study developed by Rodrigues (2009), there are 67 different techniques on stimulating creativity, which are the most known, and corroborate to the Creativity Management.

### The 67 Creativity Management Techniques

The Creativity Management Techniques help the elaboration of a propitious environment to productivity and innovation. (Loures E. Schlemm, 2006). That's why creativity must be stimulated. According to Rodrigues (2009), there are 67 most known techniques which bring more understanding and value to this stimulus. These techniques include the following: Among Them: Advantages, Limitations And Unique Qualities Technique, Analogy Technique, Brainstorming Technique, Individual Brainstorming Technique, Imaginary Brainstorming Technique, Brainwriting Technique, Navigation Technique, Weakness Listing Technique, Aleatory Stimulus Technique, Bullet Proof Technique, Banana Bunch Technique, Causal Mapping Technique, Comparison Charts Technique, Fan, Concept Technique, Inconsistency Analysis Technique, CPS Technique – Creative Problem Solving, Critical Path Diagram Technique, DO IT Technique, “Do Nothing” Technique, Drawing Technique, “ Writing An Essay” Technique, Evaluation – Discussion – Evaluation Technique, Fishbone Diagram Technique , 5W1H Technique, Focusing Groups Technique, New View Technique, Heuristics Mediation Technique, Signaling - Marking Technique, Idea Defender Technique, Ideal Final Result Technique, “Imagination When Answering The Questions” Technique, Side Thinking Technique, Mental Mapping Technique, Morphological Analysis Technique, Negative Brainstorming Technique, Notebook Technique, “Other People Definition” Technique, PDCA Technique , Preliminary Questions Technique, “Productive Thinking Model”, Technique,

Progressive Revelation Technique, Challenge Technique , Quality Circles Technique, Aleatory Stimulus Technique , Ideas Receptivity Technique, Relaxing Technique, SDI – Systematized Direct Induction Technique, “Slice And Cut” Technique, Nominal Group Technique, Technological Surveillance Technique, Reflection Groups Technique, Trigger Method Technique , “Using Specialists” Technique, Value Brainstorming Technique, Value Engineering Technique, Visual Brainstorming Technique, Goal Seeking Technique, “Why? Why? Why? Technique”, 7x7 Creativity Technique, Discontinuity Technique, External Opinions Technique, Comparison And Metaphors Technique, Presupposition Inversion Technique, Conscious Intuition Technique, Attributes Listing Technique, PNI Technique, and the Assumptions Questioning Technique. All of these techniques will be explored in this article.

#### 1. Advantages, Limitations And Unique Qualities Technique

This method is to choose an idea or solution and list the largest possible number of advantages. Following this survey, it is necessary to address the disadvantages. Raising the disadvantages, back to the principle of the method, seeking the benefits to filter the original ideas, new or unusual (Isaksen, Dorval E Treffinger, 1994).

#### 2. Analogy Technique

Analogy, according to Mycoted (2009) is to compare something with something else, in other words, to explain a concept in comparison with another, assisting in the process of creativity, creating ideas for the problem found through links between the problem and its analogies.

Analogies have been used for a long time as tools in the process of building concepts (Harrison & Treagust, 1993), opening new horizons and ways to focus this problem by the challenge of this analogical reasoning that according to many researchers is an important component of human cognition (Dagher, 1995).



### 3. Brainstorming Technique

The brainstorming technique seeks to leverage the creative thinking through a team work in an environment free of criticism. Also called a brain storm, brainstorming becomes the critical thinking in creativity. It focuses from a given problem, where team members should suggest possible ideas for their solution through the free expression of all. And among these ideas, the probability of finding a solution to the problem increases (Gomes, 2006).

### 4. Individual Brainstorming Technique

Individual Brainstorming is a technique that uses the same fundamentals of traditional brainstorming, however in a solitary basis, and often the result is much more significant. (Rodrigues, 2009).

### 5. Imaginary Brainstorming Technique

This technique follows the same basics of traditional brainstorming, but before starting it clearly defines who will be the subject who will face the problem, the verb and the object or action required to be served. Soon, a new formula-problem (imaginary) using the elements defined above and then replaces the solution of this problem with the problem with reality. The analysis of the ideas is made through the results found for the real problem and the imaginary one. (Mycoted, 2009).

### 6. Brainwriting Technique

It follows the Brainstorming features, although in an individual view, in which ideas are exposed in a sheet of paper, making possible the participation of shy people. The problem is exposed, and the people involved write their ideas in approximately five minutes, soon after they give the sheet to other members of the team, which continues to write within five minutes each, too. To finish, the participants discuss the ideas together. (Reis, 2008).

## 7. Navigation Technique

The Idea of navigation is exposed by using a library, when searching specific information, aleatory information, or just when looking for inspiration. In other words, through content selection, the creative stimulus is reached. (Mycoted, 2009).

## 8. Weakness Listing Technique

This technique consists in creating a list of known things in which the flaw is seen, the listing is performed in a humorous way and seeks to open the mind to allow the “mind flowing”, and new ideas. (Mycoted, 2009).

## 9. Aleatory Stimulus Technique

The creative thought is an example of this aleatory stimulus, which formally consists in identify the idea criteria, to choose an aleatory stimulus through facts or objects which facilitate the creative thinking and critical analysis. For example, breaking the routine and comparing the aleatory stimulus with the idea and if the chosen stimulus fails, search for another, but always looking for the amplification of the idea. (Mycoted, 2009).

## 10. Bullet Proof Technique

This technique consists in identify possible areas in which the ideas and objective might fail, classifying them in high probable, little probable, bigger problem and minor problem, according to the possibility of its occurrence (Mycoted, 2009).

## 11. Banana Bunch Technique

This technique consists in taking into consideration the good mood inside the involved atmosphere, avoiding stagnation or inertia. The mood, through a joke or an image that catches the attention, used to treat a specific problem, is called the “banana bunch”, and must be used to allow new ideas. (Mycoted, 2009).

#### 12. Causal Mapping Technique

According to Rodrigues (2009, p. 50) “Causal mapping (also known as cognitive mapping) helps you to create a complex or messed data structure”. These data will be used as a kind of map.

#### 13. Comparison Charts technique

In this technique a chart is formed, containing certain opinions and/or actions to be performed, and among these actions some options are drawn. For each option a point is attributed, and a score, consisting from score 1 to 5. After the (pesos) definition and scores of each option, it's possible to observe the one with the best results. (Mycoted, 2009).

#### 14. Fan Concept Technique

According to Rodrigues (2009, p. 52), for this technique initially, the concept of the fan demands that you draw a circle in the middle of a great piece of paper. Write in the circle the problem you are trying to solve. To the right, some lines represent the possible solutions for the problem.

#### 15. Inconsistency Analysis Technique

This technique consists in the searching of established contradictions for a determined action, possible innovative solutions, Rodrigues (2009, p. 54) recommends the need to keep: “a list of inherent contradictions of these problems, which you could solve in a daily basis. Add to the list the new contradictions you may find and try to identify the interaction among them. If you could find a way to remove or reduce multiple contradictions at once, then you will have a higher probability to identify an executable solution.

#### 16. CPS Technique – Creative Problem Solving

According to Rodrigues (2009, p. 55): “The method can be used as a program aimed to form and has a vast historic, linked particularly to the Creativity Studies Center, from the State College in Buffalo, New York, the “Buffalo Creative problem solving Group”, and with the Creative

Learning Center in Sarasota, Florida.” This technique consists in find the main aspects, gather information concerning the problem, find an adequate idea and make considerations, finding the solution and identifying the necessary steps to activate it. (Rodrigues, 2009).

#### 17. Critical Path Diagram Technique

The objective of this technique, according to Rodrigues (2009, p. 58) is to:

“Allow to recognize, establish which activities on the “critical path” – in other words, those for which any misfortune or surprise will affect the global time for the project. This will help you to manage the handling of the tasks and to perform them on the global goals fixed dates.

#### 18. DO IT Technique

The name of this technique works as an acronym: D: Determine the problem, O – Open the mind and apply creative ideas, I – Identify the best solution, T – Transform. (Rodrigues, 2009) .

#### 19. “Do Nothing” Technique

This technique consists in determine which results might appear if nothing is done, concerning a given problem (Rodrigues, 2009).

#### 20. Drawing Technique

This technique is to draw some lines in a piece of paper, or articulate in the paper a thought, to draw possible solutions for a given problem, highlight in color, forms, to get a better view of the ideas and creativity. (Reis, 2008).

#### 21. “ Writing an essay” technique

It consists in writing a text in a piece of paper articulating the possible solutions for a given problem, helping the expansion of ideas and creativity (Rodrigues, 2009).

22. Evaluation – Discussion – Evaluation Technique

This method starts from the idea that a group of people evaluate a given situation individually, afterwards, a discussion is performed concerning the theme, aiming to create a basis to a new individual evaluation, and the ideas are approved according to the (pre-supposed) of the most part of the group. (Mycoted, 2009).

23. Fishbone Diagram Technique

Also called Ishikawa Diagram, it is represented by a graphic on a fishbone style, with an arrow on the horizontal and many arrows on 45 degrees, and in each arrow there is a portrayal of a possible problem indicated by the company, in a way to indicate the key cause that leads to the problem (Rodrigues, 2009).

24. 5W1H Technique

This is an acronym to: “What” “Where” “When” “How” “Why” “Who” To each of these words following its meanings is directed the objective and planning for its execution (Rodrigues, 2009).

25. Focusing Groups Technique. Rodrigues (2009, p. 66) writes that: “This is a technique similar to the “Using specialists” in which “specialists” are used to provide ideas and suggestions for a political group, or similar organism.

26. New View Technique

This technique consists in pervade the events of an organization to another person, external to it, which has no direct connection or knowledge on its operation. From theses suggestions and recommendations, new changing possibilities are opened (Rodrigues, 2009).

#### 27. Heuristics Mediation Technique

This technique aims to find attributes for a determined product, service or activity in the company. It organizes the possible alterations that may be interesting and contributes for the creativity. According to Rodrigues (2009, p.69) this technique has the following golden rules:

- New ideas are generally combinations from elements of previous ideas;
- The core of several ideas for new products may be frequently picked up from the combination of two elements;
- The combination of different elements (“chalk/cheese”) works better than similar items (“chalk/limestone”).

#### 28. Signaling - Marking Technique

It's a simple technique that seeks to point out the best ideas and put them into discussion. This way, one intends to extract positive points that contribute to the improvement (Rodrigues, 2009).

#### 29. Idea Defender Technique

This technique seeks to offer continuous support and defend the presented ideas, in a way that each one of the ideas can be minutely explained and defended so that it can be understood and managed (Rodrigues, 2009).

#### 30. Ideal Final Result Technique

Seeks to describe, in a proper way, the solution for a problem. This step becomes important for the person's psychological effect, generating motivation for the execution of activities (Rodrigues, 2009).

#### 31. “Imagination when answering the questions” technique

Rodrigues (2009, p. 72) describes that: “This technique is based in its own intuition, similar to praying or meditation. “And also describes the guide as follows:

"Imagine yourself on the seaside.

..First [Pause]: There is a small boat getting closer. Get in the boat and make yourself comfortable. Let the boat flow. Listen the noise in the water. Feel the movements of the fresh and calm air while you slowly and quietly float.

..Second [Pause]: The brightness diminishes and you notice you entered inside an underground canal. There is a great space for you and your bow. The more you get inwards the canal the darker it becomes, and the water movement is continuous. You float smoothly and without problems.

..Third [Pause]: You see a light getting closer. Your boat flows toward the light. It becomes brighter and brighter, and then the sun rises, in a smooth and beautiful movement. After sometime, the boat stops. Get off the boat and go to the grass. Look around you. Keep quiet.

..Fourth [Pause]: Someone or something will bring a gift which has a meaning for you – maybe a message, an object, an image... Wait the gift to get closer.. It might make no sense... Don't worry. Trust. Whatever it takes to get to you.

..Fifth [Pause]: Once you have received the gift, get out and come back to the boat. You notice it has an engine, and then you turn it on and can navigate very fast.

..Sixth [Pause]: Soon, you find yourself in the place you have started your journey. Get off the boat. You are back again in safe land, taking your gift with you."

### 32. Side Thinking Technique

It translates the idea from the statement: “One must dig wells in different places instead of digging always deeper to find the objective. It means that one should always look for new alternatives for the solution of a given problem (Rodrigues, 2009).

### 33. Mental Mapping Technique

Mental Mapping is to interconnect actions and/or concepts onto a general theme, creating branches and so, through these interconnected concepts, new possibilities for creativity are generated. It is possible to use different colors, forms, pictures, graphics, in other words, everything that have a resemblance to the central theme, in a way to oversee its branches and so make the creativity flows (Rodrigues, 2009).

### 34. Morphological Analysis Technique

The Morphological Analysis seeks to create possible combinations for some fact or product, in a way to engender several other interconnected elements. Once the new combinations are performed, it is possible to choose the one which best supply the needs (Rodrigues, 2009).

### 35. Negative Brainstorming Technique

Negative Brainstorming applies the same techniques from Standard Brainstorming, although answering the question: What could go wrong in this project? It is important that the question be directed in a positive form, adding value to the project (Rodrigues, 2009).

### 36. Notebook Technique

It is defined by the criterion to keep always a notebook for writing down ideas, in daily life, in seminars or events that may generate new ideas, so after the exposition of those ideas the minds are open and new ways are made possible (Rodrigues, 2009).



### 37. “Other People Definition” Technique

This technique consists in searching several point-of-views to a given problem, in which people will work as a kind of consultants, listing their point-of-view, from the problem analysis.

(Mycoted, 2009).

### 38. PDCA technique

In the words of Rodrigues (2009, p.82), PDCA can be synthesizing as: The PDCA cycle, or “Deming Cycle”, as it is frequently called, consists in four phases: Plan, Do, Check and Act.

- Plan: Find the problem origin, and then plan a change or testing focused on improving.
- Do: Do the changing or testing, preferably in a pilot or small scale.
- Check: Check if the desired result has been achieved, if there is any mistake, and what has been learned.
- Act: Embrace the changes if the desired result has been achieved. If the result isn't the hoped, repeat the cycle using the knowledge obtained from the previous cycle.

### 39. Preliminary Questions Technique

It is described as the selective usage of the “5W2H Technique, seeking to amplify the question field to each questioned field, extracting deeper the problem's roots (Rodrigues, 2009).

### 40. “Productive Thinking Model” Technique

Most used in group activities or conferences, comprises 6 phases: the first sets the problem's context, the second sets a vision from the future with the problem solved, the third is to choose for a question that reflects on the problem, the fourth seeks to generate solutions for the problem from the given question, the fifth is to build the answers taking the positive and negative points, the sixth and last one seeks to organize these answers and focuses on the solution for the problem (Rodrigues, 2009).

#### 41. Progressive Revelation Technique

This technique is to expose the problem in a theoretical form, abstract and generalized, and one should expect for the proposed solutions. The proceeding is repeated and in each repetition one more problem detail is added, until it is completely revealed. (Rodrigues, 2009).

#### 42. Challenge Technique

The challenge technique seeks to challenge colleagues from the group before their ideas or assumed attitudes, so to induce the questioning and necessary changing. For this technique to obtain success, it is important that all the participants understood the importance of this technique and do not feel frustrated before the challenge made (Mycoted, 2009).

#### 43. Quality Circles Technique

This technique is to organize regular and short briefings, which focus on the problem itself, and aims for a solution from the problems exposition (Rodrigues, 2009).

#### 44. Aleatory Stimulus Technique

First step for aleatory stimulus technique is to focus on the problem and choose an aleatory stimulus. If this stimulus fails. Choosing another one and resume the process (Rodrigues, 2009).

#### 45. Ideas Receptivity Technique

This technique consists in give value to all ideas shown by the group, one of the steps is to paraphrase the newly-created statement or idea and repeat it to yourself. Then the idea pros and cons come, and finally the final formulation of the idea (Rodrigues, 2009).

#### 46. Relaxing Technique

The Relaxing Technique seeks to find a quiet and calm place to relax, so this way it is possible to let the ideas flow (Rodrigues, 2009).

#### 47. SDI – Systematized Direct Induction Technique

According to Rodrigues (2009, p.92) the SDI technique “is a useful method to oppose the “personal questionings”. The Workshops must involve from 4 to 100 people. These people are organized using equips from the same or different departments.” In the workshops, Rodrigues (2009, p.92 e 93) describes the following steps:

1. Preliminary introductions, to provide incentive, the interdepartmental mix and the combinations among supervisors and employees, all the ones in the unit, are encouraged to sit around small tables in a group of four. The problem to be studied is described and exhibited and it is assured to the participants that all the suggestions made are kept anonymous.
2. Do the exercise, a piece of paper in a specific color (yellow, for example) is given to all the participants. They are invited to “identify their main problem in the daily work routine”, write this down in the colored paper, which will be gathered then.
3. Identify and discuss the key problems: other papers in different color are given (red, for example), with “how to do it” in the upper part. Each one must now complete the sentence “how to do it” with what they think the company does which forbids the workshop to solve its main problems. Each table has a quick session from 5 – 10 minutes to discuss the ideas.
4. Identify from 1 to 4 more problems: Each participant completes four more pieces of red paper, completing the sentence “how to do it” four more times.
5. Create a ranking for the Five Problems: Each participant now classify their five problems in pink paper, marking the most important with the number 1 and the less important with number 5.
6. Interlude: Pause for breakfast/lunch, and during the interlude, more pieces of paper is placed on the tables with different colors (green, for example).

7. Solutions Generation and Discussion Cycle: after the interlude, each participant chooses his/her piece of pink paper addressed with the “problem number 1”, and writes down a solution for it in the green piece of paper. Each table runs a quick session to discuss the solutions. This process is repeated with all the pink papers combined with the green ones.

8. The workshop ends, each participant gathers his/her problems with the pink paper and the solutions with the green papers in a group and finishes the workshop.

9. Further analysis: each group is gathered and examined, with the purpose to perform a management report. If the workshop is too big, a small equip can be called to make the analysis. To embody both the company’s equip and external consultants probably will affect the final relevance and acceptability of any “alterations” that may be implemented as a result.

#### 48. “Slice and Cut” Technique

This technique requests the listing of attributes referred to a determined problem. After listing the problems, the important points are mixed and they provide a deeper knowledge of the problem in a way to focus the best solution (Rodrigues, 2009).

#### 49. Nominal Group Technique

This technique seeks to reduce the list of attributes generated after the application of the Brainstorming. The group will elect the best ideas attributing scores to each one (Rodrigues, 2009).

#### 50. Technological Surveillance Technique

Consists in a methodical attendance on the technological process, from all the performed procedure, because based on this knowledge and notes new ideas are born (Rodrigues, 2009).

#### 51. Reflection Groups Technique

This technique can be described in the words of Rodrigues (2009, p.96)

“Reflection Groups” is essentially, a body of specialists and academics collaborating for a common purpose. A variety of alternative ideas, orientations and complementary information are suggested by the reflection groups which will aid in the achievement of a possible solution for a given problem.

#### 52. Trigger Method Technique

It is a technique based on the repetition and the principle that an Idea generates another idea.

This way, the repetition of the Best ideas is sought more than stimulating new ones (Rodrigues, 2009).

#### 53. “Using Specialists” Technique

This technique is focused on sessions with specialists or through specialized studies, seeking the solution for the problems (Rodrigues, 2009).

#### 54. Value Brainstorming Technique

This technique focuses on the generation of short ideas and the values attributed to them. The characteristics are similar to the traditional Brainstorming, though focused more on value (Rodrigues, 2009).

#### 55. Value Engineering Technique

This technique seeks to create results from efforts and economically viable means. It consists on identifying the basic, the secondary and the support function, of a determined object. The cost of each function is calculated, as well as ways to perform it in a more economic way, helping to break the panorama and changing perception (Rodrigues, 2009).

56. Visual Brainstorming Technique

It comes from the idea generation phase, evaluation of ideas and comparison phase, helping the generation of new thoughts (Rodrigues, 2009).

57. Goal Seeking Technique

This technique starting point is to focus in a goal and remember it daily, forcing the positive and encouraging thoughts. When the goal is achieved, it is important to visualize its personal importance to reach this goal and also for the next (Rodrigues, 2009).

58. “Why? Why? Why? Technique”

The questions generates many answers, and this technique requests na interconnection from the questions to the answers, resulting in fortunate results from the analysis. The questions are eliminated when the problem is extinguished (Rodrigues, 2009).

59. 7x7 Creativity Technique

This technique has no determined structure. It starts with a bunch of ideas in a piece of paper and can be used with a Brainstorming or Brainwriting (Reis, 2009). Rodrigues (2009, p. 101) cites the following steps for this technique:

1st phase – Combing the similar ideas;

2nd phase – Delete the ideas considered useless or difficult to put in use;

3rd phase – Change the ideas, making the combinations between them;

4th phase – Set aside the non-adequate ideas in the moment, even if they are relevant for the problem solution;

5th phase – Reconsider the already ordered ideas, with the objective to verify the generation of new ones.

6th phase – Separate the ideas in seven groups, based on its resemblances or relations;

7th phase – Organize the main ideas, in a decreasing order of utility or importance, placing them in seven lines of a matrix;

8th phase – Give a simple to each one of the seven columns, reflecting the main idea;

9th phase – Order the columns, placing the most important or most urgent on the left.

#### 60. Discontinuity Technique

The discontinuity technique seeks to change routine on which the human mind is used to, so to visualize a determined question with different focus, encouraging creativity. (Reis, 2009).

#### 61. External Opinions Technique

This technique is focused on the importance of the opinion of people strange to the problem, who sometimes have a clearer vision on it (Reis, 2009).

#### 62. Comparison and Metaphors Technique

Through the problem, this technique seeks to compare it or create metaphors so to understand new ideas. (Reis, 2009).

#### 63. Presupposition Inversion Technique

This technique seeks to have an inverted vision from the expected presuppositions, for example, when asking yourself, what would happen if a given service didn't show the expected quality.

So, it is aimed to encounter new points of view for the problems. (Reis, 2009).

#### 64. Conscious Intuition Technique

This technique suggests that the human sub-consciousness, which is much creative, acting by intuition, be influenced by de-concentration. (Reis, 2009). Esta técnica sugere que o subconsciente humano que é muito criativo e que age por intuição seja influenciado através da descontração (Reis, 2009).

#### 65. Attributes Listing Technique

This technique seeks to list some attributes for a determined product or action, which in many cases are not visualized. (SIQUEIRA, 2009).

#### 66. PNI Technique

The initials which give this technique its name are referred to the words: positive, negative and interesting. It is used after a Brainstorming and each generated idea must be classified into one of these words: positive, for the Best ideas, negative for the ones which are considered inefficient and interesting for the ones that, besides having not yet served immediately for the team, can still be used later (Rodrigues, 2009).

#### 67. Assumptions Questioning Technique

Through this technique, its focused the need to question the usual and real assumptions, which until that moment were not modified. These assumptions are often the obstacles for the change. (Siqueira, 2009).

### Final Considerations

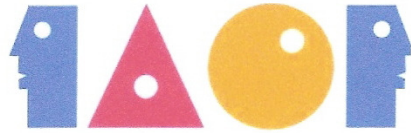
Creativity Management has become a relevant issue within the organizations, given its importance in generating ideas which contribute for the growth and optimization within organizations, and it may be implemented with the aid of the different creativity techniques.



The Creativity Management Techniques are tools which allow the organizations to make changes, ideas and innovation. Among the Creativity Management techniques cited, it is one the responsibility to choose the one that better suits its needs or has a better adaptability.

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## CREATIVITY, INNOVATION AND COLLABORATIVE ORGANIZATIONS

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### Abstract

This article intends to make a contribution to the clarification of the concepts of creativity and innovation using a multilevel approach of individual, group and organization, in order to show that these may be better integrated within collaborative organizations. Trying to maintain the principle of the primacy of the individual (creativity) over the business (innovation), we stressed the cognitive and emotional processes (when speaking of creativity) and power and communication (when it comes to innovation). Following on a description of group processes that try to combine creativity and innovation, we address the measurement of innovation, concluding with the need to avoid classifying an organization as innovative or non-innovative. The latter judgment should be left to the market itself. At the organizational level, we gave primacy to the concept of "organizational innovation", as it is within this framework that the best fusion between creativity and innovation may be achieved. Finally, we address collaboration in business as connecting people, ideas, and resources that would not normally interact with each other. These decentralized organizations operate in such a way that makes it possible to abolish or, at least mitigate, the role of power. We believe that this will ultimately define the future of

successful organizations.

Keywords: Creativity; Innovation; Organizational Creativity; Organizational Innovation, Creative Problem Solving; Innovation Measurement; Collaborative Organizations

## Introduction

The terms creativity and innovation are often used interchangeably in the academic literature, apparently because researchers in creativity and in innovation come from different backgrounds and fail to make the necessary convergence. The field of creativity is closer to the behavioural sciences (like psychology and education) while researchers in the field of innovation come from areas related to management, economics, public administration or political science. Therefore, depending on the origins, both terms have been used with similar or different meanings, often contradicting each other. Acknowledging that this is a normal phenomenon in the scientific literature, this research intends to make some contribution to the clarification of these concepts. We will show that only at the individual level is it fairly simple to separate creativity from innovation.

This research will focus on innovation at an organizational level where we discuss what is meant by *organizational innovation* (as a synonym for *organizational creativity*). Specifically the emphasis is on, firstly, the collaboration as a means towards innovation in organizations and, secondly, on the development of organizational structures and dynamics which may foster the individual's potential and the company's profitability (see cases presented). We conclude by trying to make sense of a rather transcendent subject - the measurement of innovation.

## Creativity and Innovation at the Individual Level

As Woodman & Schoenfeld (1990) recall, the term *creativity* can be seen either as a social concept, expressed by people's implicit theories, or as a theoretical construct, developed by researchers in the field. Considering the theoretical definitions, and after carefully analysing the propositions evidenced by Kasof (1995), it is possible to conclude that the construct of creativity was (and still is) used in the scientific literature to designate something perceived by others. Stein (1953) maintains that, *creativity is a process that results in novelty which is accepted as useful, tenable, or satisfying by a significant group of others at some point in time*. Amabile (1983) states that, *"a product or response is creative to the extent that appropriate observers independently agree it is creative. ...and it can also be regarded as the process by which something so judged is produced."* These examples illustrate what may be designated as *hetero-attributed creativity*, something pertaining to the *communication process*.

Envisaged as a sort of *persuasive communication*, in which the creator is the source, the original product is the message, and the judge or audience is the recipient (Kasof, 1999; Csikszentmihalyi, 1999). Therefore creativity enters the broad domain of exceptional personal influence (Sawyer, 1998; Simonton, 1995), the social processes of the making of a reputation (Ludwig, 1995), or the processes underlying the capacity to shift roles, in which the creator develops a dialogue with his or her work, anticipating the audience's reaction (Stein, 1993). As the product of that communication process, creativity appears connected to what is perceived as new by someone other than its originator, or as the *putting to use of an idea* (Kanter, 1983; West & Farr, 1990), in the domains of production, adoption, implementation, diffusion, or commercialisation of creations (Rogers, 1983; Spence, 1994). In these cases, creativity is seen as *innovation*.

Baer (1997) and Runco (1998) also see creativity as a *self-attributed* construct. Baer considers creativity to be *anything that someone does in a way that is original to the creator and that is appropriate to the purpose or goal of the creator*. To a certain extent, it is like getting back to Galton's *intention and effort*, and in the way the individual perceives reality and develops his or her individuality. Within this view, creativity may be seen as *growth*, or development, as in Otto Rank's conception, described by Menaker (1996), of the human will as a central cause of action and creation. To Otto Rank, *each individual is unique and carries within him or her the potentiality of creating something new, different and unexpected out of past experience (via the human capacity to internalise experiences of the outer environment and making it a part of the self)*.

Recognising creativity as a self-attributed concept, used by people to describe their acts at any moment is, in a sense, using implicit theories of creativity. It lies in how each individual organises and incorporates the perception of reality in his or her own self. Striving for mastery and perfection, the expression of one's own individuality and sharing with others, become essential parts of the core construct of creativity, which may, then, encompass a wider array of activities, products, processes and performances.

Creativity seems then to acquire its full meaning as a process of communication between the creator (or the product) and the judges or audience (hetero-attributed), or between the creator and the product (self-attributed). Innovation seems to be more appropriate to designate the resulting attribution made by the audience a propos the product, as depicted in Figure 1.

As a consequence, hetero-attributed creativity can only be measured through socio-cultural judgements, and is therefore context-dependent. Quoting Csikszentmihalyi (1991), '*creativity is located in neither the creator nor the creative product but rather in the interaction*

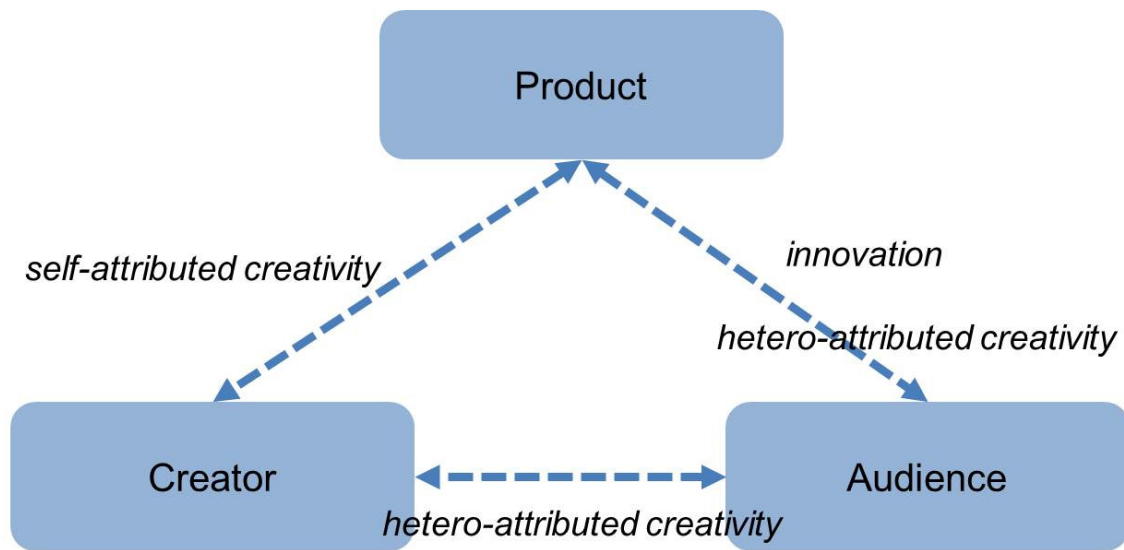


Figure 1. Creativity as a construct

between the creator and the field's gatekeeper who selectively retains or rejects original products'. In this way, the theoretical construct of creativity relies on people's implicit theories of creativity, i.e. in the ways they consider a specific product, person or process as representative of their conceptions of creativity. In addition, Ghoshal and Bartlett (1987) classify innovation into broadly two categories: those that see innovation as the final product - the idea, practice, or material artifact that has been invented or that is regarded as novel independent of its adoption or non-adoption - and those who see it as a process, which proceeds from the conceptualization of a new idea to a solution of the problem and then to the actual utilization of a new item of economic or social value.

However this distinction between creativity (undoubtedly the source of the whole process), and innovation is a minor issue in the corporate context, since the most important question turns out to be with regards to the system that allows putting the ideas into practice. Consider, for example, the invention of the famous "post-it", in the sixties, when Spence Silver

discovered non-permanent glue and tried for years unsuccessfully to convince the company of the utility of his invention. Only in 1974, his friend and colleague Art Fry, saw the value of such a glue to mark temporarily his missal in church, and managed to overcome the company's policy ("The 3M glue glues better"), giving way to the "post-it". Nevertheless, even after being fabricated and commercialized, resistance had to be broken by offering the product to internal and external consumers. Therefore, for every creative act producing an idea or a product, a social act is required to promote it in the organization and that is the reason why real innovation in companies is always a team effort (Woodman, Sawyer, & Griffin, 1993). Every innovation starts with an initial idea but needs a system to expand the individual creativity and install it at the group level. This group will need to solve a wide variety of problems resulting from the adoption, dissemination and implementation of this product.

As Burns & Stalker (1996) explained, if innovation does not necessarily need creativity to emerge, for it can be reached by introducing new techniques or technologies, it cannot be ignored during the adaptation process required to succeed in the market. Innovation for the sake of innovation can even be harmful to the enterprise, as happened when Coca-Cola tried a different flavor, or it could happen if McDonald's changed its production chain.. If we want to follow some of the authors on business management, like Johnson-Laird (1993), then we may conclude that *success in business seems to be fundamentally a matter of staying after the others have left*, thus discouraging the systematic search for innovation, at least in such a way as advertised or relating to continuous search for new products.

While individual creativity seems always to be the starting point, because it may exist even in the absence of innovation, the organization depends on it to innovate. It is easy to get ideas; difficult is to implement a system to turn creativity into profitable business. As Kilbourne and

Woodman (1999) have shown, any system of innovation depends on a wide number of variables besides creativity, such as autonomy, the available information, the reward system, education or training, the system of authority, participation in decision-making, or the team cohesion.

### Creativity and Innovation at Group Level

The integration of creativity and innovation at group level can be better illustrated in group work methodologies aimed at generating ideas or problem solving (Paulus & Brown, 2003). Although Alex Osborn's brainstorming (Osborn, 1953; 1963) is probably the best known technique for idea generation and solving problems creatively, there are several other protocols for generating creative outcomes within teams. Sidney Parnes and Ruth Noller (Parnes & Noller, 1972), for example, worked on Creative Problem Solving (CPS); a method that has been subjected to investigation by several researchers including Isaksen, Dorval, and Treffinger (2000), Basadur (1994), or Buijs, Smulders, and Meer (2009). Other creative process methods are available, like Synectics (Gordon, 1961), TRIZ (Altshulla, 1996), Soft Systems (Checkland & Poulter, 2006) or De Bono's Six Thinking Hats (De Bono, 1965), but few would argue that they do not have the scientific research background as CPS does, and so we will concentrate on this methodology to discuss creativity and innovation at group level.

Even though the problem solving methodologies follow the classic steps of *objective finding, fact finding, problem finding, solution finding, decision making* and *action planning* (Isaksen, Dorval, & Treffinger, 2000), practitioners adapt the CPS process to suit specific situations (e.g. Buijs, Smulders, & Meer, 2009). The CPS process places an emphasis on problem definition, solution (idea) finding, or on both. There are also adaptations regarding the use of divergent or convergent thinking tools but these adaptations will not often influence the action plan, which is sometimes considered outside the creative process. In fact, the "idea" rules



the process output, probably because of (1) either its brainstorming and product development origins to which the process is usually aimed, or (2) by remaining faithful to a methodology used mainly for training and education (Parnes & Noller, 1972). Besides small changes in the process steps, by increasing or reducing its number, tools for idea development concentrate the changes that normally appear related to the process. While addressing this issue we will concentrate on variations of Basadur's CPS model, which focus on obtaining effectiveness (Puccio, Firestien, Coyle, & Masucci, 2006), while still allowing many adaptations.

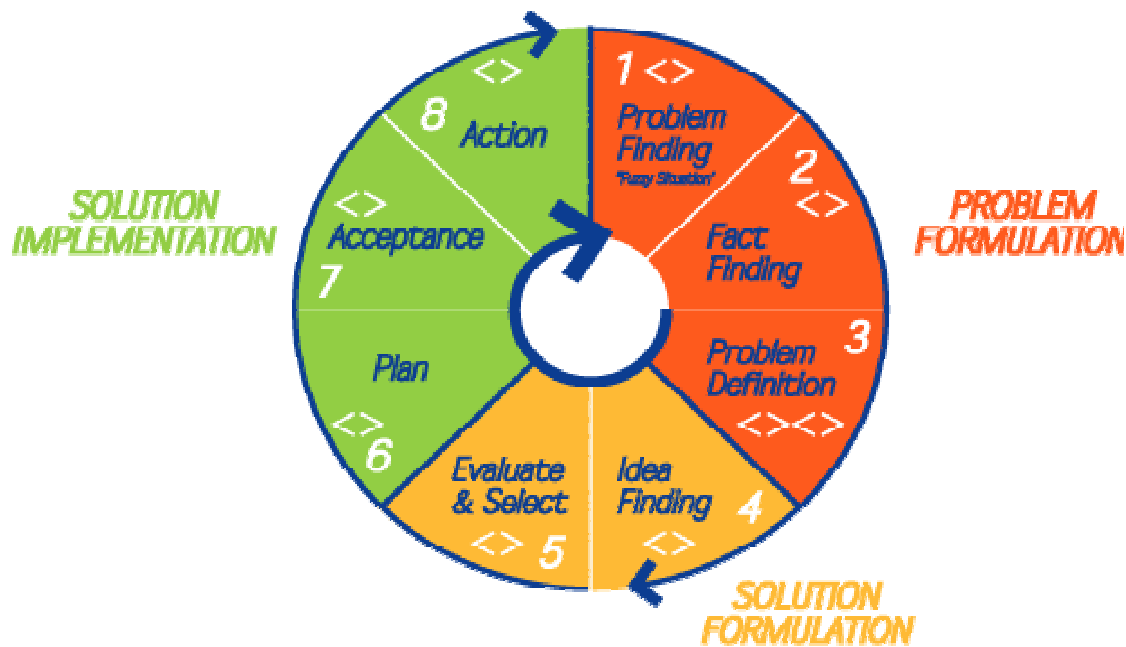
### Basadur's CPS Model

Based on the Osborn-Parnes CPS approach, Basadur (1987) proposed the *Simplex* model. This is a cyclic process in three distinct phases and comprising of eight steps (see Figure 2). Within each step there is a period of time for active divergence when individuals or groups produce as many ideas or options they can find, in a supporting environment, in which judgment is deferred to allow the perception of new relationships between facts. During this divergence period, participants are encouraged to avoid stopping ideation too early in order to maximize the number and diversity of the ideas produced. During the convergence stage participants select one or more ideas to carry on to the next step. The Simplex process is organized as follows.

#### *First Phase – Problem Definition*

This involves the following steps:

1. *Problem finding* - This comprises identification of problems and opportunities for change or improvement, within or outside the organization. After a first moment of active divergence, the active converge stage follows and problems that deserve further exploration are selected.



**Figure 2. Basadur's *Simplex* creative problem solving method (reproduced with permission)**

2. *Fact finding* - In the divergence moment, the group gathers as many information as possible on the selected problem and, when all useful or possible facts have been collected, the group selects just a few.
3. *Problem definition* - In this step the group reformulates the facts selected into creative opportunities or challenges. Then the more promising problem is selected to carry on to the next step, using the question "How might we...?". The challenge mapping process helps to see the hierarchy or problems and the relations between them, clarifying the big picture.

*Second Phase – Problem Solving*

The following steps are involved:

4. *Generating potential solutions* - The divergence moment allows creating the most radical and apparently impossible solutions, and in the convergence moment, some of them are selected for evaluation.

5. *Evaluating potential solutions* - Here it is required to generate as many criteria as possible, to help evaluating the potential of each solution. Having established the criteria, participants evaluate the potential solutions against each criterion and decide which should be implemented.

### *Third Phase – Solution Implementation*

The following steps are involved:

6. *Action planning* - Divergence skills are required to generate a number of specific actions that may help the implementation of solutions generated previously. Then convergence skills allow selecting the most adequate actions.

7. *Gaining acceptance* - This step aims at overcoming resistance to change and involve people needed in the process to assure its feasibility. This is directed essentially to people who did not participate in the earlier steps, but whose commitment is indispensable to bring the project to success.

8. *Taking action* - Taking action is not the final step of the model, assumed as a circular process. In this step, participants start with simple, specific and realistic actions, to address the fear of unknown by analyzing what could happen and then generating ideas to cope with fear of failure, trying to turn it into advantages.

### CPS Adaptation

After a series of trials, Basadur's model was reduced to five and then, to four steps (Figure 3), in order to adapt it to a 4-hour session design. The new four-step model was designed

and tried, with good results: *objective finding, problem definition, action planning and the action itself*. However, as the objective finding step is completed during the pre-consulting stage with management, and the action itself happens beyond the CPS session, the process finds itself reduced to only two steps: problem finding and action planning, in a single continuous loop, where not even the “solution” step takes place, being replaced by a series of actions needed to solve the problem. This new cycle allows for cutting more than half of the time in team meetings, making it possible to run a single four-hour session, and focuses the team in the action plan, which includes reflection on how to develop the execution, its different steps and goals, management control measures, acceptance and communication tasks. This approach provides an initial structuring of the group, during the listing of problems included in the objective, followed by an emotional linkage between members, during the convergent phase of problem definition. Then, another structuring step - action planning - where team creativity expresses itself during the "how to" develop each planned task, including its acceptance by external people and factors.



**Figure 3. The CPS four-step method**

The cycle of diverge-converge is still maintained during both steps: in the first step, the team enumerates all possible problems that may occur when trying to reach the objective and, then, selects a final problem definition to work with, described by a question beginning by “*What are the steps necessary to ....?*”. In the second step – action planning – the team starts by enumerating all possible actions (tasks) needed to solve the problem; then puts them by order of execution and, for each task, the “how to” is defined (including the tasks derived from the acceptance plan for the task at hand, if appropriate). Each task is attributed to a small team, which defines the exact deadline and, finally the person or organism responsible for evaluating the quality of task accomplishment (if pertinent), and the management control measures that will be associated to the task, especially the financial ones.

The method still reinforces task accomplishment through the follow up procedures of in-between one to two-hour meetings, scheduled before the project deadline and aimed at coordinating team performance, developing team commitment, and redefining the problem and the action planning. This way the team learns more about the initial objective and develops creative ways to achieve it by balancing problem definition with task implementation, learning by doing in a sort of trial and error approach. Even though any project team is supposed to follow a similar process, the method allows for a better balance between structure, planning, improvisation, knowledge management and organizational commitment. Here the problem solving process loses importance to development of the project, as it is during the action step that real problems are solved and creative solutions may arise. The *Aha!* may not occur during the meetings but many *Ahas!* will happen during plan implementation.

## Creativity and Innovation at the Organizational Level

The organizational level has received more attention from research than any other level. A significant number of empirical studies, seeking to determine the antecedents of innovation, have identified the factors that influence innovation in organizations. For instance, the characteristics of (1) the organization, of its members and its environment; (2) the influence of structural factors related to group composition, time working together, the available resources, the features related to the quality of interactions between the members of the group, and others. Nevertheless, innovation is almost always the dependent variable. Indeed, as Anderson, De Dreu, and Nijstad (2004) mention, there are very few research studies in which innovation is taken as the independent variable.

As Lam (2005) states, the literature on innovation can broadly be classified into three orientations:

- *Theories of organizational design*, focusing predominantly in the link between the structure of the organization and the tendency to innovate (e.g. Burns & Stalker, Henry Mintzberg, Lawrence & Lorsh). Organizational designs such as the *N-Form Corporation*, *Hypertext Organization*, *J-Firm*, *Adhocracy (Silicon-Valley-Type Companies)*, *Spaghetti Organizations*, are examples of structures. Here the unit of analysis is the organization and fundamental research aims to identify the impact of structural variables on product and process innovation. This research stream is very solid and has anchors in the literature on technological innovation.
- *Organizational theories of cognition*, in contrast, focus in the micro processes and the way organizations develop new ideas in problem solving. They tend to approach learning (for example Argyris and Peter Senge - learning organizations) or the information and knowledge

creation and processing (Nonaka & Takeuchi - tacit and explicit knowledge; communities of practice).

- *Processes of change and adaptation* which are the basis for creating new types of organizations. It focuses on understanding how organizations can overcome the inertia and adapt to the changes occurring in the environment and the technology (for example Weick, Schein and Kanter, on culture and innovation; Amabile and Ekvall, on creative climate).

Returning to the creativity-innovation concept, we have seen that, while the innovation relates to the fields of implementation, production, dissemination, adoption, or marketing of creations, mainly based on power and organizational communication processes (Spence, 1994), creativity remains exclusively tied to the relationship between the creator and his or her product (where not even originality is important, but only the *trying to do better* linked to cognitive and emotional processes taking place at the individual level (Sousa, 2007). Damanpour (1991) defines innovation as the adoption of something generated internally, highlighting the value of communication in addition to creativity.

If we relate creativity to problem definition and problem solving, and decision implementation to innovation, this last step requires a series of problem solving and definitions in order to implement the decision or the idea. This makes it very difficult to separate the two concepts at the organizational level. In fact, when we move from individual to group and organizational levels creativity and innovation become increasingly difficult to separate, so that we can agree with Basadur (1997), when he says that there is no difference between creativity and organizational innovation. So, whenever we approach any other level beyond the individual, these terms (creativity and innovation) will be used as synonyms, and we will refer to organizational creativity as a *system to develop and channel individual creativity, through teams,*

*towards profitable company innovations.* However, this definition is not rigorous and does not eliminate further attempts to give meaning to the term.

Innovation, as a research construct, has its roots in the fields of economics and engineering, later in sociology, political science and education and, only recently, social psychology. As mentioned by Rowley, Baregheh, and Sambrook (2011), the variety of models, frameworks, classifications and definitions of innovation make it difficult to understand the connection between all the definitions reported by different researchers, as well as the relationship between the various types of innovations. Schumpeter (1934) is acknowledged as being the first to state that innovation is the introduction of a new product, unknown qualities to the market, a new quality in an existing product, a new production method, or a new form of commercial treatment of an existing product, a new market to the sector in question, regardless if the market already exists or not, new suppliers of raw materials or semi-manufactured, or some form of monopoly. Schumpeter and other scholars in his field (Freeman, 1982) changed the view of the static equilibrium from mechanical engineering and classical economics, gradually abandoning the search for a relationship between macroeconomic measures, or the exploration of new technologies. Instead, they focused on the issue of national innovation systems (using a systemic approach, or the analysis of the innovation process at the organizational or institutional levels) as a process not only technical but, mainly, social, characterizing political and learning features. Progressively, starting from an invention perspective, as in Cebon, Newton, and Noble (1999) ...*the utility of an invention in the production of new products or services, or in improving the existing ones, or in improving the way they are produced or distributed*, the orientation has democratized itself, dropping the requirement of absolute novelty, as in Damanpour (1984) ... *the implementation of an idea produced or adopted regarding a product*,



*artifact, system, policy, program, or service that is new to the organization when it is adopted* and, recently, the tendency is to reinforce the direction to the customer and the market, as Coakes and Smith (2007) refer ... *to introduce the right products at the right time, in the right markets with the adequate distribution network and then continue to update, optimize, and remove them when necessary.*

As for the various approaches to identify the different types of innovation, either separating the adoption of products and processes from its development (Cebon, et al., 1999) or, in a more classical way, distinguishing product or process innovations, most authors agree (Adams, 2006) that the innovation capacity or organizational innovation, is a third important type of innovation, representing the potential of the workforce to promote changes in the organization's benefit. As Huhtala and Parzefal (2007) mention, ... *to remain competitive in the global marketplace, organizations need to develop continuously innovative and high quality products and services, and to renew the way they operate, based on the continuous ability of its employees to innovate.* Similarly, and although innovation can take place through the adoption or development of a product or service, available through investment in R&D or technology acquisition, only by creating and sustaining a creative workforce can the organization develop a potential susceptible to overcome problems and difficult situations, which cannot be solved only through investments (Cebon, et al., 1999). And although it is true that the use of the innovative potential of the workforce is not reflected, in general, in radical innovations (Love & Roper, 2004), it should be understood that it is in small incremental innovations that the main innovative potential lies, occupying today more than 80% of every innovation produced. This innovation is directly linked to forms of collaboration that are increasingly on the basis of innovation (Uzzi &

Spiro, 2005). And this collaboration is critical to the kind of innovation that is being able to do more with less (Prahalad, 2010), increasingly the watchword in the business world.

But the creative potential of the workforce is not limited to team projects. It is also related to the ability of retaining and developing creative employees and managers (McAdam & McClelland, 2002) and, at the same time, providing an environment of trust where everyone feels free and interested to contribute to the organization's success. Such features as the increasing complexity of work, the employees autonomy and time constraints, along with a reduced organizational control (decision-making, information exchange and reward systems) encourage the creativity of employees (Adams, 2006). However, this is not enough to make people want to collaborate in organizational effectiveness. For example, a supportive leadership climate, incentives to knowledge creation and to group processes fostering creativity, may help success (Unsworth, 2005). Creative people, managers or employees, may become more committed with their work and organization if top management values their work and ideas. In fact, according to a survey published by the Gallup Management Journal (Hartel, Schmidt, & Keyes, 2003), employees involved with the organization are more likely to "think outside the box" and produce ideas, rather than less committed employees, and they are also more receptive to new ideas. This research found that committed people tend to find and propose new ways to improve the work and business processes, which may suggest that the more creative people have a better understanding of the organizational processes, as they are in a privileged position to identify and define problems. However, it would be erroneous to think that the organization's creative potential may increase only by hiring new talents, because a new talent alone will not be very useful, or his or her usefulness will not last for long. The creative talent needs other less creative, to comment, sell, adopt, and implement the ideas he or she produces. So the secret of

creative management is, quite simply, to recognize and promote the existing talents, wherever they are and in any way they manifest themselves.

To some extent, this can be achieved by raising the importance of creativity in the organization and providing a system through which individual potential may be channeled into a cost effective innovation. This approach views innovation as a process that involves the entire organization and not only the result of technology adoption, investments, research departments of R&D or new organizational designs. And is more appropriate to the psychological framework, in which the individuals and groups have the leading role. Wheatley (1992) advocates that *the literature on organizational innovation is rich in lessons...describes processes that are also prevalent in the natural universe*. Innovation is fostered by information gathered from new connections; from insights gained by journeys into other disciplines or places; from active, collegial networks and fluid, open boundaries. Innovation arises from ongoing circles of exchange, where information is not just accumulated or stored, but created. Knowledge is generated anew from connections that weren't there before.'

#### The Measurement of Innovation

Another one of the most widely discussed issues concerns the measurement of innovation and the accurate measures needed in this action (*If you can measure it, you can manage it*, as Drucker says). Indeed, these attempts to measure innovation, expose the weaknesses, shortcomings and contradictions existing in the actual definitions and identified types of innovation. If it is rather easy to develop metrics regarding product innovation (as the number of new products / services launched in the market over the past 3 / 5 years; the life cycle of a product; percentage of return due to new products), in connection with research or not (e.g. investment in R&D, number of patents, percentage of the total budget allocated to research,

number of employees working in R&D), it becomes much more difficult when it comes to processes (e.g. projects submitted, ideas collected, training, formal structures of innovation, changes in marketing strategy, distribution or sales) or services (Miles, 2005). Kline and Rosenberg (1986) believed that models that depict innovation as a smooth, well-behaved linear process, do not specify the nature and direction of the causal factors at work. Innovation is complex, uncertain, somewhat disorderly, and subject to changes of many sorts. Innovation is also difficult to measure and demands close coordination of adequate technical knowledge and excellent market judgment in order to satisfy economic, technological, and other types of constraints - all simultaneously. The process of innovation must be viewed as a series of changes in a complex system not only of hardware, but also of the market environment, production facilities and knowledge and the social contexts of the innovation organization.

One possible option is to develop more measures, intended to cover more aspects linked with innovation. However, the simple action of introducing more measures does not mean necessarily that the measure will turn more objective, but even if it does, it will not necessarily clarify the relationship between innovation and the global business results - the main question in innovation discussion. Actually, even when we speak of the so-called indicators of return on investment (ROI - Return on Investment Metrics), as opposed to those measuring exclusively the input (e.g. R&D), the relationship input-output, regarding the investments and the products, it is not easy to obtain satisfactory data, as Cebon et al. (1999) explained. Let us consider, for example, a popular measure like the return coming from the sale of a new product. The product manager may prefer to make a quick and simple change to an existing product, calling it a "new product", rather than to invest years of research into something truly new that, in addition, could fail to provide the measures he needed to meet management requirements. We need to remember

that, nowadays, almost everything in the companies is determined by financial measures (revenue, operating margins, cash flow, costs, new markets), although any indicator exclusively financial is incomplete when it comes to measure innovation.

If we do not seek only the financial measures, related to company results, the task will turn much more comprehensive. Indeed, many intangible measures such as employee or customer satisfaction, training in innovation tools, skills acquired, or the existence of a formal system of idea management, can be much more important than the objective metrics, although not allowing a direct relationship with profits. In this regard, Armbuster, Bikfalvi, Kinkel & Lay (2008), report different type of surveys attempting to measure the levels of organizational innovation. While developing consistent measures, the researchers find no significant relationship between these indicators and other more objective, such as productivity. They also consider that this is not a valid or safe process to distinguish innovative from less innovative companies, since they did not find any criteria which may remain stable for a significant period of time. Furthermore, if we expand our analysis to knowledge - the real basis of all innovation - we discover that most of it is unknown in the company, as in the sentence reported by Hagel III, Brown & David (2010), *...if HP knew what HP knows, HP would be three times more profitable.* Therefore, we may question the usefulness of measuring innovation, an issue that has received so much attention in national and international forums, and has been considered one of the most important measures to compare and classify the countries' economic activity (OECD - Oslo Manual, 2005; Innovation Europe Scoreboard, 2011). If the objective measures of innovation do not have a direct relationship with the company's final results, as we saw previously, and if the criteria to measure organizational innovation shows weak validity and reliability levels, what is the interest of measuring innovation?

All research in innovation tries to understand the way to adapt to the introduction of new technologies, or to develop new products and processes, or to manage the circumstances determining the organizational change, in a systematic search for the structure capable of continuous problem solving and innovation. Reflecting again with Smith and Coaker (2007), only innovation can make the company continue to optimize the introduction of the right products, at the right time, in the right market, with the right distribution network but, as Christensen (2003) remembers, “right” does not mean “correct management”, especially when dealing with disruptive innovations. Thus, being innovation the most important organizational process that includes all the others, it becomes critical to assess its pace and intensity, i.e. it is important to measure it, providing the measure does not turn into an end in itself. Only through the process of innovation or, more specifically, the so-called *Innovation DNA* (Tucker, 2008), i.e. the employees’ ideas, knowledge, commitment and innovation skills, will it become possible to gain the required competitiveness in the market, indispensable to the organization’s survival. As the only important thing are the results, not the process, it is important to establish the link between innovation and the different measures related to profits, costs, productivity and employee satisfaction.

Without questioning the importance this search for criteria has to management control, the most significant issues in the innovation study rely in improving the essence of an organization of persons, mediated by technology, towards a common goal. And we should not forget that creativity, rather than innovation, is the mainspring of the organizations and that an company can only be considered truly creative when its employees get to do something new and potentially useful, in a continuous way and without being taught, or shown how to achieve it. As Robinson and Stern (1998) mention, each employee knows something, only known by him or

herself or, at most, by one or two colleagues, but only when the organization manages to share this potential, the term "creative" becomes accurate. Such sharing should be directed to the discovery of new ways of creating value - the true heart of the innovation (Shapiro, 2001). That is why the organizations that do not take a collaborative approach will be seriously constrained in the current economy.

### Collaborative Organizations

Founded in the internet (as Wikipedia, TripAdvisor, Skype, Napster, Google, Facebook, Twitter, Craigslist, eBay, Amazon), the collaborative organizations (where several agents, including the customers, collaborate in decision-making) began to impose on the business scene (Brafman & Beckstrom, 2006) as decentralized organizations, not focused solely on profit but on the willingness of people to contribute to projects in which everyone can benefit. They operate in such a way that has made it possible to abolish or, at least, mitigate the role of power, reducing considerably the hierarchical levels. Examples such as General Motors (Brafman & Beckstrom, 2006), Semco (Ghoshal & Bartlett, 1994), WL Gore & Associates (Gladwell, 2000), Natura (Ibarra & Hansen, 2011), and HCL Technologies (Nayar, 2010) have provided interesting case studies for this other form of organizational setting, based on decentralization, team-based organization, elimination of vertical and horizontal barriers, and development of collaborative systems, based on projects. This organization based on projects foster the improvement of the so called co-workers' *alignment*, that is to say, the employees' interests and actions become aligned with organizational objectives, defined by the management, around common projects, resulting in increased productivity, satisfaction and group cohesion.

The idea of collaborating in business has earned new breath with the Internet and the social networks, by providing opportunities for linking people and for having access to

information. Here collaboration means connecting people, ideas, and resources that would not bump into one together, either through people – the “connectors” (Gladwell, 2000) – design of the working space (Fayard & Weeks, 2011), organizational design (Cherkasky & Slobin, 2008) or the Internet (Brafman & Beckstrom, 2006).

Facilitating communication has always been one of the major goals in organizations, and enormous efforts have been dedicated to designing charts, spaces, and software that could push people to interact more, at least for working purposes. Who does not remember the “open space” offices, designed to break organizational silos, but that failed to understand that people need privacy? In fact, as Fayard and Weeks (2011) explain, although interactions decline exponentially with the distance between offices (the Allen curve), organizations need to balance privacy and encounter, by providing spaces, time and opportunities for people to meet informally, when they feel like. People tend to get stuck in their own spaces, or to interact only with others with similar backgrounds, or that they know well, which does not facilitate the development of new perspectives and ideas (Ibarra & Hansen, 2011). Even using social networking is not enough, as people need face to face encounters. In fact, companies even tried to rely on people from the generation Y (born mid-1970s to the early 2000s), who grew up with more habits of sharing knowledge, but other problems prevented the success.

The kind of problems that prevent people from collaborating does not even come from the human nature itself. In fact, in a company survey described by Benkler (2011), only 30% behaved in selfish terms, while 50% behaved cooperatively and the remaining 20% were unpredictable, and could become collaborative if treated fairly by management, and addressed to intrinsic motivators. The reasons for isolation have to do with the same kind of reasons that prevent creativity in organizations, which have mainly to do with control of decision making,



information and the reward systems (McClean, 2005). These difficulties in communication and collaboration may be better understood with a metaphor addressing Alice's fairy tale (Sousa, 2012).

Alice wonders why people follow rules and regulations that are seemingly meaningless, and they do not even question those rules! The Mad Hatter thinks that people develop a range of activities and routines that make sense for them but to the outside observer seem absurd. He believes that these things make no sense within the system as a whole. He knows that organizations develop sometimes a private reality which has little to do with the real world, isolating it in exactly the same way a person isolates from others.

Both characters are afraid of the Queen of Hearts, who only has exaggerated and distorted thoughts about what should be done. She asks rhetorical questions, with no real interest in the answers. It is true that a possible defense would be the humor that helps make things more flexible, but who dares to look unconventional and defend the respect for the power of nonsense? The Cheshire Cat knows that those who laugh at the idea in force are subject to beheading.

Within this framework of behavior, oblivious to reality and subject to the unquestionable will of power, people isolate themselves and reduce their level of commitment to working together in the collective future. Indeed, Alice reinforces this view by pointing out that she is so involved in her activities that she does not find time to collaborate with other people. The Mad Hatter reinforces this by saying that such collaboration does not just happen because people are not willing to drink tea together. The White Rabbit helps by saying that the culture of competition is gaining ground to collaboration; people are being rewarded for arriving first, or being stronger. As Alice says, people have forgotten the feeling of flow for collaborating together.

In the end, everyone knows that it is not exactly the lack of time that motivates this to happen. There is plenty of time. For example, consider those boring meetings in which Alice wakes up from time to time, only to conclude that it is best to go back to sleep. These meetings where the Flowers never agree with each other because they all say something different, making it impossible to achieve mutual understanding. The White Rabbit also thinks it is because they complain that they do not have time, are in a hurry and, therefore, take much longer than the necessary if one stops to listen to each other.

All this means that Alice never knows exactly who is sincere and who is not. She does not know who to trust in order to collaborate.

This will of management to exert control may not even be an open intention to exert power, but mainly the illusion that they are in a better position to view the landscape, and better situated to make decisions that will benefit the whole organization, as in the case description adapted from Vineet Nayar's book "Employees first, costumers second", picturing ways to decrease the influence of position and increase the influence of expertise in decision making..

HCL Technologies is a large company in the area of information technology and software, created in India, in 1976, as a start-up. It grew rapidly and became a global company, currently operating in 31 countries. It has 85,000 employees of various nationalities and guarantees revenues of 6.2 billion dollars.

In 2005, Vineet Nayar was named President of HCLT, and with the support of the company founder, began a process of change which he called "employees first, customers second," a philosophy of transparency and trust that sought to reverse the pyramid and create a unique organizational culture, focusing on the employees.

Without any pre-defined plan, with the objective of placing the company among the first and gaining market share, he began his leadership, visiting all the departments of HCLT and hearing a significant number of employees. He realized that delegating power to employees (those who were actually responsible for the creation of value) could provide a better service to customers, since *enthusiastic employees enthusiasm the customers*.

Relying on the transformers, managers and staff more open to change, he started by creating a platform with all the financial information of the company, so that each worker could, at any time, know the objectives and the results, not just of his or her own team, but of the whole organization. He also created an online forum, an open site where everyone could ask a question, which would always be answered by the leaders. Later on, he found out that, along with the increase of confidence and proximity to the leadership team, the forum allowed a reflection and information share even with the workers who, although not directly communicating, could contribute to problem solving.

The performance evaluation system was also changed: from a 360° evaluation (which did not include any criterion related to the creation of value) to an open process, with each person (leader or not) being evaluated by any employee, granting that the assessment was fully available to any member of the organization. Anyone could assess a leader having influenced positively or negatively his or her action. This evaluation process was seen as a development tool for the leaders, helping them to be the aware of their own strengths and weaknesses, thus allowing for continuous improvement and accountability. A manager was evaluated mainly by the number of assessments and the functional distance from evaluators, thus inferring the extent of his or her influence.

Vineet Nayar, conscious of the need to promote co-workers' deep involvement around their beliefs, ethical values and passions, as a way promote responsibility, created communities. Initially these virtual communities joined together around different areas, such as health and security, art, music, social responsibility, and further on, in the core business areas, encouraging the production of valuable ideas for new business. This concept was extended to customers who also produced hundreds of valuable ideas.

In the end, he set as a goal the self-governed company, thus accomplishing a total change in the power structure that will allow the system to keep on successfully, even when the presidents change. Idealism? Or a must for a company's future, more productive and respectful of the human values?

**Vineet Nayar (2010) "Employees first, costumers second". Boston: Harvard Business Press**

Another story, brought by Ghoshal and Bartlett (1994), may explain the extent to which it seems necessary to make managers seem more vulnerable to the company.

Semco is the name of a large Brazilian company, producing electronic products, which was close to bankruptcy. At that time, the company was putting a lot in R&D, but some studies revealed that, in order to maintain such investments, it should hold at least 6% of the market share; instead Semco had less than 1%.

In 1989, as a consequence, the leadership changed; the CEO was replaced by the director of one of group companies, who had devoted his entire career to Semco. Intending to cope with the difficulties, the new administrator and his team proposed a 20% staff reduction, a cut of 50% in R&D, and to close some factories, with the consequent product elimination.

This decision changed completely the way of thinking and acting in the organization. The Administration adopted participative management practices and established regular meetings where they established 4 main goals to be implemented throughout the organization, from top to bottom. These goals were defined as projects, which included performance standards and an entire monitoring program: one of them, the project "time to market", aimed at reducing the development cycle for a new product; another was designed to reduce the time needed to deliver the product; the project "customers' satisfaction" was seeking to improve the response to customers and, finally, the project "portfolio choice" sought to decrease the number of products from the list of 15,000 items. The specific tasks related to each project were implemented by several teams who gradually gain confidence in the possibility of success and of achieving excellence.

The change process was closely monitored by a consultancy team who interviewed managers and employees at the different levels. The content analysis of numerous interviews, conducted over 3 years, allowed to extract 4 dimensions associated with the process of change:

- **Discipline**, associated with the collective awareness of the initial company's situation and with the definition of clear objectives, which led to the development of a new accounting system allowing for individual accountability; a system, allowing to give a quick feedback of the activities carried out during one working cycle, was implemented; appropriate sanctions, not accepting apologies or arbitrariness (the fact that managers in power positions had been fired, served as an example and guaranteed equity).
- **Flexibility**. People began to define their own goals and expectations, which proved far more ambitious than in the past. The content analysis showed that three attributes contributed to this dimension: the establishment of shared ambitions; the emergence of a collective identity and the development of an individual feeling of making an important contribution. The regular meetings and the participation in the projects mentioned above were an important factor of identification with the organizational goals.
- **Confidence**, built around the perception of justice and equity in decision-making processes, organizational commitment and people's involvement in the company's projects, and the increased perception of proficiency developed by the co-workers at all organizational levels.
- The perceived **Support** increased as the organization shifted from a control orientation to an help and development orientation, giving the co-workers greater freedom and autonomy to take initiatives. The free access to resources and information proved to be an important to this dimension definition.

The development of these four dimensions promoted the emergence of co-workers' initiative and cooperation, which proved to be aligned with the organizational goals, and gave rise to organizational learning.

**Sumantra Ghoshal & Christopher Bartlett (1994). Linking organizational context and managerial action: the dimensions of quality management. *Strategic Management Journal*, 15, 91-112.**

This is why we cannot expect collaboration to come freely, except for the fact that companies will tend to have better results if they move to the collaboration way. Beyerlein, Freedman, McGee, and Moran (2003), for example, report that a survey on Fortune 1000 companies that revealed team-based practices were associated with: *66% return on sales; 20% higher return on assets (ROA); 20% higher return on investments (ROI); 14% higher return on quality; 14% higher return on equity (ROE); 1.700% higher return on investors and 257% higher market-to-book ratio.* If it were not for other reasons, these would seem enough to justify a progressive move towards collaboration, which means to engage the minds and hearts of their members and to create effective relationships across boundaries.

Besides trying to move the whole organization, as a whole, towards a collaborative posture, either by a project-based, or a team-based approach, which might prove real difficult in the present (e.g. Beyerlein reports that 74% of U.S. workers are not engaged in their work), companies might either create, or reinforce, the innovation process, or develop networks and interactions.

The best idea management software will not be enough to make the best ideas to cross organizational silos, make them benefit from peer review (Hellstrom & Hellstrom, 2002), and visible throughout the network (Bernoff & Schadler, 2010). First of all, there must be a process of idea generation and mobilization, from which the advocacy and screening instruments used may allow the best ideas to be experimented and turned into innovations. This requires the existence of a centralized unit to commercialize inventions and, as Desouza et. al. (2009), explain, other structures to make its diffusion (generating buy-in and acceptance) and implementation (structures, maintenance and resources). This innovation process is mostly a discipline of generating, realizing, and evolving ideas that improve the business and the customer

experience but aiming at innovation for its own sake does not provide collaboration or creativity. The creative requirement lies directly in management control bias, already described.

Creating value networks (inter-organizational networks, linking together firms with different assets and competencies, and that attempt to respond to market opportunities – Konsti-Laaso, Pihkala, & Kraus, 2012), is another initiative aimed at business innovation by collaboration, which includes the customer as a network member.

### Final Considerations

In this article we have tried to maintain some coherence in presenting the concepts of creativity and innovation in organizations. Usually the researchers with different scientific affiliations, present the developments in the study of creativity and innovation in a rather atomist way, the former seen mainly as related to personal development and the later as pertaining to the business sector. As a consequence of this separation, we often find attempts to merge both concepts, leading either creativity to be "dragged" to the business side, or innovation to be forced into personal development, through team work techniques, attempts to improve the creative climate or others, which will always result in a partial view of the whole process, independently of the results.

In spite of our attempt to balance the weight given to both concepts, we are aware that we made some choices revealing only a part of the whole complexity. Indeed, we omitted the development of the psychological study of creativity, including issues related to motivation and divergent thinking, as if we were not aware of its importance. As for innovation, we have chosen not to deal with the multiple interpretations of the concept, or classifying typologies, and favored the development of a constant connection with creativity, especially when speaking above the individual level. Particularly, in developing the link between creativity and innovation at the

organizational level, and in highlighting the value of individuals, when it comes to organizations, we tried to maintain the principle of the primacy of creativity over innovation, i.e., the primacy of the individual (creativity) over the business (innovation), well attuned with the *employee-driven innovation* (Smith, Kesting, & Ulhøi, 2011). We regret for not having the opportunity to develop the issues of the intellectual capital and knowledge management (Nahapiet & Ghoshal, 1998; Adler & Kwon, 2002), among others, due to restriction tied to the size of the article.

We have defined creativity as resulting from the relationship between the creator and its creation, in other words, we consider it is the attribution process that allows the distinction between the two constructs (creativity and innovation), thus emphasizing the cognitive and emotional processes when speaking of creativity, and power and communication when it comes to innovation. When focusing the organizational level, we emphasized the external attribution process, without any reason now to separate the concepts of creativity and innovation as, in our opinion, creativity is always an individual process. We do not deny the existence of "creative groups" or "creative organizations," "creative industries" or "creative cities" and, somehow, we prefer these designations to those using the term "innovation", as we understand that the group must gather the creativities when pursuing something that others may consider unique and useful, rather than unite individual only interested in their own creativity. Let us remember, however, that the term "creative" should refer to the conditions given to the individuals to express and develop their creativity and not to the fact that it contains innovative products or processes.

At the organizational level, we gave primacy to the concept of "organizational innovation", which also appears linked to administrative, ancillary or business innovation (Rowley, Baregheh, & Sambrook, 2011), for three main reasons. The first, related to the lack of

clarity in the distinction between product and process, either in the adoption or development. Secondly, the increasing tendency to focus on services (with or without products), and the emphasis given to improvements at the expense of radical innovations or, in other words, the tendency to make radical innovations by associating small product transformations and new services, thus ending with a disruptive business concept. And finally, we consider that it is around organizational innovation that we achieve the best fusion between creativity and innovation.

This option has disrupted the traditional view, which associates the concept of organizational innovation to changes in the organizational structure, taking as dependent variable some new practices (marketing, sales, distribution, markets), or new forms, or even changes related with the evolution or development (Lam, 2005). We prefer to place the organizational innovation within the organization as something systematic and involving everyone, usually organized in team projects, properly framed by the management, also integrating external collaboration such as *co-creation* or the *open innovation*. Organizational innovation is an intentional process and should be part of the work of each co-worker, along with routine work; we can measure its intensity by the results, such as processes and products profitable for the organization. It is an interactive process involving multiple agents, resulting in learning that will become part of the company's social capital and, so to speak, of its ability to continuously generate innovation. Or, as Morgan (1997) stated, its way to organize in socially based networks, norms, generalized trust and cooperation that facilitates coordination and cooperation for mutual benefit. This concerns an alternative kind of management we may find in collaborative organizations.

We tried to emphasize the importance of finding objective measures to determine the impact of innovation on the organizational results, and have testified the difficulty of such a task, especially in the service sector. But if the execution is difficult, it does not mean we should abandon it; it only means that measuring should not be an end in itself, rather one among other actions intending to produce something different. It should especially avoid classifying an organization as innovative or non-innovative. Although the search for such classification is inevitable for most situations, it is the market itself the one who may or may not require the certification, as it happens with quality, environment, etc.. But we all know it is not the certification that will turn the organization more innovative, although it may be a normal corollary to the effort. It also happens with the innovation premiums flourishing in state agencies and business associations.

If we really want to understand the innovative dimension of an organization, we only have to ask their key actors: if either customers, consumers or the market have a favorable perception of the innovative characteristic of an organization, we can be sure that there is a high probability for it to be true, and if this matches the employees' opinion (overcoming the biases of espoused theories - Argyris, 1999), then we can be sure that it is indeed an innovative organization. And it is worth acknowledge the organization's product: to have an innovative product is different from being an innovative organization, since the former can be brief and transitory, while the second designation supposes the organization has an extensive history of accomplishments and practices before it can deserve the name of "innovative".

Regarding the process of change, the main message that we want to leave in this text, is that the real capacity to change an organization is the ultimate skill of a high level leadership. We are not referring to changes in structure, technologies or markets but the one related with the



people's beliefs in the domains of work, social and client relationships. Organizations may engage in intensive training, sophisticated methods, technologies, disruptive products, but if the management does not have the capacity to generate global changes, able to persist over time, innovation will always turn to be a temporary success in the market, certifications or awards.

Finally, we addressed collaboration in business, starting with Internet and the social networks-based companies, which provide opportunities for linking people and for having access to information. Here collaboration means connecting people, ideas, and resources that would not bump into one another normally. These decentralized organizations, not focused solely on profit but on the willingness of people to contribute to projects in which everyone can benefit, operate in such a way that has made it possible to abolish or, at least, mitigate the role of power, reducing considerably the hierarchical levels. Examples have provided interesting case studies for this other form of organizational setting, based on decentralization, team-based organization, elimination of vertical and horizontal barriers, and development of collaborative systems, based on projects, fostering the improvement of management and co-workers' alignment, resulting in increased productivity, satisfaction and group cohesion. And, then, the final question we would like to provide a positive answer: will collaborative organizations be the future type to which all organizations shall evolve?

While studying the whole process, we found ourselves facing the fact that the researcher is highly dependent on management. And some bitter flavor remains as one realizes that although he can advise, intervene or even achieve partial or temporary results, in the end, only those who have the responsibility for leading the destiny of an organization can materialize on the field, the desires of those who theorize. This leaves the researcher hoping to be lucky enough to find the agents who will provide the raw material from which he can learn in order to

retrieve to others the knowledge he collects. This is not as simple as it seems, for the investigator must be able to identify the relevant examples from which he can learn or, in other words, he must be able to maintain a creative attitude about the reality, not hesitating to reject what he already knows in the benefit of a new knowledge.

It is precisely in the areas of organizational innovation that the psychologist is more likely to achieve this aim. Not only because the approach to the subject requires one to acknowledge different interpretations and scientific backgrounds, such as economics, management, engineering or technology, but also because in no other field of organizational behavior will it be required such a perspective of effectiveness as in organizational innovation. Indeed, either the psychologist is able to suggest something that will result in a real improvement for the business, or she will remain a friendly and curious entity, which is allowed to work, providing she does not bother the company too much. Therefore a synthesis of the most important subjects in organizational psychology should be provided, since creativity and innovation drag all the understanding occurring beyond the traditional areas of human resource management.

And, yes, of course, we believe that collaborative organizations represent the future, in terms of development.

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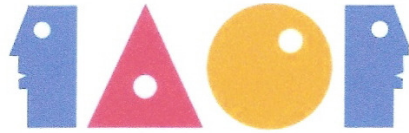
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## THE STRUCTURATION OF AMBIDEXTERITY: AN URGE FOR CAUTION IN ORGANIZATIONAL DESIGN

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### Abstract

Ambidextrous design models are instrumental in enhancing an organization's innovation and productivity but fail at predicting organization behaviors. Applying Giddens' structuration model enhances understanding of an organization's dynamic reciprocal processes. A case example of a company that strongly espoused the ambidextrous model is used for illustration. By performing structuration analysis in this case, it was found that: a) ambidextrous structure can be supportive of entrepreneurial objectives but insufficient during times of turbulence; and b) traditional performance management control techniques can hamper critical entrepreneurial behaviors. This study shows that it is prudent for managers and organizational practitioners to use systems and ambidextrous models cautiously, because not all the structures that underlie observable practices are identified. When ambidextrous designs are considered in tandem with structuration frameworks, however, there is a more flexible, robust identification of the interfaces and relationships between an organization and its members. Leaders who combine ambidexterity with structuration models will better understand their organizations' complexities and lead them more successfully through inevitable times of uncertainty.

KeyWords: Ambidextrous design models, structuration analysis, organizational design, innovation

## Introduction

The latest financial crisis challenged the effectiveness of such stalwarts of industry as Lehman Brothers, Washington Mutual, General Motors, Chrysler, Texaco, and The Company. In the wake of these companies' bankruptcies, executives of mature firms are struggling with monumental dilemmas concerning strategizing, operation, and growth. As corporate leaders, not only are they expected to plan and solidify their destiny and direction, but they must also do so in the midst of continuous and unexpected economic shifts.

Strategic planning becomes complex as firms institute more objective planning and goal-setting processes to instill predictability and alignment into the workplace. These activities can often prove to be futile, however, if they only buttress outdated processes. Employees' independent ideas may be encouraged and given free reign in the interests of innovation and entrepreneurship; but in doing so, the firm's processes become less predictable. Charged with instituting fairly rigid goals and objectives as well as controlling and being accountable for organizations' outcomes, corporate leaders must control the workforce and, at the same time, "coach" employees to creatively meet evolving customer and market demands. These conflicting requirements cause a dilemma for executives: on one hand, they must exploit and exercise power, and on the other—give it away.

The opposing forces within these dialectics have only begun to be analyzed by scholars, who search for a business model that can accommodate the ambiguity of the changing environments, while helping executives discern emerging organizational patterns and support needed changes while simultaneously keeping the core business afloat. Models considered to be most successful in promoting innovation are those that design "ambidextrous organizations"-- organizations that allow change within individual departments which have their own structures

and cultures, but that use the existing executive management hierarchy (O'Reilly & Tushman, 2004). Models of ambidexterity are sometimes criticized for targeting only the structural aspects of an organization, with an organization's ability to adapt, therefore, generally overlooked, since such a model does not account for the potentially ambiguous nature of employee agency. To address this, the "contextual" ambidexterity model recognizes that the choices and behaviors of individual employees are crucial to a firm's success in alignment and adaptability (Birkenshaw & Gibson, 2004). Although this added dimension provides the ambidexterity model with more depth, it does not go deep enough to be fully descriptive of organizational dynamics.

This paper builds upon the ambidextrous model that explains the relationship between the structure of an organization and the context in which it must function. It goes on to suggest that Giddens' structuration theory (ST) can be used to describe the dynamic and paradoxical nature of the employee/employer relationship (Giddens, 1979, 1984). Although Giddens' model is often considered to be a meta-theory, this paper attempts to find the theory's practical application, particularly for further understanding of the actors' (i.e., the employees and managers) perspectives and impact of those perspectives on the organization's success. The objective of this analysis is, therefore, to describe the dynamics of the corporate strategic planning process by using the ambidextrous model, determining where there are gaps in the model, and then extending it by overlaying a practical application of structuration theory (Giddens, 1984). 'The Company' was used as a case study because, although its leaders espoused a particular model of ambidexterity called "loose-tight coupling" (LTC), they failed to consider the agency and discourse of its employees and so ignored critical processes that could have optimized its effectiveness in strategic change management.

Previous ambidexterity and structuration studies have been rich in insights but have not generated an overarching theory that encompasses both models. In the absence of such a theory, and with the goal of moving closer towards one, this study therefore extends the ambidextrous design of organizations through structuration theory, and then tests its application on a case study.

### *Paradoxes In Organizational Models*

Historically, organizational theory has provided little relief to the dichotomous ontologies of the interpretivist/subjectivist and structuralist/objectivist traditions (Poole & McPhee, 1983). The interpretivist/subjectivist perspective, as a social constructionist paradigm, stresses that people are the creators of their own worlds and thus the structures of their organizations (Searle, 1995). The practical application of such theories calls for entrepreneurial, innovative qualities in an organization, therefore requiring leaders who believe that empowering employees increases innovation, mutual decision-making, and organizational agility (Peters & Waterman, 1982; Hamel, 2000). This stance, although popular with theorists, has been less popular in organizations, since it implies that managers must relinquish power and control, which managers view as being a risky endeavor. Although disproved for the most part in theory, in practice the traditional structuralist/objectivist model characterized by high-compliance command and control is the model that most corporations practice today in the Western world (Deetz, 2001). Control models are popular because even though they may not be particularly accurate, they arise from the hope that corporations and the people in them are predictable and that the destiny of the organization can be determined by management's ability to find the "one right" strategic plan. This is usually accomplished by changing and controlling employees' values to fit the

organization's goals which may dampen the workforce's willingness to be innovative and entrepreneurial (Argyris, 1994; Spender & Grinyer, 1996).

At a surface level, the ambidexterity model appears to encompass the dichotomies of the structuralist/objectivist and interpretivist/subjectivist arguments. It does so through the creation of a structure for every different activity, so companies are able to continue operations in the core business while simultaneously adapting to environmental changes (Tushman & O'Reilly, 2002). The ambidextrous design of an organization can be considered to be comprehensive in that it attempts to connect and integrate both structuralist and objectivist philosophies, and in doing so leverages their paradoxical properties and synergies (Lewis, 2000). The tension of the relationship between the two traditions is integrated through "the balance of contradictory structures, skills and cultures and the urging of leaders to be able to juggle this balance by making both incremental and revolutionary changes simultaneously" (Tushman & O'Reilly, 2002, p. 15). Although the ambidexterity model is one that attempts to integrate the paradoxes listed above, there is a need for further research to examine these complex issues (Raisch & Birkinshaw, 2008).

#### *Ambidextrous Organizations: Loose-Tight Coupling*

The ambidextrous model will be explored through the exemplar, the loose-tight coupling (LTC) model (Weick, 1976). LTC has its roots in systems theory, and purports to encompass both the structuralist and the interpretivist philosophies by describing the inherent contradictory properties of organizations as "closed systems searching for certainty and open systems expecting uncertainty" (Orton & Weick, 1990, p.204). Opposing tensions are considered to be "loosely-coupled" when the parts (e.g., departments) remain distinctive but still respond to the needs of the whole organization. Through the process of "enactment," LTC further reveals the

cyclical interactions between the members of an organization, implying reciprocity within a fluid, dialectic process that is affected by environmental and internal contexts (Daft & Weick, 1984; Danneels, 2003). When the system becomes too open or closed, it decouples from effective action meaningful to the whole organization, and so its activity becomes either detached from its environment or less focused on overall goals (Orton & Weick, 1990; Andriopoulos & Lewis, 2009). As a systems model, LTC helps show the non-linear dynamics of change more robustly than the classical model of traditional theorists where change is static (Lewin, 1999).

This multi-dimensional version of the ambidextrous model has been of interest to organizational theorists, but became interesting to practitioners when it was argued that the optimal balance of the loose-tight design creates excellence in a company by providing agency to the individual well as control to management (Weick, 1993; O'Reilly & Tushman, 2004). Its attraction lies in the promise that managers can have their cake and eat it too: "Organizations that live by the loose-tight principle are on the one hand rigidly controlled, yet at the same time allow (indeed insist on) autonomy, entrepreneurship, and innovation from the rank and file" (Peters & Waterman, 1982, p. 27). This model can be used as a predictor in the strategic planning process because it can describe the organization's reaction to uncertainty and ambiguity. However, since actions are most binding when they are experiential and involve high degrees of choice, irreversibility, and visibility, there are dangers inherent in decisions made under such potentially limiting circumstances (Weick, 1993). For one, due to the tendency for organizations to become too tightly coupled with the areas they are most familiar, environmental analyses become narrow and more vulnerable to the unexpected, so the natural drift of the process is toward ossifying and limiting the perspective of the organization. To counteract this effect, loose coupling can be

encouraged through integration of “enactment” techniques, such as experimentation and consciously broadening organizational planners’ perspectives (Danneels, 2003).

LTC is sometimes demonstrated through more quantitative methods, such as network analysis, and used in conjunction with the strategic attributes of the firm (Miles & Snow, 2003). For instance, LTC methods may be used in early stages of firm development and start-up, when goal and value setting takes place, and later looser coupling can be implemented during a production stage requiring less frequent interactions and communications. Despite its success, even the network analysts admit there are some aspects of coupling in organizations that are not quantifiable (Beekun & Glick, 2001). Some contend that it rests more on the dichotomy of action and structure than their integration (Jack & Kholeif, 2007). In any case, when attributes are not easily observed or measured, researchers must rely on measurements of human perception that are not normally amenable to quantitative analysis. For example, data on the power relationships, communications, and perceptions among members of the organization are not easily captured and put into a mathematical formula. That does not mean, however, that those dynamics do not exist.

For an organization to have the flexibility to master different situations there must exist the ability to be both in alignment with the core business and adaptable to the changing environment simultaneously. Designers who would develop such systems must look to an area of an organization’s function that is beyond its structure, in order to enable an adaptable culture. Termed the “exploitation-exploration tension”, it has been seen that multiple tactics are used to stimulate the ambidexterity required for integrating the need in the organization for innovation for new products and the stability for current customer satisfaction (Tushman & O’Reilly, 2002; Andriopoulos & Lewis, 2009).

Therein lies another paradox. By leading organizations according to the dualistic strategies of objectivist or subjectivist strategies, an “either/or” paradigm is promoted. Under this philosophy, either the organization creates top-down systems to strongly coordinate the work for efficiency and productivity – or it uses a flexible bottom-up approach that promotes employee individuality and creativity. Such strategies give rise to thinking that is dependent upon using an organizational design to promote innovation, or incorporate the perspectives of its people as strategic resource.

Ambidexterous models such as “loose-tight coupling” (LTC) attempt to overcome either/or thinking by integrating the varied and contradictory systems that have been designed to accomplish varied, and often contradictory, outcomes. These same models are still placed within the context of open systems theory, where strategic processes are usually understood to be orderly, harmonious, and self-sustaining. In the more realistic dynamic, non-equilibrium context, however, organizational change, encompassing contradictions and conflict, requires the integration of opposing dialectic processes, potentially generating a new, more agile organization (Stacy, 2000). The limitations of continuing such either/or based strategies have been evident as economic factors have indicated that even ambidexterous models are losing their potency. Executives want and need a new model for their organizations that embrace the complexity within organizations.

New strategies must be based on a “both/and” paradigm that can deliver both cost performance and innovation - breaking the either/or nature of the ambidexterous models in order to deliver current results and position themselves for the future through innovation. Corporations need models that promote both productivity and innovation and cannot afford to be forced to choose either one or the other. The examination of ambidexterous systems models through a



structuration lens can deliver both concepts by managing results in a coherent strategy that recognizes and reconciles the dichotomies and paradoxes of the organization. This fits the challenge found in the review by Raisch and Birkinshaw (2008) to look at the multiple levels and complexity of the ambidexterity model.

As paradox creates uncertainty in the members of the organization, it has been proposed by some that rigorous socialization in a centralized, tightly coupled situation may enable members to attain similar values (Denison, Hooijberg & Quinn, 1995). Additionally, loose-coupling rituals such as sharing knowledge and committing to goals keep a balance between employee and business needs (Meyer & Rowan, 1977; Lewis, 2000). Adaptation to an uncertain environment may thus lead to decoupling of the formal structure from the actual daily practices, which can be very unsettling to the workforce. For instance, when there is instability, there is more uncertainty in the environment and leaders must attempt to make meaning of the situation before making a decision; however, when the environment is stable, the different options available to decision-makers are clear.

Some researchers conclude that loosely coupled systems “*somehow* [italics mine] resolve the additional uncertainties presented by environmental heterogeneity” (Spender & Grinyer, 1996, p. 25). Attempts have been made to explain that “somehow” by delving into the ways in which loose-tight couplings are bonded together through descriptions of the fluidity of movement between the whole and its parts, and by eschewing the formal boundaries of the organization as being constructed by the sharing of values, actions, and relationships between the members of the organization (Denison, 1990; Orton & Weick, 1990).

Still, LTC theorists and practitioners are challenged to find an organizational model that encompasses renewal, uncertainty, and change (Spender & Grinyer, 1996). When there is loose

coupling and no direct supervision, then it becomes clear that an organization's culture contributes to homogenous rules and values (Weick, 1987). There is still little definition and understanding of the culture metaphor, however. Hallett and Ventresca (2006) recognize, for example, that "coherence, coordination, control, and forms of coupling are firmly rooted in rituals of deference and demeanor" (p. 920), but the esoteric aspects of culture that they mention are only poetically framed, and not explained. LTC tactics imply the importance of employee inclusion, but why such "rituals" work is not answered in the literature (Eden, 1992, p. 799).

The systems aspect of the LTC model allows it to lend itself well to engineering and mathematical analysis, and although its proponents recognize there is a portion of the coupling that has to do with human agency and the interrelations between people and structure, these are not sufficiently explored. There is a need to look more closely into what comprises the couplings or "glue" that bind together the organization and maintain its dialectic processes in a cohesive alignment. Giddens' structuration theory (ST; 1984), therefore, provides a useful tool in clarifying and extending the arguments of various strategic research models (Pozzebon, 2004). ST not only provides us with a rich metaphor for the dialectic nature of social systems, but extends the ambidextrous LTC model by describing the dichotomous aspects of an organization as a series of patterns of relationships and interactions between the members of the organization and the organizational structure. Critics of ST argue that it is merely a "meso-level" ontological philosophy, and as such, an impractical model for practitioners (Parker, 2000). However, more recently, scholars have attempted to provide more practical "in situ" guidelines for structuration research and analysis, particularly in the accounting and management domains (Stones, 2005; Jack & Kholeif, 2007).

### *Recurrent Social Patterns: Structuration Theory*

Structuration theory, like LTC, is based upon the view that more divergent perspectives can be developed by considering the employee in the workplace to be a “knowledgeable actor” in a two-way interactive social situation (Goffman, 1997). In fact, structuration continues to be a valuable contribution not only to organizational theory, but also to research (Jack & Kholeif, 2007). ST offers an integrated perspective on both structures and agents (i.e., employees) equally and “places phenomenology, hermeneutics and practices at the heart of the interrelationships and interdependencies between the two” (Stones, 2005, p. 4). Giddens’ “duality of structure” and “dialectic of control” allow him to explain what holds the couplings together.

The construct “duality of structure” is at the core of structuration because it is practical: it takes into account the paradoxes executives must face and acts as a “hinge between structure and agency” (Stones, 2005, p. 4). A recursive pattern (i.e., mutually constituted social practices that form between the organizations’ members and its structure) develops by which people simultaneously draw upon and create the structure of the organization. Such a pattern would, perhaps, more appropriately be termed “duality of structure and agency” (McLennan, 1984). Cassell (1993) explains that “it is agents who bring structure into being, and it is structure which produces the possibility of agency” (p.12). Firms demonstrate these processes by engaging in a cyclical, reciprocal communication practice of “information sharing” as a cognitive process that mediates between managers’ practices—loose/participative and tight/directive—with the work outcomes (Sagie, Zaidman, Amichai-Hamburger, Te’eni & Schwartz, 2002).

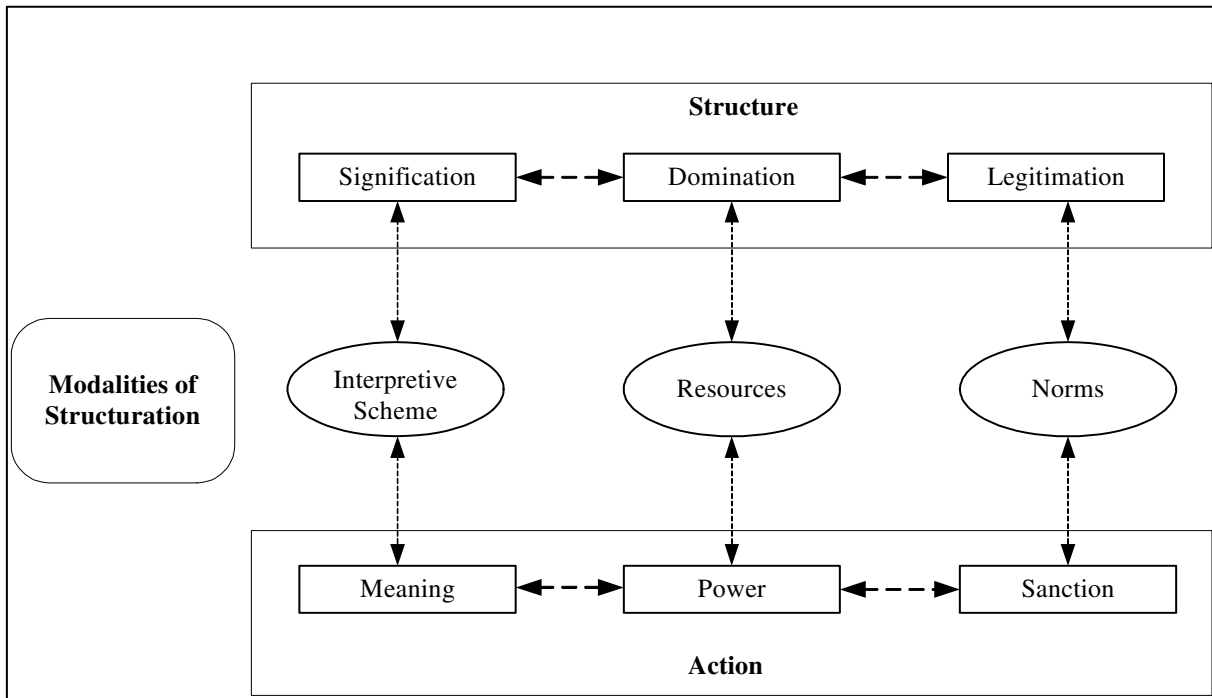
ST’s “dialectic of control” describes the knowledge employees have of how things work in their organizations and places importance on their autonomy, free will, and power (Giddens, 1984). In his theory, Giddens acknowledges that, although traditionally seen as being in the

“weaker” position, employees actually have a great deal of influence on management structures. Since all social relations involve elements of independence and dependence, this power flows in two directions, with employees controlling and influencing, not only affecting production, efficiency, and material outputs, but also the organization’s structure. This is done through both practical (tacit) and discursive (explicit verbal) consciousnesses, which are continually and interchangeably present in each situation.

When companies peer “behind the looking glass” and go beyond structure to look deeply within their organization— ST offers a way to decide how the value of internal processes can affect the organization’s operations. “The deeper the understanding, the more opportunities there will be for clarifying the causal processes involved ... [and therefore] the greater the possibility of desirable preventative or reparative practical intervention in the world” (Stones, 2005, p. 192). ST thereby explains how employees’ are able to draw upon their companies’ “structures-within-knowledgeability...that involve phenomenologically inflected ‘stocks of knowledge’ about the external context and conditions of action” (Stones, 2005, p. 17). ST further defines these as structures and, for analysis purposes, reduces them further to domination (power), signification (meaning), and legitimation (norms) (Giddens, 1979). The ways in which employees employ their memory traces of domination/signification/legitimation structures are defined by Giddens as “modalities of interaction”—the rules and resources in interaction (see Figure 1). For example, the structure of domination as a “stock of knowledge” within an individual may be very broad, while its “facility” within a particular circumstance may be more limited due to the tasks, rules, and specific resources a particular company draws upon (Stones, 2005).

It is in its recognition of the tensions of power and transformative elements of the “dialectic of control” and “duality of structure” that the structuration model extends

Figure 1. The three modalities of structuration (adapted from Giddens, 1984).



ambidexterity theory. The application of ST to a situation provides a useful mental model that, rather than taking a linear perspective, provides the view that corporations are interconnected communities of never-ending change that affect individual members and the organization as a whole. The ST in practice demonstrates that although the structure is influential, it is often the people who have the greatest influence on organizational processes through their perceptions, conversations, and shared meanings.

#### *Ambidextrous Loose-Tight Coupling Vs. Structuration*

Both LTC and ST appear to be very similar in that they both espouse a dialectic model as opposed to one of duality. By addressing apparent ambiguities and polarities, they also account for an organization's ability to adapt to change. The two models also describe influences that impact structure. Practitioners of both the LTC and structuration models understand there are

interpretive schemes formed that encompass such structures as rules, procedures, and power relations, and both theories describe iterative patterns that are formed between the structure and the framework of roles. The LTC model implies, however, a direct causal effect between the two subsets, while structuration emphasizes that human agency and other complex factors defy predictability (Giddens, 1984; Weick, 1993).

In his attempts to reconcile the LTC and structuration models, Weick (1993) uses systems terminology to define structuration as a “deviation-amplifying cause loop capable of intensifying either an increase or decrease in either of the two connected elements” (p. 645). This definition alone does not adequately describe the discourse and agency within the organization, however. Weick goes on to say that the process of enactment in the loose-tight model accounts for the processes of human agency to some degree, but resorts to describing people’s recursive patterns as being a feedback loop between an organization and its environment, where the organization makes adjustments through interactions with the environment (Weick, 1988). Although LTC proponents understand there are complex interrelations between people and subsystems, their theory cannot account for those interrelations substantively. It instead inclines toward a normative mechanistic metaphor by which organizations appear to be well organized and unified with humans being reified as one of the elements in the mechanism. Within the theory, little consideration is given to the view that the members of the organization can have impacts on the construction of their futures and choose to collaborate with their environments for mutually gratifying results (Morgan, 1997). Through the formulation of rigid boundaries, LTC objectifies the organization, making it appear to be more concrete and material than it actually is. With the concept of “duality of control,” however, ST clarifies issues of member agency and free will, conveying the underlying belief that all members are part of the constitution of the structure.

Like any structural model, systems thinking metaphors assume that leaders can think objectively and logically about their organizations, as if separate from and in control of them. This type of thinking lends itself well to strategic planning techniques in which stability and predictability are highly desired (Stacey, Griffin & Shaw, 2000). As a systems model, LTC does not, however, address the uncertainty and unpredictability that most leaders face when they try to implement their strategic plans. Although systems theorists often state that “the whole is more than the sum of its parts,” upon review, their model actually implies that the whole is only the sum of its parts, with a causal relationship between those parts, and that the system, once designed, is presumed to remain relatively static. These assumptions, although perhaps desirable from a management standpoint because of their efficiency and controllability, do not prevail when compared to what happens in the day-to-day operations of organizations (Stacey, Griffin & Shaw, 2000). This is where structuration can fill a gap.

Structuration theory thus provides a more complete picture of the intricacies within organizations. The heart of the differences between the two models is the loose-tight philosophy that is rooted in systems thinking, which is framed by the principles of double-loop learning to explain the underlying dynamics of an organization (Stacey, Griffin & Shaw, 2000). This heuristic is beneficial for both the observation and strategic redesign of work processes. It evokes an attractive, paradoxical management style which is reflective of the contradictions within organizations, simplifies complexity, can incite disagreement in order to form consensus, and is guided by key values that are constantly being challenged (Morgan, 1997; Gharazedaghi, 2006).

### *Case Study*

These arguments were tested in a study of a large Houston Oil & Gas company. The executives of this organization wish for the company name to not be used. The case study

organization (The Company) is a company that had applied an ambidextrous organizational model to advance its understanding of the interrelationships between employees and the institution's structure. By analyzing interview and archival data, as well as applying Giddens' institutional analysis process, this research has examined The Company's discursive properties. In doing so, it is revealed how The Company's management, even though implementing an ambidextrous loose-tight coupling (LTC) approach, failed to consider many critical processes in its strategic plans. For our purpose, the ambidextrous LTC model is the theoretical framework being examined and Giddens' structuration theory will be applied for deeper analysis of the discursive and recursive aspects. In this study, it can be seen how LTC provided The Company with a view of its structure, but how the overlay of structuration is an ideal conceptual lens for revealing the dynamic dialectic processes in which employees are engaged while working in a corporate context (Giddens, 1984; Rosen, 1991).

### *Method*

This research was a qualitative study with data collected from various sources: 25 semi-structured interviews from ex-employees, 6 video-taped interviews of The Company executives, text from annual reports, website, memos, artifacts, and any other records available to the public. The 25 ex-employees from many levels and functions were selected through a snowball approach and encompass the roles of accountant, administrative assistant, engineering manager, energy trader, human resources professional, organizational designer, and banking specialist. We used a guided interview, consisting of open-ended questions focused on a) the interviewees' perceptions of what they felt were the espoused values, goals, and power structures of their corporation; b) how they came to those conclusions; c) their perceptions of the relationships and communication with their co-workers; and d) how this communication related to company



values, power structures, and goals. Probing questions helped uncover the source of their perceptions (i.e., text, symbols, dialogue, ideology, etc.) and to understand how power was manifested within the discourse. The problems of inaccurate, retrospective memories were partially ameliorated by anchoring statements with biographical data and narrative (Silverman, 2001). Because the purpose of the interview was to understand the participants' perceptions of the company, the relevance of retrospection increases as the cultural norms in relation to power and dialogue were examined.

This last point was of particular interest in the study. As patterns of power were identified, and how people submitted to, rebelled against, or complied with those patterns, a more complete picture of the shared meaning between the organizational members developed. Although the whole picture can never be fully captured through interview and archival data alone, the object of the study was to reflect on the myriad, emergent voices of these former employees.

#### *Data Analysis*

Like all organizations, The Company had its own indicators of discourse and consensually shared meaning and also its own events that were interpreted similarly, all of which demonstrated its "unique and idiosyncratic patterns of rhetoric" (Mumby, 1988, p. 15). Some of the data described explicit rules (e.g., how performance reviews were conducted), but most of the interviewees' descriptions concerned the meaning they attributed to latent or unobtrusive rules within dialogue and symbols. To mirror the underlying premises of the structuration model, we fleshed out relational data by studying the recursive patterns of discourse and power processes from the employee point of view. This qualitative method provided a "deeper insight into the nature of the loose and tight practices than quantitative analysis" could achieve (Sagie et al.,

2002, p. 316). It also took into account the dialectic struggles between the members of the organization and the deeply embedded organizational structure, norms, symbols, and culture.

Once the topics were listed, a thematic analysis was conducted and six major themes were identified (Whittington, 1992; Miles & Huberman, 1994). These were 1) Vision: the The Company dream; 2) Strategy: innovation and entrepreneurialism; 3) Values statements; 4) Culture: stockholder and momentum; 5) Rewards: meritocracy and incentives; and 6) Sanctions: performance review committee. For the purpose of this article, only subsections of the strategic plan of “entrepreneurialism” and “innovation” are considered, since they are the most directly related to The Company’s executives’ espousal of loose-tight management. The LTC model was prevalent and institutionalized in the culture, as it was “recurrent, materially bounded, and the social action was engaged in by members of the community” (Orlikowski, 2002, p. 256). Once uncovered, the innovation and entrepreneurial themes were reexamined and described according to the espoused, interpreted, and enacted patterns demonstrated within The Company. Interview and archival data were placed into various themes, and then an institutional analysis was conducted according to Giddens’ categories of legitimation, domination, and signification. This data analysis has been abridged for this article (See Table 1).

#### *The Company Espoused: Innovative and Entrepreneurial*

The Company executives espoused innovation and fostered entrepreneurial attitudes among employees in several ways. First, they communicated the value of entrepreneurialism directly to the public and employees, which was further reinforced by the outside media. Then, they made public The Company’s value statement of innovation, through various visual images (e.g., banners inside the lobby, continuous commercials playing in elevators), thus inundating both visitors and employees with a multi-media array of positive communications. This strategic

effort proved to be very successful, as *Fortune Magazine* named The Company “Most Innovative Company” six years in a row (O’Reilly, 1997).

Through the analysis of public and archival records, it was found that The Company approached the institutionalization of innovation as a purposeful, rational activity, championed by its Chief Operating Officer. Much of this can be attributed to his background as an elite management consultant, educated at Harvard Business School, and further trained by the well-known consulting firm. The CEO, like every associate who worked there, was taught the MECE (mutually exclusive, collectively exhaustive) method of solving problems, meaning that their solutions had to be “fact-based; rigidly structured; hypothesis driven” (Rasiel, 1999, p.3). The use of the hypothesis is attributable to a scientific method approach in which consultants determine a possible solution to the problem first and then work to prove or disprove that solution. Presentation of a credible image to the client is important to McKinsey consultants and CEO purposefully used his expert communication to engineer The Company’s transformation from being an asset-based energy company to one that relied on human intellectual capital and entrepreneurial behavior. In communicating a strategic plan of “entrepreneurialism,” he emphasized to both The Company stockholders and employees the importance of thinking creatively and finding better ways of doing business (Hassell, 2001).

Thus, it appears that a systems approach was taken to increasing The Company’s wealth (Raisel, 1999). In designing a company to be entrepreneurial, consultants using the systems approach would contend that an organization’s structure and internal relationships play a major role in determining its performance. Although such consultants would acknowledge that organizations are “whole systems,” as part of their organizational design methods they would analyze organizational subsystems and work to improve each part separately (Stacey, 2001). In

fact, The Company was described as being “atomized”—another way of defining ambidexterity—in that it was broken down into small, self-contained units that service a particular market niche with “their own personalities headed by disrespectful chiefs” (Peters, 1994, pp. 62-63).

In order to promote innovation, The Company executives proclaimed they would use a “loose-tight” approach to management. By “loose” they meant that they would take risks, and by “tight” they meant to maintain central controls over critical parts of the operation, such as trading and credit. The CEO provided a potent example of the loose-tight style as a general philosophy that proved successful for The Company in the realization of a new market:

CEO: There’s a whole area of things that I didn’t think we ought to mess with. We ought to leave it to people to come up with on their own. And that was, how do you serve your customer, how do you execute strategy; what strategy do you want to choose; and how do you operate in your business? I really don’t care. If you want to come in at 10:30 in the morning and leave at 2:00 in the afternoon – that’s fine, as long as you are accomplishing your objectives. You want to get rid of hierarchy and forms, that’s OK. And wear baseball caps in the office, it doesn’t really matter. If you want to try a new product with your customer, you don’t have to ask me, just do it. Figure out how you make it happen. (Bodily & Bruner, 2002)

Another, more specific example of the “loose” style was instigated when the CEO eliminated some of the extrinsic control factors from his position in the The Company hierarchy.

CEO: The first week I was here, my secretary brought a stack of expense forms, and I was supposed to sign all of these things. I said, “What am I supposed to do with these” “Well, you are supposed to sign them” (laughs). Here, the world is just falling apart around us—deregulation, new customers, new products, and I’m going to sit here line-item-by-line-item and go through an expense report. There’s no way. Send it back and tell them from now on it’s approved. (Bodily & Bruner, 2002)

Most popular management advice stresses that innovative leaders and employees must be willing to “think outside the box,” “push the envelope,” and sometimes act “insane.” The CEO, a

contemporary of the management guru, Tom Peters, subscribed to Peters' philosophy that proclaims, "Welcome to a world where imagination is the source of value in the economy. It's an insane world, and in an insane world, sane organizations make no sense" (Peters, 1994, p. 1). He connected his philosophy of loose-coupling with being creative and sometimes with being "weird" (Anderson, 1992), while showing a bias for those employees who were considered by others to be "weird":

So we kept a lot of things really loose internally which led to a lot of creativity. It allowed people who didn't quite fit the mold to fit in. I always said our weirdest people were our best people. Weird people come up with weird ideas. It is the weird ideas that create new businesses and so you want to have an environment that weird people liked. Hallelujah! So the whole loose side was—"Bring on the weird people because the weird people will do good things for us." (Bodily & Bruner, 2002)

Innovative corporate leaders are sometimes described as being outlaws who become heroes and forerunners of corporate change, and as corporate "heretics" they have to endure betrayal, office politics, and giving up their lives to their jobs (Martin, 1992). By espousing the "loose" style of management, the Company CEO showed how much he valued this form of conduct, seeing himself as an iconoclast who (literally) tore down the walls of tradition:

CEO: I had to come up against the Building Gestapo at The Company. We had this nice building, very uniform, all the floors looked exactly the same. And I said, "how do you communicate when you have these walls? I want to get rid of the walls!" So I went to the building people and I said, "Rip out all those walls and get rid of all those standards! Let's have a great big bullpen and people will sit around and they'll talk and they'll say things to each other and get excited and creative." The Building Gestapo didn't get it and said "You can't do that." I finally got to the point that I said, "Forget it!" and called a contractor and we started ripping the walls down. (Bodily & Bruner, 2002)

Although this style was called loose-tight management by top executives, very little evidence of the “tight” side of the equation could be found in the study. The only time the “tight” side was defined was in an interview with the CFO:

CFO: I think one of his [reference to CEO] best prescriptions is his management style of “loose-tight.” There are a few things you have to control. You want to quantify and manage all of your risks centrally in books so you know what your risks are, you know what they are priced at and then you can figure out how to intermediate those...Everything else, you can let people go do, as long as you are controlling a few important things centrally. (Bodily & Bruner, 2002)

The Company’s value of innovation sparked the imaginations of employees. Although the term “loosely-coupled” may not have permeated down to the workforce, its concepts, as this studies interviews revealed, were recognized and enacted.

HR Professional: It was managed chaos. If you stood in the middle of Grand Central Station in New York City, you’d just see them helter-skelter—people running all over the place. But underneath all that, there’s a method, because people had specific destinations and places they needed to get to, so it was actually managed. I would say The Company worked on the same concept.

While innovation as a structural property combined with an amalgamation of employee’s actions, our interviews with employees unveiled a pattern in which they had felt autonomous and energized by their work:

Internal OD Designer: Hey, we had no model. [We were told] you have to develop a model to go out to the customers. Put the deal together. See how to make the deals work. It was kinda like building a completely new business.

Paradoxically, the loose management may have assisted in the creation of problems in that ideas generated were not put through a rigorous, “tight” process of checks and auditing. By design, the meaning of being an innovative trading company was never clearly defined for

managers nor employees. The espoused values of innovation and entrepreneurialism were often translated into risk taking, which gave employees permission to implement ideas without a careful risk assessment or analysis of capabilities.

Accountant: There was an extreme amount of pressure to do a whole lot more than what would be expected to do in another company. It was just get it done today—come on, come on, come on. Now, where's it at? Now, OK, it looks good, fantastic. The next thing you know, it was oooh, we have some problems here. How did THAT happen? Who was responsible for THAT? I thought it was a very dysfunctional environment, very chaotic. There wasn't much rhyme or reason to how they were structured as far as management was concerned. The management seemed to let people run on their own for the purposes of creating or inspiring creative thoughts, or whatever, but it didn't really work that well. And it caused a LOT of problems as far as I could tell.

#### Institutional Analysis of Duality Of Structure

As seen in Figure 1 earlier, the recursive patterns that are critical to the “duality of structure” process are interrelated aspects—signification, legitimation, and domination—which create, as described by Giddens, as a “form of interaction which involves attempted communication, the operation of power, and moral relations” (Giddens, 1993, p. 133). To analyze recursive patterns within The Company, an institutional analysis was conducted comprised of the symbolic patterns of discourse and power from the perspective of ‘duality of structure.’ Such an analysis attempts to identify coherence and commonalities in the discourse while recognizing these patterns are often self-determining and have elements of independence from each other (Riley, 1983). Any evidence of symbolic patterns that emerged in our data were aggregated and clustered into three 3X3 content analysis (Selcer, 2005). Although the original research had three tables of data, one each for signification, legitimation, and domination, the three tables have been summarized into one table for the purpose of this article (see Table 1).

## Discussion

On the surface, it would appear that The Company did everything according to a design application that would encourage entrepreneurial behaviors and an innovative culture. In listening to the conversations of its leaders, all the elements for success were present and were in concert with the goals of the organization. This retrospective study cannot, however, ignore the obvious—that The Company collapsed as an organization. Although all the right structural resources were provided and the patterns of interaction for excellent performance were put in place, the fact remains that The Company ended in failure.

It is admirable that The Company executives wanted to break away from the old patterns that had become institutionalized in their company over many years. To make the needed changes, they mounted a multi-front systems-oriented organizational change campaign to transform the direction of the company from being solely an energy company to one expanding into new markets. The Company espoused the use of an ambidextrous “loose-tight” management style, which was ground-breaking at that time, in order to become more innovative and creative.

Innovation was an integral part of The Company’s new strategic plan. In their attempts to institutionalize entrepreneurship, The Company executives influenced—but did not control—the direction of organizational patterns. In using the LTC model, they implied that at work was the rational, sequential logic of a systems approach to the institution of change. The strategic planners were not prepared, however, for the uncertainty of coworker interactions and their inherent unpredictability. Also, in promoting the performance attribute of “innovation,” executives did not take into account its ambiguous, iterative nature, which cannot be instituted through logic and linear thinking.



By taking a prescriptive approach to running the company, The Company executives set its objectives in terms of a pre-determined strategy. Executives then designed the business's organization so that it would self-regulate as it adapted to change, assuming that employees would always work within that system in a harmonious way. To implement its ambidexterous strategy of loose-tight coupling, the executives concentrated on molding and controlling the innovation process using systems-designed tools, communications, and text.

After introducing strategic organizational development (OD) programs, The Company management then assumed that patterns of discourse and behavior would proceed as planned. As the structurationist model would have predicted, alternate "rogue" patterns emerged, which are reflected in the employee interviews in this study. Since the company had no method for gathering feedback, with its opportunities for reflection, the iterative variable nature of the workforce went unrecognized, ignored, or underground.

In contrast, a more processual perspective such as the ST model would have envisioned the future strategic direction as being enacted by emergent patterns of discourse and underlying, hidden order (Bohm, 1996; Fonseca, 2002). If emergence of new meaning and knowledge is an interactive process, then in their *demands* for entrepreneurial behavior, the top executives were in opposition to the desired *facilitation* of innovation. Individualism and maverick behaviors were rewarded, which did not promote the interactive communications required for a collaborative group mind, and thereby prevented the interactive complexity necessary for innovation that would work toward a group vision (Weick, 2001).

The function of The Company's management became one of attempting to control the forward movement of the company by objective means. The firm's executives strategized its future as a linear movement in time, with the assumption that it would continue on a stable and

predictable path of growth by orchestrating the employees' shared goals and values. The Company executives focused little attention on the meanings that were being constructed by employees in the present and, therefore, expected their tactics of control to be effective in a logical linear environment where people make consistently sound decisions based on an economic model. When they failed, failing to consider the unpredictability of both the environment and the workforce, it became apparent that their systems model could neither control the inputs nor the outcomes. Had the structuration model been considered, the ambidextrous LTC approach would have been seen as being too simplistic, since all the infinite number of reactions, creations, and enactments were not considered. Perhaps a more fortunate outcome for the company would have been accomplished if the patterns of communication between employees and their behaviors and practices had been observed and considered.

#### Implications For Practitioners

The dilemmas and dichotomies corporate executives face today are natural and to be expected, but as long as executives use partial information and limited perspectives, they will never be able to comprehend the “bigger picture” within their corporations. Connective conversations must be collaborative within the workforce, since the future success of the organization is more than a product of individual intelligence. It is a synergistic combination of all perspectives.

This study has shown that it is prudent for managers and organizational practitioners to use systems and ambidextrous models cautiously, because not all the structures that underlie observable practices may be identified. Unwritten norms unfold through organizational discourse, power, practice, and action, while the processes described by the systems models are primarily driven by cognitive knowledge (Spender & Grinyer, 1996). When ambidextrous

designs are considered in tandem with structuration frameworks, however, there is a more reflexive, robust identification of the dialectics of the interfaces and relationship between an organization and its members. ST fills in the action-oriented gaps and acknowledges that an organization is a process that cannot be manipulated and controlled, but rather uncovered and encouraged—found through going through the looking glass into the real world of the corporation. By recognizing that power is shared amongst its members, no matter where they sit in the organizational hierarchy, executives and employees alike will foster the collaboration, dialogue, and collective reflection needed for their companies to adapt and endure.

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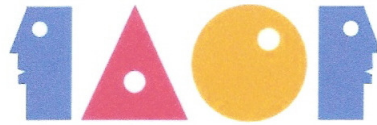
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TABLE 1.  
Structuration Institutional Analysis of the Company Interviews (Abbreviated)

| Structures   | Verbal Symbols<br>Metaphors, myths, rumors  | Action Symbols<br>Rituals, covert strategies, info control   | Material Symbols<br>Status symbols, logos, perks   |
|--|---|--|--|
| Signification<br>Language in use                             | <p>We heard from everyone we were “The Best and the Brightest”. We started to believe it.</p> <p>Everyone talked about the stock price every day.</p> <p>They used the acronym: RICE which stood for Respect, Integrity, Communication and Excellence.</p>                                      | <p>The organization structure was always changing, the process was changing.</p> <p>Respect came when they were willing to let you make decisions.</p> <p>A lot of employees did day-trading during work time.</p> <p>The orientation made you feel you were working for a successful company.</p>   | <p>The screens in the elevators ran presentations on the values, innovation, intellectual capital.</p> <p>They were design conscious. Everything sent the message; they knew what they were doing.</p> <p>The new building was awesome, the high level walkway was called ‘Saturn’s Ring’.</p>   |
| Legitimation<br>Norms  | <p>In meetings you would hear the comments and were encouraged by peers and you would jump on board real quick.</p> <p>If someone didn’t interact with new ideas, he probably wouldn’t fit in.</p>  | <p>We were indoctrinated in a cutthroat, winner-take-all environment.</p> <p>There was one unwritten core expertise- that was to manage analysts’ expectations.</p> <p>Management let people run on their own for the purpose of creating or inspiring creative thought.</p> <p>It was unspoken, but I felt pressure to come back from leave early.</p> <p>The main value was to make money. That is what the top was doing, making money.</p> | <p>Being the #1 energy company was posted everywhere. Everybody pushed towards that and worked long hours.</p> <p>The dollar ruled. It’s going to negatively impact my bonus, screw the vision and values.</p> <p>Bonuses helped a lot about how you felt about the company. If you were in, you got good bonuses.</p> <p>They would do anything for you. It made you feel like you were part of a family – a common bond.</p> |
| Domination<br>Allocation or<br>Authorization of<br>Resources | <p>It was like Grand Central Station. It seemed helter-skelter, but underneath it was actually well managed.</p> <p>Like Tom Cruise in the firm- there were enough perks for you to stay their slave.</p> <p>We were always dodging bullets and we didn’t know where they were coming from.</p> | <p>It was like a 2-headed monster. One was glad-handing, the other was Bobo Sett – they wouldn’t say anything, just blow people’s heads off.</p>   | <p>We were paid higher and that was an inspiration.</p> <p>I was squeezed. If I didn’t side with my boss it would be a performance issue and my job was in jeopardy.</p>   |





FOREIGN AID AND ECONOMIC DEVELOPMENT:  
THE CASE OF PAKISTAN

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Abstract

Pakistan has long been the recipient of foreign aid dating back since the 1950's. This paper aims to understand the relationship between foreign aid and economic development. Is it a Dutch disease or an economic escalator? Regression analysis has been run on 24 years secondary data to understand the impact of foreign aid on GDP, through official development assistance, balance of trade and capital account. The regression estimation suggests that ODA accelerates growth but at the same time some negative results have been generated.

Key words: Regression, Official Development Assistance, Economic Development

## Introduction

In the most recent decades, foreign aid has become one of the very major forms of enhancing the economic development of a country. It has become a synonymous term with the development of a nation. But how far etched are the positivity's, are the negative aspects not addressed well? What are the long term effects? Foreign aid is usually categorized into four basic forms; namely, long term loans, soft loans, food aid and technical assistance. While the soft loans are usually catered for the least developed nations to give them a boost to stand upon their own resources, with a low interest and amore than usual period for pay back. Rationale for foreign aid could be anything from humanitarian, to political to economic. Pakistan is a rich resource country with few of them used to their optimum level. Political instability, weak policy measures, instable infrastructures and terrorism are the latest trend of constant issues, which Pakistan is plagued with.

## Objectives of the Study

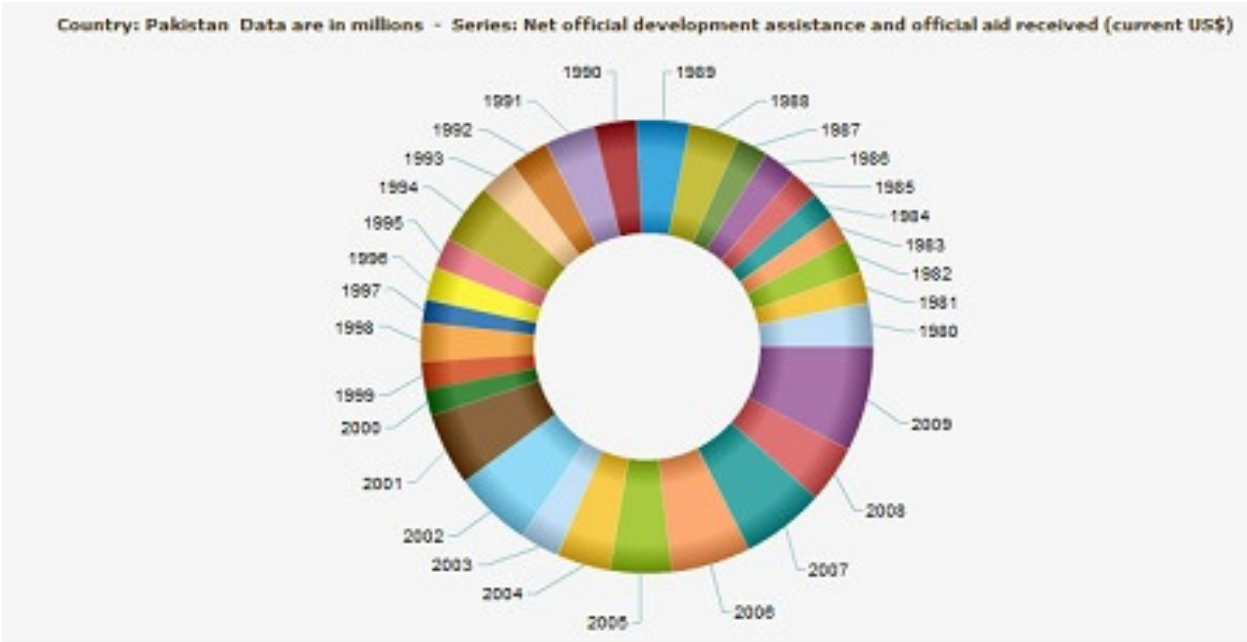
This study aims to analyze; the composition of foreign aid to Pakistan during the last 2.5 decades with its impact on Economic Development of Pakistan.

The impact of foreign aid on different countries has been well documented in the Literature. It has been a foregone conclusion that foreign brings with itself technical assistance, exchange rate benefits, trade benefits, investment opportunities and much more. Both negative

and positive results have been highlighted by previous researchers. Pakistan, being an underdeveloped country, has suffered from decades of internal political disputes, decreased levels of foreign investment and deteriorated infrastructures. Poverty levels have decreased by 10% in 2001-2007, as the capital steadily rose development spending. GDP growth was in the 5-8% range between 2004-2007, despite acute electricity shortfalls. But growth slowed in 2008-09 and unemployment rose. Despite numerous policy measures inflation remains the top concern among the public, and normal life seems disrupted. In 2007 it rose from 7.7% to more than 13% in 2010. In addition, the Pakistani rupee has depreciated since 2007 as a result of political and economic instability. A standby agreement with IMF, with acceptance from the Pakistani Government was made to accelerate growth and turn around the balance of payment crisis. During 2009-2010 the current account balance strengthen through the capital and financial accounts and foreign exchange reserves stabilized. Then again in May-June 2010 Pakistan once again faced a natural calamity, this time the floods which lowered agricultural output and contributed to a jump in inflation. Pakistan still faces long term challenges include expanding investment in education, healthcare, and electricity production, and reducing dependence on foreign donors.

#### Trends of Foreign Aid in Pakistan

Figure 1. shows a changing trend of foreign aid over the time (1980-2009) in terms of



Source: World Bank Indicators

Figure 1. Net ODA Received

both Official Development Assistance and foreign Aid. In the following doughnut, both decline and boom periods can be witnessed in terms of aid recipients. The overall trend seems to be taking an upward movement. In most of developing countries the population growth rate was known to be about 3%. Thus the growth rate of 6% was assumed as a target for the rapid economic development.

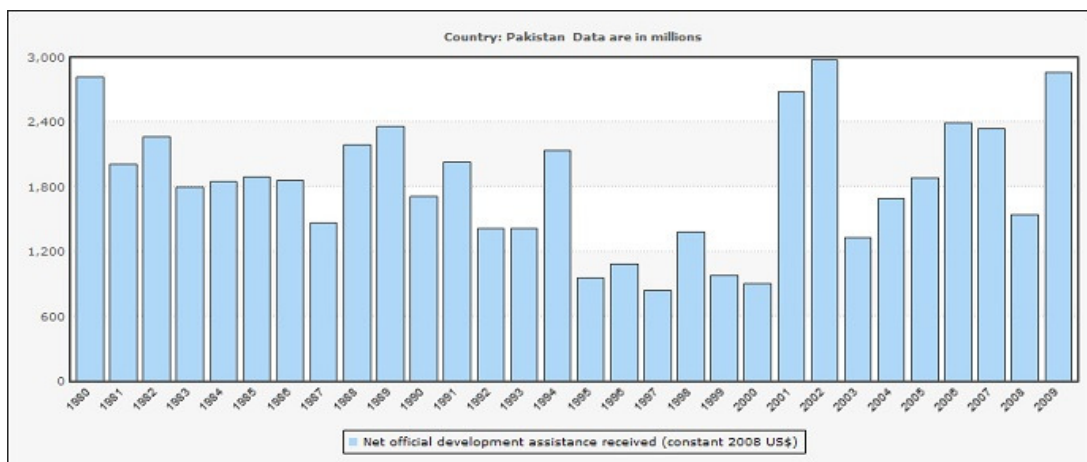
Table 1. gives us a clearer picture of how the ODA is bifurcated into the developing countries in different time dimensions, and Pakistan sporting a usual spot of the top ten positions as the recipient of official aid. The Recipients are usually the underdeveloped countries of the world and the donors comprise of the developed countries or different donor agencies.

Table 1 . Top 10 Aid Recipients over Decades

| 1970-71     |       | 1988-89         |       | 2000-01     |       | 2003-04     |       |
|-------------|-------|-----------------|-------|-------------|-------|-------------|-------|
| Country     | ODA   | Country         | ODA   | Country     | ODA   | Country     | ODA   |
| India       | 1625  | Israel          | 1553  | Russia      | 815   | Iraq        | 2,157 |
| Vietnam     | 1227  | Egypt           | 1180  | Egypt       | 789   | Congo, D.R. | 758   |
| Indonesia   | 912   | Pakistan        | 485   | Israel      | 555   | Egypt       | 724   |
| Pakistan    | 584   | El Salvador     | 410   | Pakistan    | 428   | Russia      | 695   |
| Korea       | 526   | India           | 236   | Ukraine     | 240   | Jordan      | 628   |
| Brazil      | 421   | Philippines     | 224   | Colombia    | 223   | Afghanistan | 596   |
| Turkey      | 421   | Pacific Islands | 199   | Jordan      | 169   | Pakistan    | 557   |
| Colombia    | 351   | Guatemala       | 186   | Yugoslavia  | 155   | Colombia    | 506   |
| Israel      | 199   | Bangladesh      | 174   | Peru        | 154   | Israel      | 495   |
| Laos        | 187   | Honduras        | 174   | Indonesia   | 154   | Ethiopia    | 472   |
| Total above | 6452  | Total above     | 4821  | Total above | 3682  | Total above | 7,588 |
| Total ODA   | 11689 | Total ODA       | 12426 | Total ODA   | 11163 | Total ODA   | 18217 |

Source: World Bank

As defined by the World Bank indicators; Net official development assistance (ODA) consists of disbursements of loans made on concessional terms and grants by official agencies of the members of the Development Assistance Committee (DAC) non-DAC countries to promote economic development.



Source: World Bank Indicators

Figure 2. Net ODA

## Material Source and Methodology

This study aims to analyze the aid effectiveness in economic development in Pakistan during the period 1980-2009. Different statistical techniques are used for this purpose.

### *Sources of Data*

The study is based on the following:

- World Bank, World Development Reports • World Bank, World Development Indicators

| Years | BOT    | GDP     | ODA  | FA   | CAB     |
|-------|--------|---------|------|------|---------|
| 1986  | -2516  | 31,899  | 913  | 1861 | -636    |
| 1987  | -1603  | 33,352  | 816  | 1466 | -556    |
| 1988  | -1890  | 38,473  | 1353 | 2188 | -1,422  |
| 1989  | -2333  | 40,171  | 1411 | 2360 | -1,338  |
| 1990  | -1922  | 40,010  | 1127 | 1712 | -1,661  |
| 1991  | -1415  | 45,452  | 1369 | 2030 | -1,266  |
| 1992  | -2297  | 48,635  | 1011 | 1417 | -1,876  |
| 1993  | -3111  | 51,478  | 1002 | 1416 | -2,901  |
| 1994  | -1725  | 51,895  | 1603 | 2141 | -1,812  |
| 1995  | -2224  | 60,636  | 821  | 964  | -3,349  |
| 1996  | -3063  | 63,320  | 882  | 1091 | -4,436  |
| 1997  | -3522  | 62,433  | 596  | 844  | -1,712  |
| 1998  | -1418  | 62,192  | 1052 | 1386 | -2,248  |
| 1999  | -1596  | 62,974  | 733  | 985  | -920    |
| 2000  | -1691  | 73,952  | 700  | 907  | -85     |
| 2001  | -1476  | 72,310  | 1942 | 2678 | 1,878   |
| 2002  | -1145  | 72,307  | 2092 | 2970 | 3,854   |
| 2003  | -1015  | 83,245  | 1071 | 1327 | 3,573   |
| 2004  | -2876  | 97,978  | 1439 | 1689 | -817    |
| 2005  | -6183  | 109,600 | 1607 | 1886 | -3,606  |
| 2006  | -12010 | 127,500 | 2140 | 2390 | -6,750  |
| 2007  | -13405 | 143,171 | 2244 | 2338 | -8,286  |
| 2008  | -20196 | 163,892 | 1539 | 1539 | -15,655 |
| 2009  | -16891 | 161,990 | 2781 | 2858 | -3,583  |

- Government of Pakistan, Ministry of Finance, Board of Investment
- Handbook of Statistics, State Bank of Pakistan

### Impact of Foreign Aid on Economic Development

Different researchers have carried out different kind of researches in order to understand the impact of foreign aid on the economic development of a country. Both positive and negative results have been documented in the literature based on different dimensions taken by researchers backed by scientific evidence. In the present study ODA (Official Development Assistance), GDP (Gross Domestic Product) and BOT (Balance of Trade), FA (constant ODA at 2008 US\$) and CAB (Current account balance) variables will be used to generate some results and understand the linkage of foreign aid with the overall development..

The results of the estimated model are given below after being statistically analyzed on Eviews:

$$GDP = \beta_0 + 81.13770 ODA - 59.26656 FA + 2.017992 CAB - 4.587879 BOT + 54876.22 \quad (2)$$

From the above estimated equation we can interpret that ODA does promote growth but at the same time the negative sign of balance of trade and FA indicate otherwise. The result shows the positive effect of foreign aid on the GDP in Pakistan in the selected period as the regression coefficient has a positive sign. But BOT and FA coefficients have negative signs showing that the GDP increases at a decreasing trend of trade account. The regression equation fits well, and all the variables are significant. The value of R-Squared is 94.5%. The DW statistic of 1.14 also

show auto serial correlation among the variables selected. The lumber of acute dependence on the foreign aid has been caused by the: firstly, the change in the composition of foreign aid from soft loans to hard loans. In return over the time, it has had a reducing effect on the amount of net aid available for financing the imports and investments. Foreign Aid comes at a price with too many strings attached and hence a vicious cycle of poverty is likely to develop.

### *Granger Causality Test*

A causal relationship has been witnessed between foreign aid and the growth promoters, so we further more emphasize this test to further stamp our stance.

$$\text{GDP} = \beta_0 + \beta_1 \text{ ODA} + \beta_2 \text{ FA} + \beta_3 \text{ CAB} + \beta_4 \text{ BOT} + \mu \quad (1)$$

Table 2. Regression Results

| Variable           | Coefficient | Std. Error            | t-Statistic | Prob.    |
|--------------------|-------------|-----------------------|-------------|----------|
| ODA                | 81.13770    | 13.86305              | 5.852804    | 0.0000   |
| FA                 | -59.26656   | 9.824371              | -6.032606   | 0.0000   |
| CAB                | 2.017992    | 1.194947              | 1.688772    | 0.1076   |
| BOT                | -4.587879   | 1.190551              | -3.853575   | 0.0011   |
| C                  | 54876.22    | 7121.603              | 7.705600    | 0.0000   |
| R-squared          | 0.945366    | Mean dependent var    |             | 74952.71 |
| Adjusted R-squared | 0.933864    | S.D. dependent var    |             | 39292.52 |
| S.E. of regression | 10104.79    | Akaike info criterion |             | 21.46246 |
| Sum squared resid  | 1.94E+09    | Schwarz criterion     |             | 21.70789 |
| Log likelihood     | -252.5495   | F-statistic           |             | 82.19264 |
| Durbin-Watson stat | 1.114000    | Prob(F-statistic)     |             | 0.000000 |

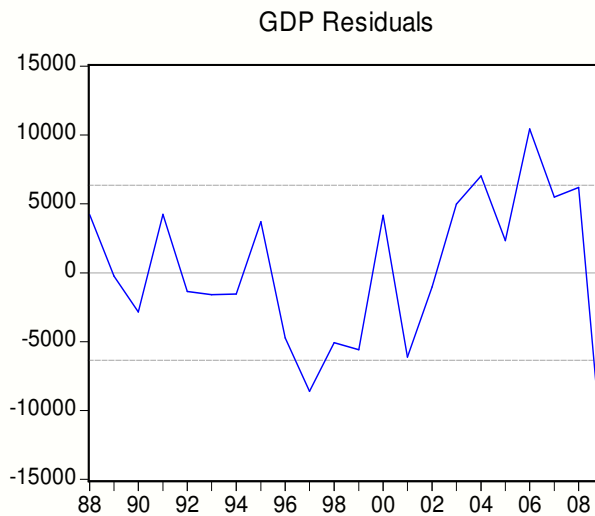


Table 3. Pair wise Granger Causality Tests Lags: 2

| Null Hypothesis:               | Obs | F-Statistic | Probability |
|--------------------------------|-----|-------------|-------------|
| ODA does not Granger Cause GDP | 22  | 2.32179     | 0.12839     |
| GDP does not Granger Cause ODA |     | 6.08165     | 0.01018     |
| FA does not Granger Cause GDP  | 22  | 1.97034     | 0.16998     |
| GDP does not Granger Cause FA  |     | 2.34537     | 0.12603     |
| CAB does not Granger Cause GDP | 22  | 3.00610     | 0.07624     |
| GDP does not Granger Cause CAB |     | 2.10313     | 0.15271     |
| BOT does not Granger Cause GDP | 22  | 2.01278     | 0.16423     |
| GDP does not Granger Cause BOT |     | 5.23115     | 0.01696     |
| FA does not Granger Cause ODA  | 22  | 1.05378     | 0.37032     |
| ODA does not Granger Cause FA  |     | 0.12482     | 0.88346     |
| CAB does not Granger Cause ODA | 22  | 3.18693     | 0.06677     |
| ODA does not Granger Cause CAB |     | 1.34050     | 0.28801     |
| BOT does not Granger Cause ODA | 22  | 7.65961     | 0.00425     |
| ODA does not Granger Cause BOT |     | 2.01017     | 0.16458     |
| CAB does not Granger Cause FA  | 22  | 1.68550     | 0.21489     |
| FA does not Granger Cause CAB  |     | 0.73634     | 0.49353     |
| BOT does not Granger Cause FA  | 22  | 2.88804     | 0.08322     |
| FA does not Granger Cause BOT  |     | 0.56017     | 0.58130     |
| BOT does not Granger Cause CAB | 22  | 0.71231     | 0.50458     |
| CAB does not Granger Cause BOT |     | 1.60754     | 0.22939     |

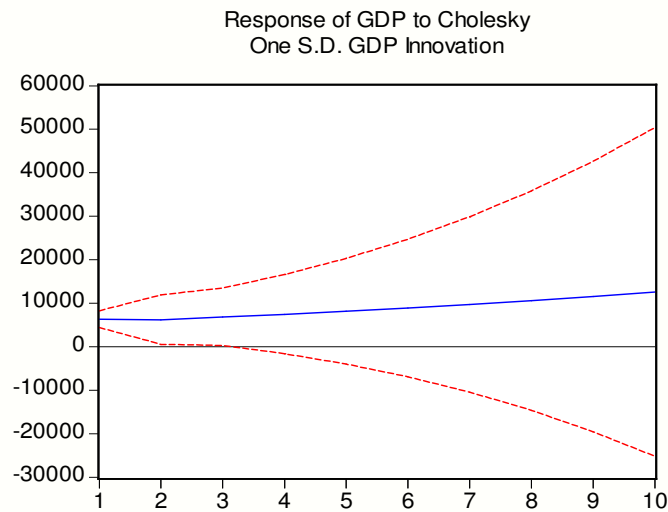
*Residual Plot for GDP*

Normal probabilities plot for the residuals of the variables explains the normality of the data. There has been nil evidence of abnormality in our model as there is no evidence of outliers, skewness in the model estimated.



### *Impulse Response Functions*

Impulse response is the response of a system to a unit impulse at its input. Impulse response function (IRF) tracks the impact of any variable on others in the system. It is an essential tool in empirical causal analysis. It is used in the estimation of the dynamic structure clearly by showing how shocks to any one variable can have considerable affects on every other variable. It then eventually feed backs to the original variable itself. In the following figure the respective shocks are clearly characterized through the cholesky one SD innovations. The Figure-1 shows impulse responses functions. The horizontal spool delegates trace periods of the response function and the vertical spool delegate responses of dependent variable to independent variables. In Figure 1, solid lines stand for calculate values of response functions, dashed line is response function values plus or minus double standard deviation confidence lines.



### Conclusions

Current research suggests that the capital inflows play important roles in the life of an undernourished, impoverished country. It definitely works as an economic growth escalator from the outside, but ingrown issues need more address. A slow paced GDP growth could be in stark contrast to the much higher Dutch disease syndrome. Link between Foreign Aid and Balance of Trade has also come in the forefront. Political instability, terrorism and such burning issues maybe the active regressors in this case. The current study shows both positive as well as the negative effects of foreign aid on the economic development. From the Impulse Response functions also it is clear that a one period shock has a positive effect. It even promotes this kind of positive effect trends to be stable gradually. Due to multiple deficits in the balance of payments and trade, extensive results could not be generated through the Granger causality tests.

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World Development Indicators

INTEGRATING HUMAN RESOURCE MANAGEMENT AND KNOWLEDGE  
MANAGEMENT: FROM THE VIEWPOINT OF CORE EMPLOYEES  
AND ORGANIZATIONAL PERFORMANCE

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Abstract

In this era of knowledge economy, a firm will enhance its productivity, business flexibility, and creativity by using its accumulated knowledge in a wide variety of processes to improve its competitiveness in the marketplace. In addition to general business knowledge management (KM), human resource management (HRM) measures also support and guide management activities, which increases the value of knowledge. The purpose of this study is to propose a framework which investigates the interaction of HRM and KM from the viewpoint of core employees and organizational performance achievements. The results show that HRM practices

including work design, recruit selection, training development, performance evaluation and salary and rewards contribute to the knowledge acquisition, knowledge creation, knowledge dissemination and knowledge accumulation. We explore the importance of harmonious coordination between HRM and KM.

*Keywords:* core employees, human resource management, knowledge management, organizational performance

## Introduction

In this era of the knowledge economy, the collective knowledge, skills, and capabilities of the employees have become important sources of the firm's competitive advantage (Becker and Gerhart, 1996; Pfeffer, 1994). Knowledge sharing among employees can create new knowledge and enhance innovative capability of a firm (Kogut and Zander 1992; Wu and Cavusgil 2006; Camelo-Ordaz et al. 2011) and human resources are the core focus of HRM (Prieto-Pastor et al. 2010). HR generates "human capital advantage" through recruiting and retaining exceptional human talent that provides value and cannot be easily imitated by other organizations. Lopez-Cabrales et al. (2006) demonstrated that the value and uniqueness of core employees' knowledge, skills, and abilities help develop organizational capabilities and contribute to organizational efficiency. Recent studies have stressed the need to strengthen jointly in KM and HRM through a bridge between both literatures (Svetlik and Stavrou-Costea 2007; Prieto-Pastor et al. 2010; Intan-Soraya and Kok-Wai 2010; Camelo-Ordaz et al. 2011).

However, little literature discussed the impact of HRM practices, particularly the core employees, on KM practices. Thus, this paper is to investigate the interaction between HRM and KM from the viewpoint of core employees and organizational performance.

To develop and promote employees' knowledge and technical capabilities, an organization's human resource management (HRM) should systematically design and implement procedures for recruiting, training, compensating, and evaluating the performance of employees. These measures should be adjusted and updated in accordance with changes in conditions both inside and outside the organization (Youndt, Dean and Lepak, 1996). If these improvements in human resource capital are implemented successfully throughout the organization, managerial flexibility and the organization's competitiveness are likely to increase. To avoid dependence on a single key employee, the organization should utilize formal training, team work and standardized documents, to gradually transform the abilities of its employees into public information about its daily operations. The organization must evaluate these procedures regularly. However, when the knowledge of a firm is transformed into publicly available written documents, it may be at risk of losing some of its flexibility and creativity.

Corporations use different knowledge management (KM) processes and practices to promote productivity, business flexibility, and creativity (Holsapple and Singh, 2001), and thereby increase the value of the business. Hansen has developed a large number of KM

practices (Hansen et al, 1999). His results reveal two strategic types of KM in organizations. Some companies emphasize computers and information systems. Knowledge is recorded and stored in a database, making it easy for employees to access and repeatedly make use of. This is called the codification of a KM strategy. The other type of KM involves keeping knowledge by individuals. The communication, dissemination, and sharing of knowledge depends primarily on face-to-face interactions among people. The computers are used to help people communicate and share their knowledge. In addition to support the activities of managers and expand the organization's knowledge base, HRM units can take measures to help implementing KM strategies (Soliman and Spooner, 2000). When a codification-oriented KM strategy is being employed, HRM focuses on hiring workers who can blend into the internal knowledge system, train employees for teamwork and computer learning, participate in the development of an electronic documentation system, and encourage frequent interactions among employees and the sharing of knowledge about the business. If an individual-oriented KM strategy is being used, HRM focuses on hiring workers who can solve problems but also tolerate ambiguity. In this case, employees are taught one-by-one and encouraged to share their tacit knowledge. If a KM strategy is to be maximally effective, knowledge enhancement strategies and human resource strategies must work in tandem (Hansen et al, 1999).



Many researchers have focused on knowledge creation in organizations (Nonaka & Takeuchi, 1995; Nonaka & Konno, 1998; Eleuterio, 2000; Wong, 2000). Their studies are usually based on the theory proposed by Nonaka (1991, 1994), who suggested that knowledge creation comes from the interaction between tacit and explicit knowledge. His introduction of the concept of *knowledge creation processes* has led researchers to examine knowledge creation in different ways. For example, Nonaka and Takeuchi (1995) studied the context of knowledge creation and core knowledge concepts in organizations. They proposed five internal scenarios that organizations can use to successfully promote the creation and sharing of knowledge.

Nonaka and Konno (1998) also examined the stages of knowledge creation in an organization. Their results show that knowledge is generated by interactions among individuals and groups that have distinctive characteristics. Other studies have examined how an organization integrates and disseminates its internal knowledge for the purpose of putting it into practice (Hedlund, 1994; Leonard-Barton, 1995; Grant, 1996; Teece et al., 1997). For example, Hedlund (1994) examined similarities and differences in how Western and Japanese organizations integrate knowledge by studying the levels in their organization. He suggested that different kinds of knowledge find their own ways to circulate in an organization. This approach to knowledge creation focuses on interactions among people or organizations. Because these

interactions are closely related to HRM, the relationship between HRM and knowledge processes offers researchers a valuable avenue for further investigation.

The rest of the paper is organized as follows. The next and third sections consider the relevant literature of KM and HRM, respectively. In fourth section, we outline the HR roles and actions that create competitive advantage from knowledge process. The fifth and sixth sections are devoted to the interactions between HRM and KM. Finally, conclusions and implications are presented.

### Knowledge Processes

Davenport and Prusak (1998) characterize knowledge as a synthesized floating mass that includes structured experiences, verbalized information, unique expert opinion and evaluation, an integration of new experiences, and the provision of an information framework. In an organization, knowledge exists not only in the form of documentation and storage systems; it also comes from daily work routines, processes, execution, and standards. KM is defined by O'Dell and Grayson (1998) as the continual process of giving valid information to other members of the organization and helping them act in proper ways that improve the organization's performance. The purpose of KM is to manage information that is scattered among the individuals, departments, and branches of the organization. As we know, firms face increasingly complicated market environments and fierce competition. The question of how they

can best manage their knowledge has become an extremely important topic. KM is the process by which understanding is achieved through seeing, knowing, and extracting pertinent information. This information is then transformed into knowledge that can be used to increase the organization's competitiveness in the marketplace. The process includes the acquisition, representation, and discovery of knowledge.

Davenport and Prusak (1998) suggested that knowledge is information combined with experience, context, interpretation, and reflection. We can draw on the experience of experts, as well as the inference rules and models provided by information systems, to strengthen learning in the organization. KM, as defined by Drucker (1993), differs from general management activity in that it is based on the premise that knowledge has a purpose that is to be systematically applied to create new knowledge. Every firm manages knowledge systems differently. Some consider knowledge to be a substance that is scattered throughout the organization. Members of the organization integrate and store this knowledge in a database for easy retrieval and use. Others focus on improving access to knowledge. They first identify the core employees who can provide the company with knowledge. Then they use proven methods and solutions to transform knowledge into practice. Other firms focus on establishing an organizational culture that supports the sharing of knowledge. Yet others treat knowledge as an asset, emphasizing methods for using this asset to increase the organization's value.

The focus of KM is to use knowledge to achieve creative goals and promote effective decision making, so that the organization can better adapt to market changes and respond to market demands. To use KM effectively, an organization must manage its activities properly and encourage its employees to share information and ideas so that new knowledge can be created. Another goal is to disseminate this personal knowledge after it is documented by KM systems such as databases, group software, email, and the Internet (Sarvary, 1999). Researchers have proposed a variety of KM procedures. For example, they have proposed that KM should include many different, interdependent activities and mechanisms. Bhatt (2000) suggested that there are five aspects of knowledge development in KM: acquisition, creation, communication, inspection, and correction. Holsapple and Singh (2001) introduced the concept of *knowledge value chains*, in which the basic activities are acquisition, selection, production, internalization, and externalization. According to the theory of Gilbert and Gordey-Hayes (1996), the components of KM are knowledge acquisition, communication, application, adoption, and assimilation. Finally, Shih and Huang (2005) divided knowledge processes into four parts: acquisition, creation, dissemination, and storage (Figure 1). Organizations can acquire the knowledge they need either from outside sources or in-house, but in either case they must transmit the knowledge effectively to other members and units of the organization. Systematic knowledge stored in a database should be continually communicated, created, disseminated, and combined. Eventually, an

organizational memory takes shape as the organization develops specific methods for storing its knowledge.

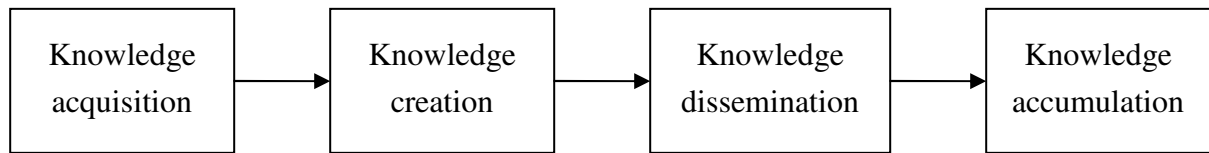


Figure 1. Knowledge Process.

### Knowledge Acquisition

When an organization acknowledges its limitation of knowledge in a certain area, this knowledge gap requires the lacking knowledge to be acquired from outside or created inside. The organization may turn to other companies to assist it in developing the ability to acquire this knowledge (Leonard-Barton, 1995). Alternatively, it can purchase advanced technology from the marketplace. Finally, companies can cooperate with one another by combining their resources through mergers or consolidation. This approach can also help the organization to obtain needed knowledge (Gilbert and Gordey-Hayes, 1996).

### Knowledge Creation

When companies realize that they cannot acquire important knowledge from outside, they must establish internal knowledge-creation mechanisms (Beckett, Wainwright, and Bance, 2000). Organizations may have unique abilities that can be difficult for its competitors to imitate

(Barney, 1991) and thus have the potential to achieve enviable product innovation and technical breakthroughs. Managers must create or encourage an environment in which employees can participate in the development of projects and new technological systems while sharing their unique knowledge with others in the organization (Leonard-Barton, 1992). They also can generate new concepts by working with others in self-organized teams (Nonaka and Takeuchi, 1995). In addition, there are situational factors that can promote knowledge creation. These factors include granting appropriate decision-making powers to employees, developing the skills that employees need to successfully deal with complicated outside environments or emergencies, establishing a database for document filing, and encouraging open discussions about new knowledge (Nonaka and Takeuchi, 1995).

### Knowledge Dissemination

Knowledge dissemination refers to the activities a unit performs to spread information efficiently and effectively to other units in the organization so that others can share and use this information. Employees in an organization must understand and adapt to others' knowledge and skills. A common knowledge base is necessary for the effective dissemination of different specialized areas of knowledge (Shih and Huang, 2005). Grant (1996) suggested that most knowledge is unique. Thus, to disseminate knowledge effectively, people need adequate abilities and explicit intentions. Nonaka and Takeuchi's (1995) concept of redundancy addresses the

point that organizations should delegate information, business activities, and managerial responsibilities to specialized staff in addition to the regular staff.

An organization should establish mechanisms for integrating knowledge from various sources by means of formal and informal communication channels such as internal standards and rules, written documents, work records, oral reports, and emails. By doing so, they can transform tacit knowledge into understandable explicit knowledge that can be efficiently circulated within the organization. This knowledge can be applied later on to improve learning in the organization as a whole (Gilbert and Gordey-Hayes, 1996). When an organization has specialized or complicated missions, such knowledge integration can facilitate solutions to problems and decision making through teamwork (Grant, 1996).

### Knowledge Accumulation

Knowledge accumulation is the transformation of knowledge that already exists in the organization's long- or short-term memory. If this transformation is efficient and effective, it can save time and effort for other members. It also allows errors to be easily corrected. Organizations usually employ the following three major channels or tools to store their core resources: (1) database and management information systems, (2) special projects, teamwork, apprenticeship systems, or educational training, and (3) the organization's objectives, structure, systems, as well as written documents and governmental files (Badaracco, 1991; Leonard-Barton, 1995).

## Human Resource Management

Human capital is scarce, of great value, and difficult to duplicate and replace (Barney, 1996). Therefore, it is considered a strategic asset that can promote organizational values. When an organization plans and manages human resource activities to meet its business goals and resource demands while simultaneously coordinating its HRM with its functional activities (Baird and Meshoulam, 1988; Schuler and Jackson, 1987), it can help improve job performance, enhance its potential for development, and strengthen its core competitive advantage (Hiltrop, 1996). The fast-paced development of information technology has increased the pressure on businesses to adopt global strategies both inside and outside their operating environment. Numerous researchers have applied a strategic approach to studying HRM functions. They also have begun to focus on long-term decision-making by stressing an integrative orientation. They propose that the activities and organizational strategies associated with HRM should be coordinated with other functional activities (Schuler and Jackson, 1987; Hiltrop, 1996; Delery and Doty, 1996).

Researchers who take a strategic approach to HRM have further suggested that the achievement of an effective HRM system requires the organization to urge all its subunits and departments to coordinate with one another (Baird and Meshoulam, 1988; Becker and Gerhart, 1996). Drawing on this idea, researchers have suggested, and empirically identified, the types of



HRM strategies that companies use to determine employee salaries and the extent to which employees should participate in decision-making (Delery and Doty, 1996). Bae et al. (1998) divided these criteria into two categories. The first, which they call the *buy-bureaucratic* strategy, emphasizes outside recruiting, limited training, exact job definitions, and seniority as the criteria. The second, which they call the *make-organic* strategy, emphasizes internal promotions, extensive training, comprehensive job definitions, and the employees' abilities or performance as the criteria.

Because it is difficult for outsiders to observe how these HRM systems work, it is difficult to imitate them (Wright and McMahan, 1992). Regardless of how employees' knowledge is created, it is valuable and unique. Its development flows naturally from individuals or groups sharing knowledge among themselves (Nonaka, Toyama and Konno, 2000). Therefore, organizations that effectively use internal and external human resources and establish an HRM system based on KM can quickly blend their old and new information and experiences to efficiently make organizational changes in a coordinated manner. In this process, the integration and leveraging of knowledge can also be enhanced.

When a firm is recruiting, it screens and selects candidates who possess qualifications, personal characteristics, and skills suitable for the job. The firm must then continually train the employees it hires to increase their professional knowledge and sharpen the techniques they need

to do their jobs. An incentive program should also be set up to promote or motivate employee performance. Because of the uniqueness of the needed abilities, corporations must have appropriate organizational designs and communication mechanisms to facilitate the internalization of employee knowledge (Pfeffer, 1994; Ulrich, Brockbank and Yeung, 1995). Lam and White (1998) suggest that employers should offer viable, long-term employment strategies that can attract, assure, and develop optimal human resources and thus create long-term competitive advantage.

According to research by Lopez-Cabrales, Valle, and Herrero (2006), core employees who have unique skills and abilities can achieve higher levels of effectiveness than those who lack such unique abilities and skills. Hence, consistent with a human resources perspective, managers should hire, maintain, and develop core employees who cannot be imitated by competitors. Such employees make positive contributions to an organization’s capabilities and contribute to its effectiveness (as shown in Figure 2).

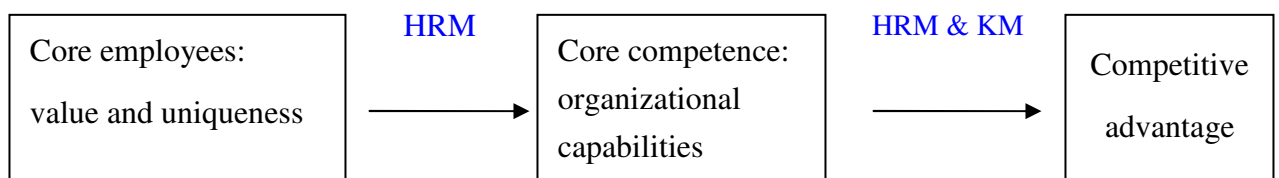


Figure 2. A Model of the Relationships among Core Employees, Capabilities, and Competitive Advantage (revised from Lopez-Cabrales et al. 2006).

The conceptual framework of this study, based on the above points, is shown in Figure 3.

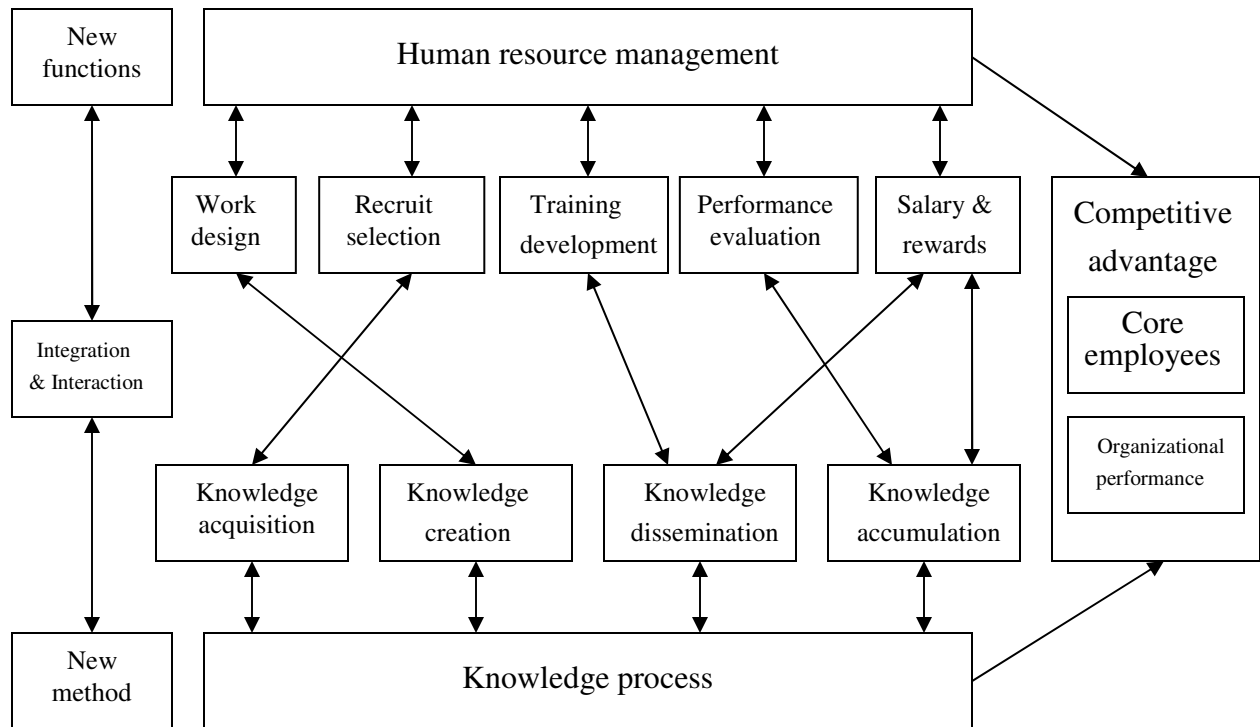


Figure 3. The Conceptual Framework of the Study.

### Human Resource Management and Knowledge Process

Knowledge cannot produce value by itself; it requires management, communication, and information technology to be useful and effective. An organization must use HRM system to confirm the knowledge, skills, experiences, and creativity of every employee. The abilities of these employees can be strengthened further through educational training and development systems. Excellent reward, incentive, and communication systems constructed in a way that make employees feel their knowledge and efforts are appreciated by the company, can also enhance their abilities. When employees' abilities are strengthened, so are their intentions to

communicate and disseminate knowledge among themselves, and a culture of knowledge sharing is established (Bartlett and Ghoshal, 1998; Buckman, 1998; Martinez, 1998; Martiny, 1998; Coleman, 1999). In other words, the interaction between HRM and KM is reflected in the HRM subsystem and produces an integrated outcome that is evident in the recruiting, training, cultivation, and applied knowledge of the organization's employees. This argument is outlined in Table 1, which is adapted from Lengnick-Hall and Lengnick-Hall (2006).

### Connecting Knowledge Process with Human Resource Management

#### *Work Design*

Nonaka and Takeuchi (1995) concluded that employees are most likely to increase their motivation to create knowledge if they are given decision-making power or learn on the job to blend their knowledge into the organization (Leonard-Barton, 1992). In addition, a creative culture and atmosphere, straightforward communication channels, and monitoring of the external environment all promote the efficient integration and transmission of knowledge within an organization (Bhatt, 2001; April, 2002).

#### *Recruiting and Selection*

An organization should choose qualified candidates who have knowledge and skills in professional fields related to the organization's mission. The organization should hire applicants who display an aptitude for team learning and future growth and development, have relevant

work experiences, and come from a variety of backgrounds (Davenport and Prusak, 1998; Greengard, 1998).

Table 1. HR Roles and Actions that Create Competitive Advantage from Knowledge Process

| HR Role               | HR Actions  | Knowledge Processes    |                         |
|-----------------------|---|------------------------|-------------------------|
| Knowledge Facilitator | 1. Hire employees (in large part) based on learning capabilities.   | Knowledge Acquisition  |                         |
|                       | 2. Map key sources of employee knowledge within the organization.   |                        |                         |
|                       | 3. Create incentives to encourage knowledge acquisition and knowledge sharing among employees.                              |                        |                         |
|                       | 4. Facilitate rapid, creative, and effective application of knowledge to organizational problems and opportunities.         | Knowledge Creation     |                         |
| Human Capital Steward | 1. Track and utilize the full range of employee talents -- not just traditional knowledge, skills and abilities.            |                        |                         |
|                       | 2. Treat workers as volunteers or free agents who “own” their intellectual capital.   |                        |                         |
|                       | 3. Create resource flexibility by identifying multiple uses for individual employees wherever possible.                     |                        |                         |
|                       | 4. Create coordination flexibility by adapting and applying HR practices across a wide range of situations.                 |                        | Knowledge Dissemination |
|                       | 5. Create an organizational culture of continuous learning, inquiry, and personal responsibility for avoiding obsolescence. |                        |                         |
|                       | 6. Staff the organization with an appropriate mix of core, associate, and peripheral workers.                               |                        |                         |
| Relationship Builder  | 1. Create and reinforce a sense of community across all units of the organization.  | Knowledge Accumulation |                         |
|                       | 2. Show employees how their individual actions and outcomes affect the entire organizational system.                        |                        |                         |
|                       | 3. Create opportunities for cross-functional and cross-occupational collaboration, learning, and shared experiences.        |                        |                         |
|                       | 4. Identify and cultivate boundary spanners that connect distant parts of the organization together.                        |                        |                         |

### *Training and Development*

An organization should provide internal and external training courses and a wide range of educational opportunities to help employees acquire new knowledge from both inside and outside the organization (Delery and Doty, 1996). Job rotation system or training courses that can be set up on the website may increase employees' vision and help them sustain and promote their professional abilities. Use of such resources can also contribute to knowledge creation, knowledge sharing, and the two combined (Narasimha, 2000; Yahya and Goh, 2002).

### *Performance Evaluation*

Individual growth, learning, development, work independence, and knowledge sharing should be added as criteria for the assessment of employee job performance; they should then be combined with educational training, salary adjustments, and promotion systems (Martin, 2000). Such evaluations are likely to enhance employees' desires to participate in long-term knowledge development and continue to use and add to their knowledge.

### *Salary and Rewards*

Greengard (1998) concluded that an organization must provide appropriate incentives and motivation if its employees are to increase their desire to communicate and share knowledge. By using salary adjustments and reward systems to encourage learning in an organization, employers can retain precious experience in the company, encourage their employees to share

and transfer knowledge through teamwork, and improve the effectiveness of KM mechanism (Buckman, 1998; Martiny, 1998; Coleman, 1999; Yahya and Goh, 2002).

### Connecting Human Resource Management with Knowledge Management Process

The interaction between HRM and KM may be further explained by considering the four steps of knowledge management separately as follows.

#### *Knowledge Acquisition*

One of the most important sources of knowledge acquisition is external talent, and such talent should be recruited for. Standardized salary agreements, salary structure arrangements, recruiting methods, and source planning will affect recruiting outcomes and thereby assist the acquisition of new knowledge. Through job and function analysis, an organization must learn how to transmit appropriate knowledge, and integrate and increase the knowledge of current employees through systematic training and development courses (Delery and Doty, 1996). Appropriate adjustments of employee job rotations can diversify the organization's experiential and knowledge base, thereby increasing its potential to create new knowledge (Pfeffer and Viega, 1999).

Inkpen (1996) noted that companies cooperate with one another to achieve specialized learning objectives and, specifically, that they form joint ventures for knowledge creation. Leonard-Barton (1995) identified the specific sources of knowledge as counseling, customers,

national laboratories, universities, other companies in the same business (both competitors and non-competitors), and suppliers. They also suggested five methods to help organizations obtain knowledge: internal self-development, externally assisted development, public market purchases, co-operation among companies, mergers, and consolidations.

### *Knowledge Creation*

Knowledge creation requires that employees have the necessary abilities as well as the intentions. Whether they succeed in creating knowledge depends on the quality of the training they receive to improve their abilities and help them solve problems (Delery and Doty, 1996). A good job rotation system can also increase the employee's vision (Pfeffer and Viega, 1999). After all situations are considered, creative opinions are proposed. There must be close connections among the desire to create knowledge, the organizational culture, and the motivational system. Executive managers, in particular, must emphasize knowledge creation, absorb the additional costs incurred by failed experiments, and link knowledge creation with salary rewards. Such efforts can be expected to promote the intention to create knowledge (Shih and Huang, 2005).

### *Knowledge Dissemination*

As is the case with information systems, knowledge dissemination is related to the arrangement of the positions in the design of the organization structure. The speed, the direction,



and the level of knowledge dissemination are affected by two sets of factors. The first is the ability and intention of employees to spread already obtained or created knowledge, which has a close relationship to performance evaluation and the reward system. The second is the enforcement of routine regulations and document flow, which involve the employees' professional abilities, which in turn are connected to their job training. Training courses can increase the opportunities for interaction and communication. They also contribute to the sharing and dissemination of knowledge (Delery and Doty, 1996). Grant (1996) and Teece et al. (1997) studied how an organization integrates knowledge in a developmental environment. Both groups of authors suggested that the organization must decide which method to use for knowledge integration by examining factors such as in-house job content, the organization structure and the common culture.

### *Knowledge Accumulation*

Well-managed employee performance and a well-designed salary system can encourage employees to transform their tacit knowledge into explicit knowledge that can be applied repeatedly. At the same time, an organization's value chain can spread, organize, construct, specify, communicate, and further apply knowledge for the purpose of decision making and problem solving (Soliman and Spooner, 2000; Carter and Scarbrough, 2001). The organization may consider bonuses or shares of company stock, career development plans, and internal

promotion to retain talented employees whose knowledge is especially important to the organization.

Simon (1996) maintained that an organization must establish an information system to spread diversified knowledge inside the organization. The establishment of such an information system can help an organization solve its knowledge accumulation problems. Nonaka and Konno (1998) concluded that after an organization successfully creates knowledge it should focus on the creation of knowledge banks. In this way, the knowledge collected by the members can be extensively circulated and applied within the organization. Finally, Ghingold (1998) suggested that an organization must effectively use and manage its technical knowledge if it is to achieve future success.

### Conclusion

Knowledge has become the most important factor for creating value in the new economy. The organization is considered to be an institution that can integrate professional knowledge and facilitate learning in the service of fulfilling its objective of manufacturing products and delivering services. Knowledge exists in different forms, such as technologies, patents, and various aspects of know-how. In recent years, many researchers have started to investigate how an organization acquires or creates knowledge to improve its competitiveness. Knowledge is regarded as an important asset in this regard.

Knowledge can be divided into tacit knowledge, which includes cognitive techniques and technical abilities learned from experience, and explicit knowledge, which is systematic and easy to communicate, share, and understand. Exclusive knowledge is the unique knowledge of a company and is the focus of knowledge management. It includes the company's routine practices, documentation, commercial secrets, and it is the primary source of competitive advantage. General knowledge is public knowledge that is not unique to the organization but exists in its external environment.

From the standpoint of organizational learning, companies accumulate certain experiences through internal development or the transmission of new knowledge from the outside. Organizational learning is promoted by individual learning. This process, which occurs at different levels of the firm's organizational structure, is referred to as knowledge creation process. The members of the organization receive information and then share it with other members. In these interactions, the created knowledge is integrated and disseminated throughout the organization. Eventually, this knowledge forms a system that leads to routine activities. In the past, researchers studying knowledge management have used organizational learning theory and HRM theory to investigate how organizations use strategic alliances and constructive learning to strengthen their ability to acquire knowledge. Therefore, the interaction between HRM and KM can affect core employees and the organization's performance. Given the current

climate of global operation, this integration of HRM and KM will become one of the most important themes in business operations.

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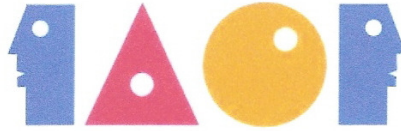
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## A STUDY OF KNOWLEDGE MANAGEMENT WITHIN THE BACHELOR-MASTER STRUCTURE IN THE NETHERLANDS

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### Abstract

This study reflects on the literature regarding knowledge management by solving the following problem definition: can the instruments Intellectual Capital and Business Process Reengineering be used as a tool of management within the redesign of the curriculum of the bachelor accountancy part-time? This problem definition is solved by applying the methodology of auditing: design – existence – functioning to the current curriculum and to the curriculum to be reengineered. This reengineering fits within the transition from the current regular studies to the bachelor studies within the bachelor / master structure, as they were implemented in the beginning of the new millennium in the universities in The Netherlands and the rest of the European Union.

This paper allows the chance to look back at the Business Process Reengineering that took place within the bachelor of accountancy in the years 2002 until 2005 and evaluate the results within this bachelor studies up to now.

Keywords: Business Process Reengineering, Intellectual Capital, Bachelor Accountancy, Bachelor Economics, Bachelor of Business Economics (BBE)

## Introduction

The possibilities and limitations of the instruments Intellectual Capital (IC) and Business Process Reengineering (BPR) within the redesign of the curriculum for the bachelor accountancy part time within Fontys University of applied sciences are researched within this paper. The research is done based on the audit methodology : design – existence – working. This methodology is applied to the existing curriculum and to curriculum to be redesigned. The results are that both IC as BPR are very well applicable as instruments of knowledge management (KM) for the redesign of the current curriculum towards the curriculum, which fits within the Bachelor- Master structure (BAMA). It even goes that far that I can conclude that it is possible based on the findings of this research a more generic model can be build, that even within other bachelor programs and maybe scientific masters and post masters is valid (Hartog, 1992). The conclusions are that by applying the concepts of IC and BPR towards the redesign of curricula, activities and processes can be made transparent by using IC and thereafter can be designed and structured more efficient and more effective by using BPR (in 't Veld, 2010).

## Design of the Curriculum

The current bachelor accountancy part time has the same criteria as the bachelor accountancy full time and are stated in 32 professional competencies, as arrested in 1999 by the 'AC-Scholenoverleg' in the most recent 'Beroeps- en Opleidingsprofiel Accountancy'. These competencies are spread over three segments:

- First segment : Operating tasks
- Second segment : Participant in a working organization
- Third segment : Member of a professional organization

The competencies in the first segment are further subdivided in four sub segments:

Audit Activities, Accounting Services, Taxes and Consultancy

The bachelor accountancy part time has a joint propedeuticum with the bachelor business economics part time and the bachelor taxation part time. The propedeuticum is build up by a number of general subjects, which are relevant to all three bachelor programs. The education consists of lectures and tutorials and a few projects and reflection reports on the working environment. One of the admission criteria for part time bachelor education is working in an environment, which is relevant for the part time bachelor program to be attended. egarding the bachelor accountancy part time a job within an audit firm is obligatory (Delhoofden, 1996). A part of the admission to the bachelor accountancy part time is an intake assessment, where

besides the requested preliminary education the already acquired competencies are described. On the basis of the preliminary education and the already acquired competencies a study program is made for the individual part time student. In this way is decided if the student has to study parts of the propedeuticum or directly can be admitted to the second year of the bachelor accountancy program. Sometimes it is possible to start directly in the third or fourth year of the bachelor accountancy program part time (Gramsbergen-Hoogland, 1999).

An example of starters in the fourth year of the bachelor of accountancy part time are the graduates of the bachelor economics full time and part time. The didactic settings within the bachelor accountancy part time are lectures and tutorials every Friday. Besides that the students perform projects in groups. Also the students write a number of reflection reports about their job environment (Janssen-Noordman, 2002). In the end the part time students accountancy participate in the Overall Assessment Test (OAT), where the knowledge of accounting information systems, financial reporting and auditing on bachelor level is tested. Passing the OAT is necessary to be admitted into the master of science and post master of science education, which leads to the job titles Registeraccountant (RA) or Accountant administratieconsulent (AA). Both job titles are legally protected in The Netherlands and have each their own law, Wet op de Registeraccountant and Wet op de Accountant administratieconsulent, which are at the moment merged into one law Wet op de accountant, in which both job titles are covered.

Recently both representing organizations for RA (NIVRA) and AA (NOvAA) merged into one new representing organization for RA and AA together, called the NBA. The part time accountancy students write a thesis at the end of their studies within their own job environment and they defend this thesis in an examination session, with first and second reader and an external examiner (Kroeger, 2007). The part time accountancy students have a coordinator part time studies accountancy as an informationdesk and they do not have individual coaches, as the full time students have. The approval of the problem definition of their thesis is done by the liaison officers of the bachelor accountancy full time (Weggeman, 2000).

#### Intellectual Capital and Business Process Reengineering

The instruments of IC and BPR within the part time bachelor of accountancy are recognizable within the curriculum (van Someren, 1991). Regarding IC we can name the Onderwijs- en Examenreglement (OER) in which the curriculum is described on one side formal, on the other side by an addendum with the format of a matrix with the limitative summing up of all the learning arrangements including examcodes and credits. A more detailed description of all learning arrangements the students find in their course manuals, where the final details in literature, assignments and course materials per week is recorded. OER and course manuals are yearly respectively once per half year updated (van Wijk, 2007).

Further regarding IC we can mention the thesis's written by the part time students of bachelor accountancy, which are kept in the mediatheek and are accessible for other students.

Finally the web board is a source of IC, where used sheets, solutions of assignments, old exams with solutions and formal and informal communication. The web board is within the part time bachelor accountancy an important tool of communication between Fontys and the students (Stam, 2004). Another tool of IC is the student monitoring system, where the grades and the results of the part time students bachelor accountancy are recorded.

The instrument BPR is not used intensively within the current part time bachelor accountancy. An example of the use of BPR within the part time bachelor accountancy is the process of work placement and graduation. Especially the process of graduation need to be redesigned because of recent fraud cases in The Netherlands where universities of applied sciences like INHOLLAND in Amsterdam and Windesheim in Zwolle had to declare hundreds of diploma's not valid and take them back from the bachelor students because the quality of the graduation thesis was below academic standards (Mirande, 1997).

The impact of these events was great in the academic world in The Netherlands and even the minister of higher education had to take action on the demand of the Dutch parliament. In practice it came to resignation of board of directors and supervisory board of INHOLLAND and foreclosure of the bachelor journalism in Windesheim. All the other universities of applied

sciences are now in the middle of completely redesigning their processes of graduation and work placement. It is legitimate to describe this process as BPR, although the universities of applied sciences might not describe it with this word. Within the part time bachelor accountancy the BPR that has been done is that the graduation criterium, which states the conditions under which a part time bachelor accountancy student can start his graduation project and write his graduation thesis, is from now on strictly applied. In the past part time students bachelor accountancy were assigned to a senior lecturer within the faculty, who monitored the student in his graduation project and proofreading concepts of his thesis and who is also chairman of the examination of the graduation thesis, when the student entered his fourth year of studies.

It was not monitored how many credits the student then had. This resulted in inadequate graduation processes (Swieringa, 1996). From now on a part time student bachelor accountancy first has to comply with the graduation criterium, which means a minimum amount of credits to be earned and the student has to deliver a researchable problem definition, which he discussed within his job environment if this problem definition can be researched within the organization he works full time. If the student complies with both criteria, he is assigned to a graduation coach and he starts the graduation process with a time of 1 academic year.

This was 6 months. Another major change in the work placement and graduation process is that there is a second reader assigned to every work placement student, which means that the



work placement report is no longer judged by the work placement coach alone, but also by the second reader. First reader and second reader have to judge the work placement report and come to a final grade together, which is recorded in a protocol. A checklist with a whole set of criteria for WP is filled out by first and second reader and attached to the protocol.

In the case of graduation there have always been first and second reader and an external examiner. The BPR change here lies in the protocol. This used to be a simple protocol, which basically stated pass or fail and the grade and one or two lines of motivation. This protocol has always been sign by the three officials mentioned before. Now there is a totally new protocol which is subdivided in four sections: Problem and Research Objectives, Methodology and Data-analysis, Results and Reports.

The sections A, B and C – the research and the questioning – counts for 75% and D – the report and the presentation – counts for 25%. The sections A, B,C and D are subdivided into subsections, which all have their own weights. The final grade has to be 5,5 or higher and then the student is successfully passes his graduation thesis (Kempen, 1996). Before the graduation session the first and second reader fill out the format as far as possible and try to come to consensus. Also the external examiner fills out the format as far as possible and brings the form to the graduation session. After the graduation session of 60 minutes, where the student gives a presentation of maximum 20 minutes and where the student answers the questions asked by the

external examiner, the first and the second reader in about 30 minutes, leaving 10 minutes to discuss and complete one final version of the format, signed by the external examiner, first and second reader, there is about 10 minutes left to explain the format and the results to the student if he has failed or passed, the student knows directly if his has passed or failed the graduation exam. When failed, he can rewrite the graduation report and within a certain time period have a new graduation exam, or he has to do a complete new graduation project of about 6 months.

#### Current State of the Curriculum

The part time bachelor accountancy was build upon the criteria which were derived from the “Beroeps- en Opleidingsprofiel” dated back to 1999, which is defined in terms of 32 competencies. The curriculum consists of a number of subjects, which are taught to the part time accountancy students in lectures and tutorials on Friday. Besides that the part time students execute a number of projects in a project group and they work as we call it projectmatig which is typical for the didactic workform of projectonderwijs. Also the part time students write a reflection report based on the activities within their professional work environment and they write a graduation thesis based on a problem definition, which is retrieved within their own professional work environment. The transformation to the bachelor master structure – which was in fact a form of BPR – is implemented within the part time bachelor accountancy, as well within

all the other professional bachelor programs within Fontys University of applied sciences (Swedberg, 1991).

This is today also true for all the professional and scientific bachelor and master programmes in all the member states of the European Union, and even outside the EU bachelor/master structure is implemented or to be implemented in the near future, e.g. Russia and other Eastern European countries, who belonged to the former U.S.S.R. and even countries in the Middle and Far East have adopted the bachelor/master structure, e.g. in Saudi Arabia and Indonesia there are found some of the most prestigious academic bachelor and master programmes. Resuming you could say that the Anglo-Saxon academic model of bachelor and master has concurred the world! Within Fontys there is an EVC- knowledge center, where EVC stands for previously acquired competencies, where these Competencies are assessed. The part time bachelor accountancy intensively cooperates with the EVC-knowledge centre to enlarge the inflow of part time students bachelor accountancy and to broaden this inflow.

By centralisation of the assessment of the EVC's there is the beginning of the building of Intellectual Capital, in a way that experience is building up within Fontys to assess EVC's and based on the results of these assessments students can be admitted to bachelor studies – part time or full time – within Fontys University of applied sciences at different entry levels, like propedeuticum, second, third or even fourth year of the bachelor studies.

In this process also lies a form of Business Process Redesign (BPR), because bachelor studies within Fontys and also the part time bachelor accountancy are being confronted with a more Heterogeneous group of incoming bachelor students, to whom the bachelor study has to Anticipate by the design and execution of the curriculum (Reynaert, 2006).

### The Execution of the Curriculum

The transformation of the earlier mentioned criteria of the most recent “Beroeps- en Opleidingsprofiel accountancy” towards the final terms of the 8 domain competencies of the Bachelor of economics for the part time bachelor accountancy took place around the year 2005. Within the possibilities of the part time bachelor accountancy connection is sought to these 8 domain competencies, without loosing sight on the still valid 32 competencies which are described in the Beroeps- en Opleidingsprofiel of the bachelor accountancy. In 2005 there was developed a new set of final terms by the “Commissie Eindtermen Accountancy” (CEA). The CEA is a new gremium installed by the minister of Finance in The Netherlands, under which jurisdiction the law on the RA and the law on the AA lies. Therefore the bachelor accountancy, master accountancy and postmaster accountancy are under jurisdiction of the minister of Finance and that makes these bachelor, master and postmaster very special studies opposite to all the other bachelor , master and postmaster studies in The Netherlands.

The part time bachelor accountancy has to comply with the general bachelor / master structure and with all the quality and legal criteria, which have to be met. But above these criteria come the criteria described by the CEA. The CEA describes criteria, to which the RA has to comply. Therefore the criteria for the bachelor accountancy and master accountancy have to develop their own criteria, which are based upon the final CEA criteria. This was a difficult exercise , because the curriculum for the bachelor accountancy had to come to final terms, which led to successful master accountancy and postmaster accountancy (Delnooz, 1996).

The CEA final terms were publicised in November 2007, and the final terms are the criteria a certified public accountant has to meet, in that respect that the future RA and AA had to meet these CEA criteria. To the bachelor accountancy and bachelor economics – part time and full time – this meant that the final terms for the bachelor of economics, with letter of notice accountancy, have to be deducted from these CEA criteria. This will change the current structure of the part time bachelor accountancy again. Here the BPR and IC theories within Knowledge Management come in. For that reason Fontys choose to design the curriculum of the bachelor accountancy part time in a way that these CEA criteria can be met also. From the perspective of Intellectual Capital (IC) this means that we can bring the experiences from the Biloba-transformation – which was the name within Fontys for the transition towards the bachelor/master structure, called after a two-lobbed leaf of the Biloba tree, which means that two

fundamental changes took place at one time : bachelor-master transition and the implementation of the so called social-constructivistic learning style – towards the bachelor-master structure in the full time bachelor accountancy perfectly as lessons learned to design of the curriculum of the part time bachelor accountancy. This also applies to the experiences we had with study career management within the full time bachelor accountancy (Friedman, 2009).

This study career model is now applied in a modified form in the part time bachelor accountancy, by which the efficiency and the effectiveness of this curriculum can be enlarged. In respect to BPR, the principles of this theory can be used for the redesign of the renewed curriculum of the part time bachelor accountancy. When we talk about bachelor accountancy, bachelor economics we mean the studies, when we talk about Bachelor of Business Economics, we mean the umbrella, under which a number of studies fall (Borgmann et al, 2012).

There is e.g. also the Bachelor of Business Administration (BBA), under which in the near future the bachelor economics studies are going to be operated. Untill now the bachelor economics is operated under Bachelor of Business Economics (BBE). BBA and BBA, and there are about 6 more, are the umbrellas under which all the economics studies are operated. These 8 types of Bachelor in the economic field, are determined in the so called Bologna agreement in 1990 of the European Union member states, where they adopted the bachelor-master structure as model for higher and academic education. This also applies for

compliance with the new CEA final terms, but also for the treatment with the growing inflow of part time students, whose earlier acquired competencies are assessed by the EVC-center, before they enter the studies at an appropriate level (Verhoeven, 2010).

### Conclusion

Recent developments within the universities of applied sciences where diploma's are given to bachelor students, which should never have been given, because the underlying bachelor thesis are below international academic standards. This has caused serious problems in the Netherlands, because students and potential students of Dutch universities of applied science maybe also universities, but this has not been researched yet – can no longer rely on their diploma's but also employers and potential employers can not. The Dutch government in the person of the state secretary Halbe Zijstra took severe measures and the board and supervisory board of the largest university of applied science, INHOLLAND in Amsterdam, The Hague and Rotterdam, were totally replaced and besides the every 6 years of accreditation, which give the bachelor studies within universities of applied science a licence to operate for 6 years, the state secretary has given the inspection power to inspect every bachelor and master studies of any university – applied or non applied – whenever they want and think necessary. Within the Netherlands this is a breakthrough, because we have freedom of education, which is written in article 23 of our constitution, which means that the government can only take

action within elementary schools, high schools, bachelor, master and postmaster after something went wrong, but no preventive measures were possible. This gave reason to Fontys to start reviewing the procedures around graduation within all their studies within all their institutions/faculties. The Fontys International Business School came with the above mentioned designed assessment format and procedure around work placement and graduation. In the second semester of the academic year 2011/2012 the new graduation assessment procedure is installed and during the graduation sessions, which take place from June 4 – 20, 2012 we will see if and how the new procedure works and we can evaluate the results for the next semester, which starts in September 2012. In the there is nothing new: to be in control or not to be in control!

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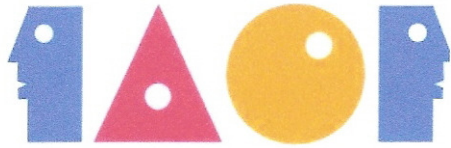


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THE MODERATING EFFECT OF BRAND EQUITY AND THE MEDIATING  
EFFECT OF MARKETING MIX STRATEGY ON THE RELATIONSHIP  
BETWEEN SERVICE QUALITY AND CUSTOMER LOYALTY:  
THE CASE OF RETAIL CHAIN STORES IN TAIWAN

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Abstract

The purposes of this quantitative study are to identify the relationship between service quality and customer loyalty and to test the moderating role of brand equity and the mediating role of marketing mix strategy on this relationship. The population in this research was selected as customers from four retail chain stores in Taiwan, resulting in 200 individual surveys for analysis. The results indicated brand equity, service quality, and marketing mix strategy have significant and positive relationship on customer loyalty. The results also supported the hypotheses that brand equity moderated the relationship between service quality and customer loyalty, and marketing mix strategy presented partial mediating effect on the relationship between service quality and customer loyalty through path analysis. Finally, this research generated the recommendations for corporate operations and suggested future scholar studies.

Key Words: Brand Equity, Marketing Mix Strategy, Service Quality, Customer Loyalty, Retail Chain Stores

## Introduction and Theoretical Foundation

Current enterprises recognize both service quality and customer loyalty are critical factors to maintain the competency for business development. Deming (1981) and Garvin (1987) identified the service quality is the satisfaction for matching the customers' demand. Customer loyalty has been regarded as the key indicator for customer retention. Oliver (1997) claimed the customer loyalty will drive customers to buy the same brand products even competitors' have better offers. Jones and Sasser (1995) indicated the customer loyalty is the behavioral intention to maintain the relationship between customer and service suppliers. The issues of brand equity and marketing mix strategy have been discussed in the academy field and recognized as necessary tools for building corporate competency in business world. Lo (2012) claimed brand equity may strengthen intangible assets and create overall success for companies. Ponnampalnam (2011) indicated the most common brand equity model encompasses five dimensions, such as brand awareness, perceived quality, brand royalty, brand association, and other proprietary asset. This model has been empirically applied in previous researches (Atilgan, Aksoy, and Akinci, 2005; Kim and Kim, 2004; Yoo, Donthu, and Lee, 2000).

The most well known marketing mix strategy tools are the 4 Ps model. McCarthy and Perreault (1994) suggested the 4 Ps model that the marketing mix strategy encompasses four factors, such as Product, Price, Promotion, and Place. Service quality has been recognized as the effective tool to improve the customer loyalty. Hu (2011) indicated service quality, brand equity, and marketing mix strategy have significant and positive relationship to customer loyalty. However, very few studies have examined the mediator role for brand equity on the relationship between service quality and customer loyalty. Hsieh and Lee (2007) indicated the relationship between publication relationship and customer loyalty is moderated by brand image. The service

quality naturally been regarded as an approach for managing public relationship. This study followed these theory concepts and extended previous research. And this study intended to test moderating effect of brand equity and mediating effect of marketing mix strategy on the relationship between service quality and customer loyalty.

### Research Purposes and Hypotheses

Based on the theory concept, the purposes and the significance for this study are: (a) to examine the moderating role for brand equity between service quality and customer loyalty, (b) to examine the mediating role for marketing mix strategy between service quality and customer loyalty, (c) to generate the recommendations for managerial application of retail chain stores business, and (d) to identify areas for future scholarly inquiry. Based the research purposes for this study, the researcher proposed two hypotheses as follows.

**Hypothesis 1: There is significant moderating effect of brand equity between the perception of service quality and customer loyalty.**

**Hypothesis 2: There is significant mediating effect of market mix strategy between the perception of service quality and customer loyalty.**

### Methodology

#### *Instrumentation*

Four instruments have adopted in this study. The *Brand Equity Questionnaires* (7 items) were from Aaker (1991)'s 5 factor model, while this study adopted four dimensions, such as Brand Awareness (1 item), Brand Association (2 items), Perceived Quality (2 item) and Brand Loyalty (2 items). The *Marketing Mix Satisfaction Questionnaires* (14 items) were based on McCarthy and Perreault (1994)'s 4 Pc model which encompasses four dimensions, such as Product (5 items), Price (3 items), Promotion (2 items), and Place (3 items). The *Service Quality Questionnaires* (21 items) were modified from the SERVQUAL questionnaire (Parasuraman,

Zeithaml, and Berry, 1988) which encompasses five dimensions, such as Tangible (5 items), Responsiveness (5 items), Assurance (3 items), Empathy (3 items), and Reliability (5 items). The *Customer Loyalty Questionnaires* (3 items) were modified from the Behavioral Intentions Battery developed by Parasuraman, Zeithaml, Berry (1996) and encompasses two dimensions, such as Recommendations and Repeated Purchase (1 item). This study also included the *Personal Demographic Factors* (7 factors): Gender (2 items), Marital Status (2 items), Ages (8 items), Job (6 items), Education (5 items), Income (5 items) and Order Frequency (4 items).

#### *Population and Data Collection*

The customers shopping in specific retail chain stores have had selected as an acceptable population for this study. The pretest was conducted with Item Analysis in 50 samples. The results for all Levene test values ( $t > | 1.96 |$ ,  $p < .05$ ) indicated this search should keep all scales. Four retail chain stores in the Kaohsiung city of south Taiwan attended this research. The researcher applied the method of random sampling. Each store randomly invited volunteer customers who shopping in stores to participate the questionnaire survey. A total of 215 customers participated this study. After deducting 15 invalid response, the total number of valid responses was 200 (130 early respondents and 70 late respondents), providing an adjusted response rate of 93%. To assess the non-response bias issues for samples, this research applied Chi-square test and results indicated the reply time for samples (130 early respondents and 70 late respondents) with 6 personal factors have no significant relationship ( $> .05$ ), except for only the factor of Income ( $> .05$ ). Thus, non-response bias is likely not an inhibitor in this research.

#### *Validity and Reliability*

The four instruments are from academy theory or existed questionnaire developed by scholars to improve the content validity. The researcher applied Factor Analysis to examine the

construct validity. The study examined the internal consistency as an estimate of reliability for questionnaires. Factor Analysis results for all instruments indicated the KMO test value ( $>.7$ ) and Bartlett test ( $<.05$ ). Two low factor loading items ( $<.5$ ) from Service Quality instrument have deleted. All test results demonstrated the construct validity for questionnaires are reasonable. The internal consistency as an estimate of reliability of four instruments ranged from .855 to .927.

### Analysis of Results

#### *For Hypothesis 1.*

Hierarchical Regression analysis was applied to examine H1. The results are summarized in Figure 1 and Table 1. The results supported H1. Brand equity ( $\beta=.114$ ,  $p<.05$ ) moderated the relationship between service quality and customer loyalty. Brand equity also has similar effect on both dimension of service quality and customer loyalty ( $\beta=.554$  and  $.549$ ).

#### *For Hypothesis 2.*

Path analysis with regression models was applied to examine the H2 and the results are summarized in Figure 1 and Table 2. Based on the mediator principles by Baron and Kenny (1986), the results supported the hypothesis H2. Marketing mix strategy ( $\beta=.59$ ,  $p<.05$ ) presented the partial mediator effect with indirect effect ( $\beta=.438$ ) on relationship between service quality and customer loyalty.

### Discussion and Recommendations

The results indicated brand quality has significant and positive relationship with service quality and customer loyalty. Brand equity also moderated the relationship between service quality and customer loyalty. This means brand equity played a significant role to effect customer's perception on service quality and customer loyalty. Corporations may apply this concept to rebuild the police of service quality or the promotional sales plan to improve customer

Figure 1. Path Analysis Diagram for Moderating Effect of Brand Equity and Mediating Effect of Marketing Mix Strategy on Service Quality and Customer Loyalty

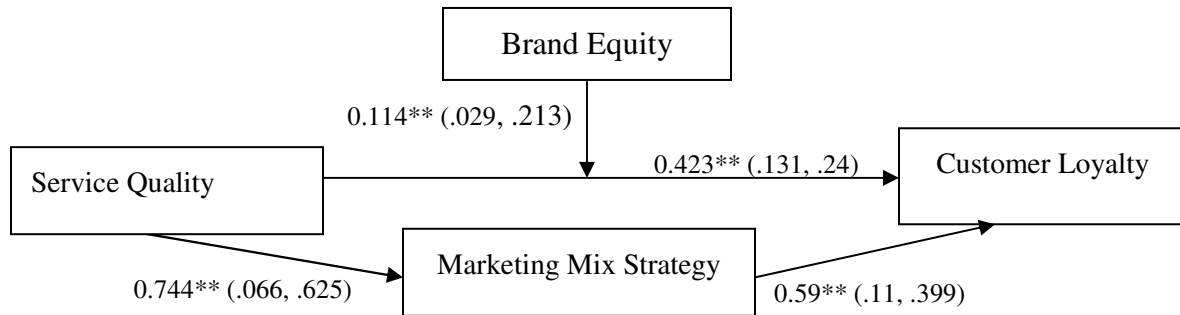


Table 1. Hierarchical Regression Analysis Results for Brand Equity Moderating Service Quality and Customer Loyalty

|         |                                | Unstandardized B | SE    | Standardized B | t     |
|---------|--------------------------------|------------------|-------|----------------|-------|
| Model 1 | Brand Equity                   | 0.623**          | 0.074 | 0.507**        | 8.456 |
|         | Service Quality                | 0.45**           | 0.106 | 0.256**        | 4.26  |
| Model 2 | Brand Equity                   | 0.554**          | 0.073 | 0.451**        | 7.565 |
|         | Service Quality                | 0.559**          | 0.105 | 0.317**        | 5.296 |
|         | Brand Equity x Service Quality | 0.114**          | 0.029 | 0.213**        | 3.965 |

Dependent variable : Customer Loyalty, \*\*p<.01(2-tailed), \*p<.05 level (2-tailed).

Table 2: Regression Models of Path Analysis for Marketing Mix Strategy Mediating Service Quality and Customer Loyalty

|         |                            | Unstandardized B | SE    | Standardized B | t      |
|---------|----------------------------|------------------|-------|----------------|--------|
| Model 1 | Service Quality            | 0.744**          | 0.066 | 0.625**        | 11.259 |
|         | DV: Marketing Mix Strategy |                  |       |                |        |
| Model 2 | Service Quality            | 0.423**          | 0.131 | 0.240**        | 3.236  |
|         | Marketing Mix Strategy     | 0.590**          | 0.110 | 0.399**        | 5.374  |
|         | DV: Customer Loyalty       |                  |       |                |        |

\*\*p<.01(2-tailed), \*p<.05 level (2-tailed).



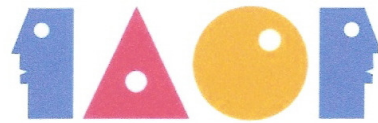
loyalty based on brand equity perception by customers. In addition, the result of path analysis showed marketing mix strategy partially mediated the relationship between service quality and customer loyalty. Therefore, the retail chain stores may push sales amount or enhance the customer re-purchasing rate through focusing on marketing strategies rather than only focusing on improving service quality. However, the findings in H2 indicated marketing mix strategy did not play the full mediating role in the relationship between service quality and customer loyalty. This fact indicated customers need both well service and money value at same time during shopping, rather than only focus on sales or discount activities. This fact revealed the complexities of customer behaviors and the necessities for future study to identify more effective factors to influence the customer loyalty.

This research suggested future research recommendations: 1).Due to time constraints and limited finances, this research utilized convenience sampling and focused on limited number store. Future study may extend the research to more stores or customers through larger random selection, 2).Moreover, the population may extend to other countries for comparisons to understand the differences in cultures, and 3) Future study may identify more effective factors to influence the customer loyalty, also generate future scholar studies.

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## EFFECT OF AGE DEPENDENCY ON SAVING RATES

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### Abstract

This study examines the link between the dependency and saving rates over a period. In the respective study the time series data on the savings, age dependency, fertility rate and investments is taken between 1980-2009 from the economic survey of Pakistan and the world development indicators. Pearson correlation and multiple regression techniques are applied on the respective data. The finding proved that the saving and dependency rate have negative relationship while the relation of other variables which include investments and fertility rate are positively and negatively correlated with the savings respectively.

Key Words: Age Dependency, Savings, Regression

### Introduction and Review of Literature

The impact of population growth on economic growth generally, and on savings in special, received extensive consideration from economists. One significant feature of this impact

has been related with the impact of dependency on aggregate savings. The analysis of population's impact on the economy has frequently been developed in the context of the dependency rate argument. There is an inverse relationship between the rate of aggregate saving and the dependency rate. The dependency rate of the young people and the old people has negative relationship with the saving Rate. The overall capacity for saving and investing is reduced because the large number of the young and the older people burden the economy because of the increase in the consumption needs of economically non productive members of the human society. Because the dependency rate, typically measured as the proportion of the total population outside the labor force, is a summary statistic which is intended to capture the influence of a population's age structure on the process of economic growth. Unfortunately, there has been substantial confusion surrounding the economic interpretation of the dependency rate. While the mixed evidence is provided by the empirical studies related to the impact of increase of dependency ratios on the saving rate Conroy (1979).

As fertility rate is declining continuously, however increase in the population ageing raise the dependency ratio, but at the same time the former proportion declines. Age dependency ratio however depends on the relatively increase in two components which includes fertility rate and population ageing. In recent decades, the most significant change in age structures in developing countries has been the reduction in the proportions of young people, due to fertility declines: the

proportion aged 0-14 has been declining in all the developing regions since 1970-1975. Young people proportion will keep on declining, and the resulting decrease in numbers will be approximately as huge as the increase in numbers of older people. Dependency ratios are useful as general indicators of future economic and social health. But they must be managed downward on both a micro and macro basis.

National savings are significantly essential to preserve a higher level of investment which is a key determinant of economic expansion which in return boosts growth and development. However, lack of savings and investment are common in developing countries; as the saving rates have decreased during the last two decades, because of the continuous increase in the age dependency of the old people as well as the dependency of young people.

Saving and dependency rate is summarized by Heller and Symansky (1997) which highlighted that the old age and child dependency ratio have changed differently during the different period of times as it has evolved differently in past and will evolved differently in future . The ratio of children in Asian countries has typically falling with falling fertility decline, and is predicted to continue to do so at least for 10 or 15 years. Coale and Hoover (1958) has also approved that savings rate is negatively affected by the high dependency rates linked with high fertility and high population growth. Taylor and Williamson examined the savings rate transitions of the Asian countries. They concluded that the savings rate was increased because of

the continuous decline in the dependency rate, defined as the ratio of young children and old people to the total population. According to them the Household savings tend to be high during the working life of a person while it tends to be decline after the retirement of the person from his or her job because one will start consume their savings at the old age after the retirement.

Subsequently a great decline in the early 1970s, the saving rates by the private sector in the Pakistan's economy has shown a gradual rise during the past two decades. Compared with the sharp increases recorded in the saving rates in the rapidly growing economies of Southeast Asia, however, Pakistan's saving performance appears weak Hussain (1995). However the national savings rate of Pakistan is not only low as compared to even those countries which are having even low per capita income. Pakistan's performance, during the previous three decades, has been remarkable. The national saving rate has fluctuated around an almost horizontal trend during the similar period of time. Thus saving performance and overall economic development of Pakistan appears to be more courageous.

It is usually preferred to have money always available to meet all the needs and demands when they arise. To enjoy a good life, one should save money regularly during their working life.

People usually save to accomplish their future goals and projects. One of the basic strategies is to save properly in order to accomplish the goals. The last century has seen remarkable increases in the expected life of the people all over the world. This has been usually

followed by low fertility in industrial countries, which would result in severe population aging and result in increase in old-age dependency ratio. Now individuals and governments are both more concerned about the effects of aging, although their area of concerns may differ.

Individuals are more concentrated about the age dependency because it will affect their savings and labor strategies. Whereas government is more concerned about dependency rate of the old people because of population aging effect on the economy. People usually save to have smooth consumption throughout their life.

## Methodology

### *Research type and objective*

This study focuses on the relationship of savings with the age dependency, investments and life expectancy as well as interdependence between these variables. The objective of this study is to examine the effect of age dependency on the saving rates through statistical techniques.

### *Data Collection*

Three variables have been taken in this research, one is dependent variable that is “Savings” and remaining two are independent variables, “age dependency and investments”. Secondary data is used in this study. Time series data has been used in this study the data is taken from 1980-81 to 2008-2009 for all respective variables. The data for all the variables is collected

from the Economic survey of Pakistan and State Bank of Pakistan and for age dependency rate; data is taken from world development indicators (WDI). The Data on savings and investments is taken in absolute terms. Data can be found in Table 1.

### *Empirical Analysis*

The SPSS software is used to analyze the data and to estimate the relationship between the chosen variables. Correlation and multiple regressions are used to generate the results.

To investigate the relationship between national savings rate and dependency ratio for Pakistan, the following model has been used:

$$Ns = \beta_0 + \beta_1 A. D + \beta_2 INV + \mu_t \quad (1)$$

Ns= National savings, INV= Investments, A. D=Age dependency,  $\mu_t$  = Error rate

While  $\beta_0$  the regression coefficients or partial slope coefficients;  $\beta_1$  estimate the change in savings, with per unit change in Age dependency while keeping all other independent variables constant. All others coefficients are also analyzed on the same pattern.

The correlation matrix is used to show the relationship between and with all other variables. Some of the variables have negative relationship while some have positive relationship with each other. The positive relationship shows that change in one variable cause change in other variables in the same direction while the negative relationship shows that change in one variable cause change in other variables but in opposite direction. There is strong positive



relationship between national savings and investments which means that if savings increase than the investments also tends to increase. The value of correlation between these two variables is 0.

959. There is strong negative relationship between national savings and age dependency which means that if savings increase than the age dependency tends to decrease. The value of correlation between these two variables is -0. 987.

|           | Years | NS        | Ad     | INV       |           | Years | NS        | Ad     | INV       |
|-----------|-------|-----------|--------|-----------|-----------|-------|-----------|--------|-----------|
| <b>1</b>  | 1980  | 30050. 00 | 93. 25 | 47667. 00 | <b>16</b> | 1995  | 269872. 0 | 88. 60 | 346045. 0 |
| <b>2</b>  | 1981  | 42070. 00 | 92. 95 | 82207. 00 | <b>17</b> | 1996  | 249842. 0 | 87. 85 | 402762. 0 |
| <b>3</b>  | 1982  | 46254. 00 | 92. 35 | 62447. 00 | <b>18</b> | 1997  | 286074. 0 | 86. 80 | 435134. 0 |
| <b>4</b>  | 1983  | 61947. 00 | 91. 60 | 68462. 00 | <b>19</b> | 1998  | 391266. 0 | 85. 50 | 474245. 0 |
| <b>5</b>  | 1984  | 63220. 00 | 90. 85 | 76401. 00 | <b>20</b> | 1999  | 343703. 0 | 84. 05 | 457357. 0 |
| <b>6</b>  | 1985  | 61056. 00 | 90. 25 | 86525. 00 | <b>21</b> | 2000  | 599936. 0 | 82. 45 | 659110. 0 |
| <b>7</b>  | 1986  | 76608. 00 | 89. 80 | 96545. 00 | <b>22</b> | 2001  | 865546. 0 | 80. 80 | 715525. 0 |
| <b>8</b>  | 1987  | 97195. 00 | 89. 50 | 109540. 0 | <b>23</b> | 2002  | 820561. 0 | 79. 10 | 738373. 0 |
| <b>9</b>  | 1988  | 92062. 00 | 89. 30 | 121666. 0 | <b>24</b> | 2003  | 1002213   | 77. 35 | 816062. 0 |
| <b>10</b> | 1989  | 108398. 0 | 89. 20 | 145570. 0 | <b>25</b> | 2004  | 1010700   | 75. 70 | 935096. 0 |
| <b>11</b> | 1990  | 121514. 0 | 89. 20 | 162076. 0 | <b>26</b> | 2005  | 1136186   | 74. 20 | 1240240   |
| <b>12</b> | 1991  | 144773. 0 | 89. 20 | 192857. 0 | <b>27</b> | 2006  | 1349679   | 72. 90 | 1687809   |
| <b>13</b> | 1992  | 206809. 0 | 89. 20 | 243894. 0 | <b>28</b> | 2007  | 1507060   | 71. 75 | 1953388   |
| <b>14</b> | 1993  | 182004. 0 | 89. 20 | 277216. 0 | <b>29</b> | 2008  | 1372732   | 70. 75 | 2259743   |
| <b>15</b> | 1994  | 246205. 0 | 89. 05 | 305140. 0 | <b>30</b> | 2009  | 1677242   | 69. 85 | 2578498   |

The table below shows the validity of the model.  $R^2$  should necessarily lies between 0 and 1 for a better fit as the closer it is to 1, the better is the fit. It measures goodness of fit in the sense that how close an estimated value is to its actual value in the given sample. The value of  $R^2$  in these results is 0. 982 which shows a better fit. There is no guarantee that it will forecast well

out of sample observations. The value of the adjusted R square is 0.981 which depicts that the change in independent variable that are age dependency, and investments cause change

Table 2: Correlation of Savings, Dependency Rate, Investments and Fertility Rate

| Variables        |                                     | National savings | Investments | Age dependency |
|------------------|-------------------------------------|------------------|-------------|----------------|
| National savings | Pearson correlation sig. (2-tailed) | 1                |             |                |
|                  | N                                   | 30               |             |                |
| Investments      | Pearson correlation sig. (2-tailed) | .959**           | 1           |                |
|                  | N                                   | 30               | 30          |                |
| Age dependency   | Pearson correlation sig. (2-tailed) | -.987            | -.942       | 1              |
|                  | N                                   | 30               | 30          |                |

\*\* . Correlation is significant at the 0.01 level (2-tailed)

Table 3: Regression Model summary <sup>b</sup>

| Model | R square | Adjusted R Square | Durbin-Watson | F       | Sig.              |
|-------|----------|-------------------|---------------|---------|-------------------|
| 1     | 0.982    | 0.981             | 1.582         | 736.205 | .000 <sup>a</sup> |

a Predictors: (Constant), Age dependency, investments,

b Dependent Variable: National savings

in dependent variable by 98.1%. The other factors might influence the dependent variable.

Model is also checked for autocorrelation. Value of Durbin Watson is 1.582 means that there is the problem of autocorrelation in the model. As for having no autocorrelation the value of D. W

should be 1.7 to 2.2. The standard errors for autocorrelation can be corrected through the AR technique. As The Durbin Watson is 1. 582 which is less than 2, hence it shows that the error terms are positively correlated. The level of significance for F-test is . 000 which shows that the model is highly significant and the independent variables very truly depict the dependent variable.

Table 4: Coefficient <sup>a</sup>

| Model |          | Standardized coefficient Beta | T       | Sig   |
|-------|----------|-------------------------------|---------|-------|
| 1     | Constant |                               | 9. 729  | . 000 |
|       | Inv      | . 264                         | 3. 447  | . 000 |
|       | AD       | -. 738                        | -9. 616 | . 000 |

a. Dependent variable: saving rate

This table shows the relationship between the independent variable and dependent variable. The T -value of investments is greater than 0 while it is negative for other variable. The T- value of investment is 3. 447 and is significant at . 000. The respective value shows that there is positive association among savings and investments. Across countries and over time higher economic growth rates are associated with higher investment, higher investment with higher savings, and higher savings with higher economic growth rates. A higher savings rate will produce more investment per unit of production than it did before which in return will guide to the growth of capital for each employee. The saving rate thus influence the stage of per capita

capital reserve and thus per capita production towards which the economy gravitates in stability, rather than the rate at which either amount changes. While the T-value for age dependency is -9.616, which shows that there is a negative relationship between savings and age dependency.

The Population structure of Pakistan has been changed over the over previous decades and the preference is toward an increase in reliance on the young people (Khan *et al*, 1992). The results depicts that the national savings and the percentage change in age dependency ratio is having a strong negative relationship. The beta value shows that the one unit change in one variable cause one unit change in other variable as well. The beta valve of investment is .264 which shows that with one unit change in investments there will be 26.4 % change in the national savings similarly the value of beta of age dependency is -.738 which shows that with one unit change in age dependency there will be a change of 73.8 % change in savings and the negative sign shows that the saving will move in opposite direction with increase in the age dependency. The results might also be highly significant because of the revisions in the State bank data over time. With lower inter correlation between the independent variables, the equation, too, shows large elasticity and a high level of statistical significance for the dependency variables.

### Conclusion

National savings in Pakistan have been low and have risen quite slowly. Public savings have been the major problem area in the past. Through the empirical analysis for Pakistan, it has been demonstrated that there is a negative relationship between the savings and dependency ratio of Pakistan. The econometric analysis of the relationship between savings and dependency ratio shows that both these major factors of Pakistan's economic growth greatly effecting each other. While the case of investment, bear a positive relationship with the savings. However, dependency ratio is having a negative relationship with the savings. The composition of the Pakistan population is changed over the previous few years and the more concentration is toward the increase in the dependence of the old people on the young ones.

Increased numbers of people are entering the working age groups in the country which can act as a double-edged sword if they do not enter the labor force. The very common sense of "demographic dividend" is challenged, but if they do become economically active it poses a big challenge to the country's economy to provide them gainful employment.

Beside due to continuous economic growth in Pakistan the saving rate is very much low as compared to the other developing countries in the world that have practiced the same economic growth development. Efforts to improve economic development potential could be rated as one of the most important strategy measures to encourage domestic saving performance in the country. Therefore, a policy suggestion that could be drawn from this study is the need to

lower Pakistan's fertility level, which is the highest among the developing countries and might remain high due to a high level of dependency on the young.

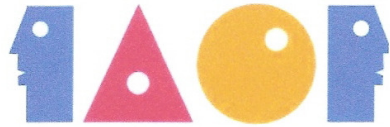
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RESEARCH ON THE KNOWLEDGE SHARING, ADVENTURE  
RECREATION AND PERFORMANCE OF INFORMATION  
SYSTEM R&D PERSONNEL

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Abstract

Various kinds of outdoor leisure activities function differently, and thus, have different values, particularly adventure recreation. However, there have been few studies on the relationship between adventure recreation, knowledge sharing and performance. The aim of this study is to explore the influence of knowledge sharing on the performance of information system R&D personnel by introducing adventure recreation as a mediating variable to discover the correlation. The findings demonstrate that the sharing of system structure and task knowledge positively and significantly influence task performance and group performance, while interpersonal relationship knowledge sharing positively and significantly influences group performance. Moreover, when adventure recreation is a mediating variable between knowledge sharing and performance,



members' sharing of task- and system structure-related knowledge positively influences performance.

Keywords: R&D personnel, adventure recreation, knowledge sharing, performance.

### Research Background and Motives

With the coming of the global electronic era, internet connections everywhere will thoroughly change business, as well as the essence and method of creating value. All industries will be involved in this trend (Prahalad and Krishnan, 2008). R&D personnel must share their professional knowledge with other members through cooperation, brainstorming and opinion exchange in order to trigger creative ideas and solve customers' problems (Amrit and Eqhram, 2005). Hidding and Cattrtall (1998) and Wallace, Keil and Rai (2004) suggested that in system R&D processes, the lack of related technical tools reduced the members' interaction and negatively influenced R&D. Scott and Vessey (2002) indicated that in system R&D, the reorganization of organizational resources, coordination of members' different thoughts and the enthusiasm to share information with others significantly influenced system R&D. Thus, if, information system R&D could be moderated or influenced by organizational members' knowledge delivery and interaction, it would be necessary to investigate the role of system R&D

knowledge sharing in order to recognize its impact on the overall performance of information system R&D.

Nonaka and Takeuchi (1995) argued that in knowledge sharing between individuals, the two parties obtain multiple experiences and information. The Leverage Effect of knowledge would result in the innovation of knowledge, and further increase performance and competitiveness. According to Diakoulakis (2004), through employees' knowledge sharing, firms could enhance overall innovation and capability and assemble individual knowledge into organizational memory to increase the knowledge base. For organizations, this multiplier effect is a kind of core capability which underlines the importance and influence of knowledge sharing (Mao, 2010). Darroch (2005) suggested that organizations implement various knowledge management activities to confirm, share and use organizational knowledge in order to increase organizational innovation and performance. Employees' knowledge sharing has three levels: individual, group and organizational. The individual level refers to altruism (Hedlund, 1994), communication (Hendriks, 1999) and organizational citizenship (Yu & Chu, 2007); the group level includes (Hsu, Ju, Yen and Chang, 2007) group creativity (Wang, 2009); and the organizational level influences the functioning of information systems (Levy, Loebbecke and Powell, 2003), performance (Darroch, 2005), attraction and innovation (Liao, Fei and Chen, 2007). Generally speaking, the relationship between knowledge sharing and the overall

organization is validated at the cross-organizational level. However, past research on knowledge sharing mainly investigated the influence on knowledge sharing, while the factors or techniques by which knowledge sharing would be increased were rarely mentioned; this was one of the motives of this study.

Ewert (1987) argued that outdoor adventure recreation resulted in social benefits for the participants, enhancement of their communication skills, respect for others, behavioral feedback, and increased friendships and a sense of belonging. Hattie, Neill and Richards (1997) indicated that adventure recreation enhanced interpersonal communication skills and relationships. Brown (1999) suggested that the main advantages of adventure experiences were enhanced self-esteem, confidence, a sense of achievement and the increased opportunity for team work. According to Sivadas and Dwyer (2000), with trust, communication and negotiation, partners have effective communication and knowledge sharing and coordinate details in cooperation. The model is in keeping with the statement of Driver (1977) and Beard and Ragheb (1983) that “learning new things” is one of the main motives of adventure recreation. Therefore, it is important to investigate information system R&D knowledge sharing from the perspective of adventure recreation.

In this study, information system R&D personnel in Taiwan were selected as the subjects in order to discover the influence of knowledge sharing on their performance. Adventure

recreation was analyzed as a mediating variable on information system R&D personnel and performance, and suggestions have been proposed as to the criteria for enhancing future information system R&D personnel efficacy.

## Literature Review and Hypothesis Testing

### *Literature Review*

#### *Knowledge sharing*

Knowledge is a unique and valuable resource which enhances the formation of competitive advantage (Nonaka and Takeuchi, 1995). Firms gradually come to value the construction and increase of the knowledge base and treat knowledge as an important strategic resource capability (Conner and Prahalad, 1996). Senge (1998) suggested that knowledge is the ability to take effective action which is obtained through learning, yet it also enhances learning and the ability to take effective action. Nancy (2000) proposed a view of “sharing” and suggested that sharing is a kind of recognition, in that a person shares information or knowledge with others, thus allowing them to have the same information. Nonaka & Takeuchi (1995) suggested that knowledge sharing is the interaction between implicit and explicit knowledge. Different knowledge interaction outcomes result in knowledge innovation. Dyer and Nobeoka (2000) indicated that knowledge sharing allows team work, enhanced knowledge exchange and increased organizational learning abilities. Ryu et al. (2003) suggested that knowledge sharing is

the behavior of sharing personal knowledge learned with other organizational members.

According to Ipe (2003), organizations could trigger a learning atmosphere by individual learning. Based on the study details cited above, knowledge sharing can be described as the means to learn, exchange and deliver knowledge in order to increase personal and individual competitive advantage.

### *Adventure recreation*

Martin and Priest (1986) suggested that the characteristics of adventure experience come from the interaction between a person's competence and the risk taken. According to the Oxford Dictionary, Brown (1993) defined "adventure" as "occasional danger or loss; risk and danger; adventurous aggressiveness or performance." The adventure situation is based on careful thinking, as the situation often includes risk or danger and an uncertain outcome (Ewert, 1989). The uncertainty of the activity's outcome is influenced by the participants. The activities include actual and perceived dangers and usually take place in outdoor natural environments (Ewert and Hollenhorst, 1997). According to Chang (2006), adventure recreation is a kind of learning experience which allows participants to learn spontaneity, gain problem-solving ability and obtain experience through adventure. Based on the above, adventure recreation refers to a certain degree of risk and uncertainty in the activities, and, in the process, the participants learn spontaneity and gain problem-solving ability.

## *Hypothesis Testing*

### *Knowledge sharing and performance*

According to the research of Castanias (1991), the performance of firms is related to the intention of organizational members to share their personal knowledge with others and to acquire their knowledge in return in order to transform it into new capabilities or techniques. Nelson and Coopriider (1996) suggested that knowledge sharing influences organizational efficacy.

Knowledge management aims to fulfill and maintain an overall competitive advantage by knowledge delivery and sharing (Dixon, 2000). Sivadas and Dwyer (2000) suggested that, based on trust, communication and negotiation, partners can have effective communication and knowledge sharing and coordinated details of cooperation. Armbrecht et al. (2001) suggested that knowledge sharing could trigger new views and knowledge and further create new services and products. Reid (2003) suggested that knowledge sharing could enhance organizational capabilities, result in solutions and rapidly accomplish business performance and enhance competitive advantage. Liao et al. (2004) indicated that knowledge sharing increased both individual and organizational abilities to accomplish goals and enhance performance. According to Darroch (2005), knowledge sharing is important if organizational innovation and performance are to be enhanced. Lin, Hung and Chen (2009) proposed that knowledge sharing would influence dynamic and innovative capabilities. Dynamic capability means that organizations

could create new products in order to respond to changes in the market. In an uncertain market environment, firms could then maintain their competitive advantage, increase organizational performance and enhance market value by this capability. Based on the above, this study constructed the following hypothesis:

***H1: Information system R&D personnel's knowledge sharing positively influences performance.***

*Knowledge sharing, adventure recreation and performance*

Beard and Raghed (1983) divided recreation motives into knowledge motive, social motive, competence motive and stimulation avoidance motive. The knowledge motive includes learning, exploration, self-recognition, knowledge and creativity; the social motive refers to friendship and the needs of interpersonal relationships; the competence motive includes challenge, a sense of achievement and developing ability; and the stimulation avoidance motive includes psychological motives such as reducing tension, busy lives and nerves. Ewert (1985) indicated that participation motives for outdoor adventure recreation include increased creativity and implies assisting others, creativity and self-expression. Ewert and Hollenhorat (1989) suggested that participating in adventure recreation would lead to social activity participation, friendships, enhanced creativity and a sense of achievement. McIntyre (1992) emphasized that adventure recreation increased self-recognition and creativity. Hall and Weiler (1992) suggested

that recreational activity participation motives of special interests included approaching nature, exploration, knowledge and curiosity of education. The research of Robinson (1992a, 1992b) demonstrated that participants of adventure recreation perceived such positive influences as increased confidence, recognition of self-capability, acquiring a sense of achievement, enhancement of interpersonal relationships, and the desire to pursue additional adventures and challenge and opportunities for self-expression after the activity. Fluker and Turner (2002) indicated that in adventure recreation activities, participants could be with friends and experience teamwork as well as recognize their own capabilities. Chang Hsiao-ming (2006) suggested that tourists' participation motives for adventure recreation included social interaction, competence and achievement, and knowledge acquisition. Research on knowledge management has also validated the correlation between knowledge sharing, performance and creativity (Reid, 2003; Liao et al., 2004; Darroch, 2005; Lin, Hung and Chen, 2009). Based on the above, this study constructed the following hypothesis:

**H2: Information system R&D personnel's knowledge sharing positively influences performance through adventure recreation.**

#### Research Method

According to the research motives, purposes and literature review stated above, the research framework was formulated as below. Data were by questionnaire to validate the



hypotheses. The research framework, hypotheses, subjects and measurement of variables are described below.

### *Research Framework*

According to the literature review above and the inference of the hypotheses, this study treated information technology R&D personnel as subjects to investigate the correlation between their knowledge sharing, adventure recreation and performance. The overall conceptual framework is shown in Figure 1 “->” means direction of effects. As shown in Figure 1, members’ performance was influenced by knowledge sharing; thus, by treating members’ participation in adventure recreation as a mediating variable, this research investigated the correlation between knowledge sharing and performance.

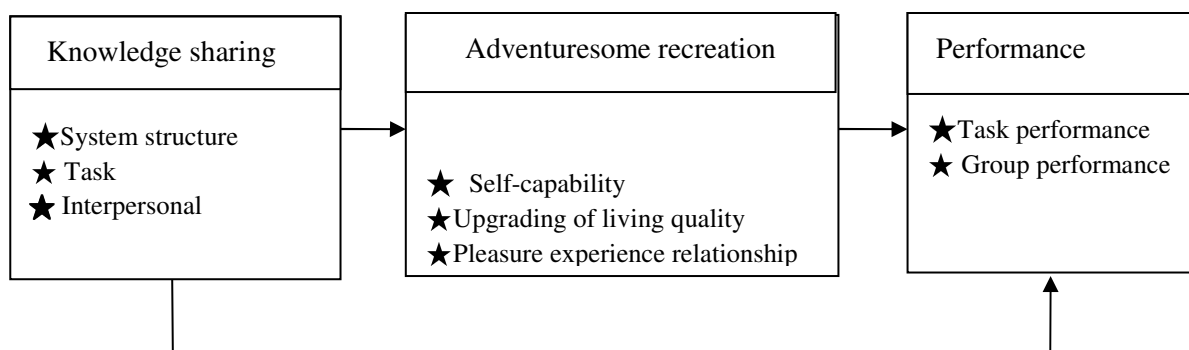


Figure 1. Research Framework

### *Research subjects*

The subjects were information technology R&D personnel who had participated in adventure education or adventure recreation. Therefore, this study adopted snowball sampling and confirmed the participants' intention by interviewer visits, telephone calls, adventure education or associations of adventure recreation, and invited the participants to fill in questionnaires in order to reduce the risk of a low questionnaire return rate.

### *Assessment of Research Variables*

Knowledge sharing was based on the knowledge sharing scale of Wang (2009), which included 14 items. System structure knowledge sharing means members actively shared overall business, system and related information with other members to recognize the workplace; interpersonal relationship knowledge sharing means the members supported each other emotionally and shared their jobs and behavior through interpersonal interaction and communication.

*Adventure recreation:* task knowledge sharing means members actively informed others as to the knowledge, experience and skills needed for performing the task, as based on reviews of Chang (2006) on Arnould & Price, 1993; Bisson, 1997; Brown, 1999; Hattie, Marsh, Neill & Richards, 1997; Iso-Ahola, LaVerde & Graefe, 1988; McIntyre, 1989; Robinson, 1992a; and Robinson, 1992b. There were 18 items.

*Recognition of self-capability*: positive pursuit of adventure attraction and increase of self-efficacy and capability; upgrading of interpersonal and living quality: respect for others, increase of communication skills, and group cohesion/ acquisition of friendship/ sense of belonging; pleasurable experiences: allowing participants to have stimulating and positive internal pleasure experiences.

Performance was based on the performance scale proposed by Robbins (1998). There were 12 items. Edwards (1991) suggested that individuals and job performance could be divided into demand & capability and demand & supply. Schermerhorn (1999) indicated that job performance was the quality and quantity of tasks accomplished by individuals or a group at work. Task performance was the match between an individual's capability and the capability needed at work. Group performance was the match between individual needs and job attributes.

## Data Analysis and Research Results

### *Basic Characteristics of Samples*

Regarding information technology, 700 R&D personnel who had participated in adventure education through adventure recreation in Taiwan were given questionnaires, of which 511 were returned. After eliminating 35 invalid questionnaires, 476 valid returns remained; the valid return rate was 68%. Of the participants, 63.4% were male; 43.9% of them were 26-30 years old and 30.9% were 31-35 years old; most had graduated from universities and had masters

degrees (university, 58.0%; master, 30.3%); as to educational background, most had graduated from technical and engineering departments (48.1%), followed by business and management (34%); as to working years, most had worked 1-5 years (47.3%); and as to type of job, most worked in programming design (73.1%), followed by system design (18.9%) and demand development (8%).

### *Reliability Analysis and Factor Analysis*

This study measured the internal consistency of dimensions by Cronbach's  $\alpha$ . Knowledge sharing: system structure =0.86, task =0.94, interpersonal relationship =0.85; adventure recreation: recognition of self-capability =0.89, upgrading of interpersonal and living quality =0.89, pleasure experience =0.90; performance: task performance: 0.85, and group performance: 0.70. The findings demonstrated that Cronbach's  $\alpha$  for all dimensions was above 0.7. Nunnally (1978) suggested that Cronbach's  $\alpha$  above 0.7 was acceptable, and it was demonstrated that the dimensions in this study revealed the necessary degree of reliability.

As to validity, by the Largest Variation Axis of factor analysis, factors with an eigenvalue above 1 were extracted. Items with low factor loading were eliminated. The results showed that the factor loading of items extracted was above 0.60, and that the accumulated explained variance was above 65.82%. The items extracted by factor analysis met the original design of

this study, thus demonstrating that dimensions in this study revealed the proper construct validity.

*Correlation among research variables*

As per the correlation analysis in Table 1, in the relationship between members' knowledge sharing and performance, system structure & task showed a positive and significant correlation with task performance & group performance. In other words, the more R&D personnel's knowledge sharing related to work regulations, goals and jobs, the higher the task performance and group performance would be. As to the relationship between adventure recreation and performance, the data demonstrated that there was a positive and significant correlation between recognition of self-capability, upgrading of interpersonal and living quality

Table 1. Table of Pearson Correlation Analysis

| Research Variables                               | 1      | 2      | 3      | 4      | 5      | 6      | 7      |
|--|--------|--------|--------|--------|--------|--------|--------|
| 1.System Structure                               | 1.00   |        |        |        |        |        |        |
| 2.Interpersonal                                  | -0.07  | 1.00   |        |        |        |        |        |
| 3.Task   | 0.26** | 0.05   | 1.00   |        |        |        |        |
| 4. Recognition of Self-Capability                | 0.27** | -0.04  | 0.42** | 1.00   |        |        |        |
| 5. Upgrading of interpersonal and living quality | 0.22** | -0.06  | 0.32** | 0.48** | 1.00   |        |        |
| 6. Pleasure experience                           | 0.40** | -0.04  | 0.33** | 0.26** | 0.23** | 1.00   |        |
| 7. Task performance                              | 0.21** | -0.08  | 0.36** | 0.37** | 0.52** | 0.23** | 1.00   |
| 8.Group performance                              | 0.30** | 0.32** | 0.31** | 0.25** | 0.20** | 0.29** | 0.13** |

Note : \* denotes  $p < 0.05$  ; \*\* denotes  $p < 0.01$

& pleasure experience and task performance & group performance. This showed that after R&D personnel experienced adventure recreation, their task performance or group performance would be better.

After the primary correlation analysis, the hypotheses were validated by hierarchical regression analysis in order to confirm the correlation among the variables. As to the collinearity analysis, VIF of system structure and task on recognition of self-capability, upgrading of interpersonal and living quality and pleasure experience were 1.081, 1.050, 1.193, 1.211, 1.115 and 1.124, which were below 10 (Neter and Kutner, 1990).

### *Hierarchical Regression Analysis*

#### *Influence of knowledge sharing on performance*

In order to recognize the relationship between different knowledge sharing and performance, Hierarchical Regression Analysis was adopted. As per Tables 2, 3 and 4, system structure knowledge sharing and task significantly influenced task performance and group performance ( $\beta$  was 0.21, 0.36, 0.30, 0.32 and 0.31), as shown in models 1, 3, 4, 5 and 6; moreover, interpersonal relationship knowledge sharing did not significantly influence task performance, as shown in model 2. Therefore, hypothesis 1 was partially supported.

*Mediating effect of adventure recreation (recognition of self-capability, upgrading of interpersonal and living quality and pleasure experience)*

A method to determine the mediating effect of adventure recreation according to mediating effect validation by hierarchical regression analysis was proposed by Baron & Kenny (1986). The conditions of the mediating effect are as follows. First, independent variables significantly influence mediating variables; second, mediating variables significantly influence dependent variables; and finally, after including the mediating variable, the relationship between the independent variables and dependent variables should be more insignificant. As per the correlation analysis in Table 1, there was a significant and positive correlation between system structure, task, recognition of self-capability, upgrading of interpersonal and living quality and pleasure experience. There was a positive and significant correlation between pair variables (recognition of self-capability, upgrading of interpersonal and living quality, pleasure experience, task performance and group performance), which met the first two conditions suggested by Baron & Kenny. A description of the third condition follows.

When recognition of self-capability was a mediating variable, the result showed there was a positive and significant correlation between system structure & task and task performance & group performance ( $\beta$  was 0.12, 0.24, 0.24 and 0.25), as shown in models 7, 13, 10 and 16. The  $\beta$  of system structure was reduced from 0.21( $p < 0.01$ ) to 0.12( $p < 0.01$ ) and from 0.30( $p < 0.01$ ) to 0.24( $p < 0.01$ ), as shown in models 1, 4, 7 and 13; the  $\beta$  of task was reduced from 0.36( $p < 0.01$ )

to 0.24( $p < 0.01$ ) and from 0.31( $p < 0.01$ ) to 0.25( $p < 0.01$ ), as shown in models 3, 6, 10 and 16.

These results met the third condition indicated by Baron & Kenny. Thus, H3 was partially supported.

When upgrading of interpersonal and living quality was a mediating variable, the result demonstrated a positive and significant correlation between system structure & task and task performance & group performance ( $\beta$  was 0.10, 0.26, 0.21 and 0.27), as shown in models 8, 14, 11 and 17. The  $\beta$  of system structure was reduced from 0.21( $p < 0.01$ ) to 0.10( $p < 0.05$ ) and from 0.30( $p < 0.01$ ) to 0.26( $p < 0.01$ ), as shown in models 1, 8, 4 and 14; the  $\beta$  of task was reduced from 0.36( $p < 0.01$ ) to 0.21( $p < 0.01$ ) and from 0.31( $p < 0.01$ ) to 0.27( $p < 0.01$ ), as shown in models 3, 6, 11 and 17. This met the third condition indicated by Baron & Kenny. Therefore, according to this study, as to the correlation between system structure & task, the upgrading of interpersonal and living quality revealed a mediating effect. Thus, H3 was partially supported.

Finally, when pleasure experience was a mediating variable, the result showed a positive and significant correlation between system structure & task and task performance & group performance ( $\beta$  was 0.14, 0.31, 0.21 and 0.24), as shown in models 9, 12, 15 and 18. The  $\beta$  of system structure was reduced from 0.21( $p < 0.01$ ) to 0.14( $p < 0.01$ ) and from 0.30( $p < 0.01$ ) to 0.21( $p < 0.01$ ), as shown in models 1, 4, 9 and 15; and the  $\beta$  of task was reduced from 0.36( $p < 0.01$ ) to 0.31( $p < 0.01$ ) and from 0.31( $p < 0.01$ ) to 0.24( $p < 0.01$ ), as shown in models 3, 6,



12 and 18. This met the third condition proposed by Baron & Kenny. Therefore, H3 was partially supported.

## Conclusions and Suggestions

### *Conclusions*

#### *Knowledge sharing and performance*

The results of this study have demonstrated that system structure and task knowledge sharing positively and significantly influenced task performance and group performance. Since information system R&D has become more diverse and complicated, R&D personnel should members actively share the overall business, system and related information with other members, their sharing of knowledge, experience and skills will increase their overall performance.

Interpersonal relationship knowledge sharing significantly and positively influenced group performance. The result was consistent with Carlson and Perrewe (1999) who suggested that members' interpersonal exchange influenced their task performance. In other words, through interpersonal relationships among colleagues, members increase their good feelings toward one another, construct effective communication measures and thereby increase group performance.

Table 2. Regression analysis of knowledge sharing and performance

| Variable Model                        | Task performance |         |         | Group performance |         |         |
|---------------------------------------|------------------|---------|---------|-------------------|---------|---------|
|                                       | Model 1          | Model 2 | Model 3 | Model 4           | Model 5 | Model 6 |
| Independent variable System structure | 0.21**           |         |         | 0.30**            |         |         |
| Interpersonal relationship            |                  | -0.08   |         |                   | 0.32**  |         |
| Task                                  |                  |         | 0.36**  |                   |         | 0.31**  |
| $\Delta R^2$                          | 0.042            | 0.004   | 0.125   | 0.085             | 0.097   | 0.093   |
| F value                               | 21.66**          | 3.03    | 68.64** | 45.04**           | 52.25** | 49.88** |

Note: \*indicates  $p < 0.05$ ; \*\*indicates  $p < 0.01$

Table 3. Hierarchical regression analysis of system structure, task knowledge sharing, adventuresome recreation and task performance

| Variable Model                                    | Task performance |         |         |          |          |          |
|---|------------------|---------|---------|----------|----------|----------|
|   | Model 7          | Model 8 | Model 9 | Model 10 | Model 11 | Model 12 |
| Independent variable System structure             | 0.12**           | 0.10*   | 0.14**  |          |          |          |
| Task  |                  |         |         | 0.24**   | 0.21**   | 0.31**   |
| Mediating variable recognition of self-capability | 0.34**           |         |         | 0.27**   |          |          |
| Upgrading of interpersonal and living quality     |                  | 0.51**  |         |          | 0.46**   |          |
| Pleasure experience                               |                  |         | 0.18**  |          |          | 0.13**   |
| $\Delta R^2$                                      | 0.147            | 0.286   | 0.067   | 0.184    | 0.315    | 0.138    |
| F value   | 42.04**          | 95.99** | 17.93** | 54.43**  | 110.27** | 38.98**  |

Note: \* indicates  $p < 0.05$ ; \*\* indicates  $p < 0.01$

Table 4. Hierarchical regression analysis of system structure, task knowledge sharing, adventuresome recreation and group performance

| Variable Model                                    | Group performance |          |          |          |          |          |
|---|-------------------|----------|----------|----------|----------|----------|
|   | Model 13          | Model 14 | Model 15 | Model 16 | Model 17 | Model 18 |
| Independent variable System structure             | 0.24**            | 0.26**   | 0.21**   |          |          |          |
| Task  |                   |          |          | 0.25**   | 0.27**   | 0.24**   |
| Mediating variable recognition of self-capability | 0.19**            |          |          | 0.15**   |          |          |
| Upgrading of interpersonal and living quality     |                   | 0.15**   |          |          | 0.12**   |          |
| Pleasure experience                               |                   |          | 0.20**   |          |          | 0.21**   |
| $\Delta R^2$                                      | 0.115             | 0.103    | 0.117    | 0.110    | 0.104    | 0.129    |
| F value   | 31.99**           | 28.39**  | 32.33**  | 30.46**  | 28.46**  | 36.29**  |

Note: \* indicates  $p < 0.05$ ; \*\* indicates  $p < 0.01$

#### *Correlation among knowledge sharing, adventure recreation and performance*

According to the results of the data analysis, when adventure recreation was a mediating variable between knowledge sharing and performance, members' knowledge sharing of task and system structure positively influenced performance. In general, task or system structure knowledge sharing will enhance overall performance. However, with adventure recreation, recognition of self-capability, upgrading of interpersonal and living quality or pleasure experience increased the positive influence of system structure and task knowledge sharing on task and group performance. In other words, with more adventure recreation activities, members' sharing of knowledge, skill and information will further enhance task and group performance. Therefore, regarding members' sharing of information and knowledge related to regulations,

systems and behavior in organizations to increase task and group performance, adventure recreation activity clearly plays a significant role.

### *Suggestions*

Based on the discussion above, the following suggestions have been proposed:

- (1) The construction of a knowledge sharing platform would increase task and group performance: Generally speaking, without a mediating variable, system structure and task knowledge sharing positively and significantly influence task and group performance. Interpersonal relationship knowledge sharing significantly and positively influence group performance. In other words, members' sharing more system related knowledge or constructing more friendships will increase task and group performance. Therefore, members should cooperate with each other, recognize unit goals, develop consensus, increase face-to-face communication and have opportunities to freely express themselves in order to increase performance.
- (2) Regular adventure recreation activities will increase members' self-capability, living quality and pleasure experience, just as adventure games and activities, and knowledge sharing will increase task and group performance. Therefore, in system R&D, organizations should pay attention to members' interaction, try to allow members time for relaxation, the

exchange of opinions and learning by adventure recreation in order to increase their overall performance.

(3) Diverse environments will encourage members' brainstorming: in creative and diverse job environments, members can fully use their professional knowledge and create rich thoughts by mutual communication and the exchange of opinions.

### *Limitations*

In different industries, the members have different kinds of knowledge sharing. In order to avoid the moderating effect of cross-industrial research on validation of theory, this study selected similar information system R&D personnel as the subjects, and convenience sampling was adopted for the questionnaires. Demographic variables cannot be taken into account in an average distribution and errors in research findings can result. Adventure recreation implies different things in different research fields and the scope and dimensions are not the same. Therefore, future researchers can focus on the implications of adventure recreation in different fields and investigate the factors of adventure recreation in order to construct a more complete mechanism.

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## A PRODUCTION MODEL FOR GALVANIZING TRANSMISSION TOWERS

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### Abstract

The production model for a galvanizing transmission tower produces a Limited quantity of various products. This model was very difficult to plane the schedule of production base on the theory of constraints. This study builds a new, unique and effective management process for production. After applied by the new production model, the loss of false production has reduced while the unit productivity has increased; the overtime rate has decreased while employees have been inspired. Finally, the study has accomplished a breakthrough by unblocking the production bottleneck and achieving on-time delivery. These improvements definitely ensure the profitability of business.

Key Words: Theory of constraints, Toyota production system, Drum-Buffer-Rope, Process of Ongoing Improvement

### Introduction

As a traditional niche manufacturer who has often faced challenges such as constant technological advancement, orders for small quantities of various products, and a volatile order

demand, the company overcame these obstacles and finally succeeded in providing a pivotal infrastructure of a transmission tower production for power generation as the foundation of the industry. The aim of this study is to understand how to overcome all its operational challenges to become a key supplier which fulfills customers' demands with highly competitive products, while retaining profitability and long-term sustainability.

The steel tower structure transmits electricity at a voltage between 33KV to 345 KV. The structural designs are totally different for towers which carry electric Lines at different voltages. A normal tower structure consists of an 80% steel angle, 15% steel plate, and 5% bolting set, which are firstly produced in a steel structure shop. Subsequently, all the steel parts are finally galvanized in the company's galvanizing shop to protect them from surface corrosion. In fact, 75% of steel angles are imported from Japan, and it often takes a minimum of 6 months from the required raw material prediction, evaluation, quotation, and placing of order to receive the materials. Therefore, both the appropriate purchasing of raw material and the utilization of the minimum inventory are crucial for on-time-delivery.

Thus this study applies Goldratt (2000)'s constraint theory of production management based on the Drum-Buffer-Rope (DBR) approach by Schragenheim (1991). This approach suggests that an appropriate amount of buffer storage should be placed in front of the bottleneck station to avoid the waste of manpower due to an untimely supply from the previous station.

## Theory of Constraints (TOC)

In a rapidly changing and competitive environment, the integration of resources and a focused strategy is extremely important. However, the impact of external changes and uncertain factors in an organization, such as employees, production process, etc., usually forces a firm to be ineffective in achieving its goal of maximizing profits. Therefore, in recent years, many firms have applied the thought and management model of Goldratt's Theory of Constraints (TOC) for process improvement in the hope of breaking bottleneck constraints, and effectively enhancing the operational performance and achieving the firm's goal. Tseng & Wu (2003) and Huang (2004) divide the constraints in TOC into two categories, namely, *Policy Constraints* and *Physical Constraints*. Policy constraints are invisible, such as the organizational culture, company operational system, management philosophy etc., while physical constraints are usually visible bottlenecks, including the changing market, actual production capacity and raw material situation. Tseng & Wu further classified the constraint theory technology into two groups, the first of which is the method to deal with practical production constraints, while the second is the general tools for resolving the problems. When the identification and elimination of the constraint, such as rhythm—buffer—binding or drum-buffer-rope (DBR) is combined with the five specific steps and properly applied in the process of highly different products with Limit production capacity, this approach is capable of offering a solution by reducing production time

and achieving a maximum yield.

### *TOC Thinking Procedure*

Goldratt (2000) used his thinking procedure on his proposed TOC, which enables both the individual and the organization to adopt a strict cause and effect relationship to ensure a significant achievement by continuous improvement. Besides knowing “*What to Change?*” a true understanding of the core problem further requires knowledge of “*What to Change to*” and “*How to Cause the Change?*” The exact answers to these three questions in detail, based on process management procedures, are the true key to continuous improvement. This is also the very framework proposed by the TOC thinking procedure. In fact TOC calls these three changing steps the Process Of On-Going Improvement (POOGI).

### *TOC management thinking*

Li & Chang (2005) suggests that TOC is an operation management solution with its origins in both logic and common sense. This approach implies a scientific thinking procedure (P→D→C→A) as the basis, and provides the following fundamental assumptions for organizations:

- (1). An organization has at least one goal to achieve: The goal of any profit-making organization is to earn more money, both now and in the future. In addition, it needs to

provide both its current and future employees a steady and satisfying working environment, and supply a good service to the market now and later on. Any activity or decision which effectively enlarges yield or reduces investment and operational costs contributes to the organization's goal. This is also widely accepted as being the common guidance of the organization and management.

(2). An organization comprises many departments or units, which form an interdependent system: Interdependency not only exists among the functions and resources of an organization. It also simultaneously exists between organizations, such as suppliers, clients, etc. The interdependent relationships of an organization can be described as the connected chain and Linkage shown in Figure 1. The chains are locked to each other by the Linkage, and every chain has its own function.

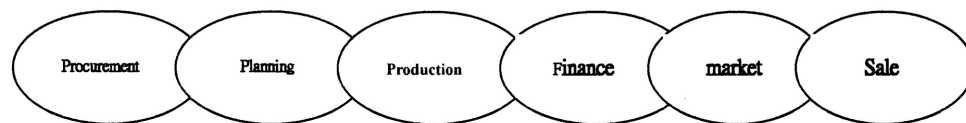


Figure 1. An organization is a connected chain (Li, 2005)

When the pace to achieve the organization's goal is accelerated, TOC suggests that the focus should be placed on the Linkage between the chains, i.e. improve the entire chain. The improvement of each chain or unit alone cannot accelerate the achievement of the organization's goal, but may rather hinder its pace. Furthermore, the chain

improvement can be measured by weight and intensity. Strengthening the chain's weight alone often incurs an increased cost for the organization. Linkage improvement is also considered to be a necessary step for improving the entire chain, i.e. the overall improvement of the organization. A good overall performance equals the total sum of a good local performance when there is no Linkage problem. Goldratt (2000) calls this the *Cost World View*. When focusing on entire chain improvement, the chain's intensity needs to be improved rather than its weight. The intensity in an organization refers to yield output, where the organization's weakest Link determines the final yield output. Therefore, the chain intensity improvement concept considers that the improvement of one chain or each unit does not equal that of total chain improvement. A good overall performance does not automatically equal the total sum of good local performances, and Goldratt (2000) calls this concept the *Throughput World View*.

(3). Each organization has its own constraints. Anything that prevents it from producing a better performance is called a constraint: Theoretically, only one weak Link exists in the entire chain, i.e. constraint. When an organization is unable to achieve its goals, this constraint should be located, and it should be determined whether it is related to the organization's own policy, performance evaluation, management thinking, or the organizational structure. A local constraint prevents the entire chain from creating a larger



output.

(4). Murphy's Law or uncertain factors exist. According to Murphy's Law: "Anything that can go wrong, will go wrong", and it usually occurs in the most unwelcome situations. In order to deal with Murphy's Law and system uncertainty, all complicated issues must be carefully evaluated and suitable protection measurements introduced in the right place. This protection mechanism is known as buffer management, and is purposely established for effective system control.

Site scheduling and a management technique were proposed by Goldratt (2000). He used TOC thinking from the Throughput World View to establish a DBR production management. Goldratt (2000) & Fox and Schragonheim further classified this technique as site scheduling and control. Site scheduling is actually a constraint-driven production scheduling, while the site control method is eventually buffer management. This technology provides key principles for site scheduling and management thinking.

### Real Case Application

A galvanized steel tower production is a multi-station continuous process. The stations work closely with each other according to the tower structure member material flow. Any mistake will create confusion and chaos in this established production Line. Therefore, detailed piece drawings are used to clearly indicate the working sequence and ensure that all the materials

are moved correctly. A working plan is established strictly based on the delivery date of each received order, as shown in Table 1. The work order scheduling is then carefully prepared to uphold the smooth operation of this small batch production Line.

Table 1. Management Goal Table

| Contract delivery date     | More than 70 days before delivery | Standard operation period | On 50 days delivery     | Standard operation period | On 30 days delivery     | Standard operation period |
|----------------------------|-----------------------------------|---------------------------|-------------------------|---------------------------|-------------------------|---------------------------|
| Delivery Finish            | 10 days before delivery           | 10 days                   | 4 days before delivery  | 3 days                    | 2 days before delivery  | 3 days                    |
| Galvanization Finish       | 20 days before delivery           | 10 days                   | 7 days before delivery  | 7 days                    | 5 days before delivery  | 5 days                    |
| Production Process Finish  | 30 days before delivery           |                           | 15 days before delivery |                           | 10 days before delivery |                           |
| CNC Work Finish            | 63 days before delivery           | 33 days                   | 43 days before delivery | 28 days                   | 23 days before delivery | 13 days                   |
| CNC Machine Setup Finish   | 67 days before delivery           | 4 days                    | 47 days before delivery | 4 days                    | 27 days before delivery | 4 days                    |
| Production Planning Finish | 70 days before delivery           | 3 days                    | 50 days before delivery | 3 days                    | 30 days before delivery | 3 days                    |

1 The time in the above table is based on the last completed package.

2. The management goal is set to a production of 600Tons/month. This restriction is exempted in the case of exceeding the monthly production goal or when a priority task is urgently inserted into the production line.

In the past, the case used to apply planned scheduling based on the predicted tower type, material amount, and multi-case production approach, which very often led to unnecessary products and shop confusion. Then the material flow in the process was unknown, the required materials could not be found, the closing date of the case was forced to be extended, the percentage of delayed delivery surged, and the production cost increased. After taking the new production model, a buffer zone was prepared in front of the bottleneck station according to the

actual job type and material amount. This enabled the production process to be visible and controllable, and at the same time, the best use was made of the constrained capacity of the process. Product maximization was finally realized, excessive products and shop confusion were avoided, and as a result, the amount of loss was reduced. Process productivity was enhanced and the delayed delivery percentage was reduced. There was no bottleneck in the production Line. On-time delivery to customers was firmly secured. The effectiveness of the proposed model to deal with this small batch tower production was well proven.

### Results and Discussion

Womack and Jones (1991) revealed that Toyota could only conduct small batch production, and continuously developed new types of cars to satisfy the market. However, this small batch production forced Toyota to develop a technique which could quickly change the mold, and then introduce a much more flexible and effective production process. Therefore this study was based on the in-time concept of Toyota Production System (TPS) to replace the estimated planning production model. The in-time production originated from customers' firm orders. Then there were virtually no excess products in the production Line, and each product flow path and parts quantity were also visible. This enabled the production Line to be operated smoothly without any bottleneck station. Consequently, the annual cost lost was NTD 5,357,792

before and NTD 1,548,429 after the application of the new production model. The net cost loss reduction was NTD 3,809,636, or 71.10% drop as shown in Table 2.

Table 2. Annual cost loss comparison before and after the introduction of the new production model

| Period                                  | Shop loss (NTD) | Service loss (NTD) | Total loss (NTD) |
|---|-----------------|--------------------|------------------|
| Before introduction                     | 2,812,185       | 2,545,607          | 5,357,792        |
| 1 <sup>st</sup> year after introduction | 1,893,467       | 1,184,135          | 3,077,602        |
| 2 <sup>nd</sup> year after introduction | 1,774,833       | 1,420,528          | 3,195,361        |
| 3 <sup>rd</sup> year after introduction | 1,304,649       | 707,012            | 2,011,661        |
| 4 <sup>th</sup> year after introduction | 788,104         | 816,198            | 1,604,302        |
| 5 <sup>th</sup> year after introduction | 638,338         | 910,091            | 1,548,429        |
| Loss comparison                         | (2,173,847)     | (1,635,516)        | (3,809,363)      |
| In percentage                           | (77.30%)        | (64.25%)           | (71.10%)         |

Table 3. Comparison of Productivity before and after introducing the production model

| Period                                | Total production (Tons) | Total manpower (man-day) | Productivity( kg/man-day) |
|---------------------------------------|-------------------------|--------------------------|---------------------------|
| Before introduction                   | 8,421.5                 | 10,909.54                | 771.20                    |
| 1 <sup>st</sup> yr after introduction | 8,968.4                 | 11,562.00                | 775.70                    |
| 2 <sup>nd</sup> yr after introduction | 9,146.0                 | 10,775.00                | 848.80                    |
| 3 <sup>rd</sup> yr after introduction | 7,083.5                 | 9,165.39                 | 772.85                    |
| 4 <sup>th</sup> yr after introduction | 6,111.9                 | 7,779.45                 | 785.65                    |
| 5 <sup>th</sup> yr after introduction | 6,055.9                 | 7,028.91                 | 861.57                    |
| Productivity comparison               | —                       | —                        | + 90.37                   |
|                                       |                         |                          | ↑ 11.72%                  |

The process improvement can be simply seen by comparing the unit manpower productivity before and after the introduction of the new production model (Table 3.) and by

comparing the reduction in the delayed percentage before and after introducing the production model (Table 4.). This is clear evidence of the verification of the performance of the new production model.

Table 4. Comparison of reduced delayed percentage before and after introducing the new production model

| Period                                | Total cases | Early | On time | Delay | Delay (%) |
|---------------------------------------|-------------|-------|---------|-------|-----------|
| Before introduction                   | 195         | 56    | 40      | 99    | 50.8      |
| 1 <sup>st</sup> yr after introduction | 202         | 68    | 34      | 100   | 49.5      |
| 2 <sup>nd</sup> yr after introduction | 187         | 33    | 62      | 94    | 49.7      |
| 3 <sup>rd</sup> yr after introduction | 185         | 97    | 31      | 57    | 30.8      |
| 4 <sup>th</sup> yr after introduction | 182         | 76    | 56      | 50    | 27.5      |
| 5 <sup>th</sup> yr after introduction | 148         | 64    | 51      | 33    | 22.0      |
| Before and after comparison           | —           | —     | —       | —     | 56.69 ↓   |

The early, on-time and delayed delivery percentage was determined by the planned delivery date according to the management goal, not the actual delivery date to clients.

In 2007, the study produced a total of 6575.1 tons, with an average yield of 547.93 tons per month. Table 5 shows the production amount from January to September, 2008. From January to July, the total production was 2730.77 tons, an average of 390.11 tons/month,

whereas in July and August the production was 2278.65 tons, an average of 1139.33 tons/month. In comparison, an additional amount of 749.22 tons can be introduced into the production Line every month, equaling an increase of 192.05%.

Table 5. Production statistics: January~September, 2008

| Month  | Jan   | Feb    | Mar    | Apr    | May    | Jun    | Jul    | Aug      | Sep       |
|--|-------|--------|--------|--------|--------|--------|--------|----------|-----------|
| Production(T)  | 64.72 | 360.85 | 351.04 | 252.11 | 217.83 | 776.47 | 707.75 | 1082.87  | 1195.78   |
| Average monthly production and increase: Jan~Jul, a total of 2730.77T, average 390.11T/month |       |        |        |        |        |        |        | 1139.33T | ↑ 192.05% |

Based on the management goal planning of 600T/month for calculation, the exceeding amount was 482.87T in August and 595.78T in September. By using the five focused steps in the *Throughput World View of TOC*, this study found that the system's constraints were in three work stations: CNC drilling, CNC punching and bending. In order to enable the constrained stations to reach full capacity, additional manpower was introduced in the CNC drilling and punching stations, organized in three shifts, in a 24-hour work assignment, whereas the bending station was arranged into two shifts, in a 16-hour work assignment. The constrained stations were finally overcome by focusing more employees and extending the working hours, and outsourcing manpower was also introduced in the non-constrained steel plate work station. As a result, the delivery date for almost every order was secured. At the same time, multi-function employees were gradually induced in deal with the abrupt changes in the production and sudden orders. The introduction of more effective process thinking and various efforts of improvement

eventually ensured highly competitive products and profitability, and the active willingness to change eventually also inspired the workers in the production Line.

### Conclusion

This study created a new model where a small batch production was based on unstable customer orders to decide its production amount and process pace. Moreover, continuous improvement was introduced to achieve zero defect products, zero unnecessary storage, and cost reduction. The production pattern finally added value to the product and brought core competition advantages to the firm. The TOC thinking and approach were applied to the production Line, while traditionally rigid production was replaced by flexible production. Buffer storage was purposely designed and placed to eliminate process constraints. Therefore, false cost loss was reduced, unit productivity was enhanced, shop capacity was increased, and late delivery was reduced. This study really offers a valuable reference on TPS and TOC for application and study.

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## EXPLORING FACTORS INFLUENCING TAIWAN'S TOURISM WEBSITE CUSTOMER SATISFACTION AND INTENTION

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### Abstract

The popularization of the internet has had major impacts on tourism markets, especially in terms of shrinkage of regional time zone discrepancies. The study builds a new model out of the integration of information system success model with perceived playfulness and technology acceptance models, seeking to probe the quality of information provided by major travel websites in Taiwan, their systemic quality, satisfaction resulting from perceived playfulness, and the intention. The study's findings hold that the perceived playfulness on travel website has positive impact on perceived ease of use and usefulness and that the perceived ease of use has a positive impact on the intention. It concludes that the information and system quality of travel websites have a positive impact on customer satisfaction.

**Keywords:** Information Quality, System Quality, Perceived Playfulness, Tourism Website, Information System Success Model, Customer Satisfaction

## Introduction

In the face of the skyrocketing pace of the internet growth, the business models of the travel industry have undergone crucial transition to information for better efficiency of communication and make continuous progress in parallel with the development of the virtual space. Due to elimination of barricades of geographic and time zone discrepancies, travel websites and on-line shopping have become increasingly more appealing to netizens who are travel enthusiasts. The burgeoning of the world wide web has not only unearthed potential consumers for businesses but also provided access to comprehensive and quality travel products, weaving a win-win outcome. This study integrates an information system successful model, perceived playfulness, technology acceptance model to build a comprehensive model anew, seeking to probe the quality of information provided by major travel websites in Taiwan, their systemic quality, satisfaction resulting from perceived playfulness, and the intention to use. The targets of the study are internet users who have purchased services of independent tours, reservation for accommodation, tickets, car rental, and package tours.

## Literature Review

### *Information System Success Model*

Delone and Mclean (1992) proposed the concept of information system success model, arguing the quality of system and information have an impact on users' satisfaction. The two

factors are constantly cited to represent the systemic feature when analyzing satisfaction and performance. Users and their satisfaction cast impact on individuals, which then cast impact on organizations. The IS success model indicates conspicuous interdependence between the quality of system and information and use of system and satisfaction, with the latter two dependent on one another and influencing individuals. Negash et al., (2003) take the IS success model a step further, targeting web-based customer support systems. They conclude with conspicuous impact of quality of information and system and services on effectiveness.

#### *Technology Acceptance Model*

Davis (1989) develops the Technology Acceptance Model (TAM) by forecasting behaviors of information technology users on the basis on rational action theory to analyze the external variants of internal belief, attitude, and the intention and how they influence the behaviors of such users. Davis (1989) suggests two determining factors: perceived usefulness and perceived ease of use. They have been proven to be key to understanding whether users believe in the function of specific systems promoting work performance and saving energy. KUO et al. (2005) found perceived ease of use have a positive effect on the customer satisfaction. The connections between trust and TAM have been widely discussed in the literature as the relationships between perceived usefulness, perceived ease of use, and trust

(Gefen, 2004; Hsu & Lin, 2008; Chu, 2010; Ho et al., 2010). Teo (2010) found perceived ease of use have a positive effect on the perceived usefulness. Yu & Yu (2010) found perceived usefulness have a positive effect on the behavioral intention.

## Methods

### *Hypotheses*

The hypotheses of this study are as follows:

- H1. Information quality will positively affect customer satisfaction.**
- H2. System quality will positively affect customer satisfaction.**
- H3. Perceived playfulness will positively affect perceived ease of use.**
- H4. Perceived playfulness will positively affect perceived usefulness.**
- H5. Perceived ease of use will positively affect customer satisfaction.**
- H6. Perceived ease of use will positively affect perceived usefulness.**
- H7. Perceived ease of use will positively affect behavioral intention.**
- H8. Perceived usefulness will positively affect behavioral intention.**

### *Data Collection and Sampling*

The study distributed a total of 400 questionnaires September through December, 2011, of which 322 were recollected, 5 invalid and 317 valid. Male respondents constitute 53.3%,

slight above the opposite sex. 58.3% of the respondents surf the internet more than five days in a week. The majority of them (51.3%) surf for 2 to 4 hours every time they connect to the internet.

## Results

The data shows that information quality had a positive effect on customer satisfaction ( $\beta_1=0.35$ ,  $P<0.05$ ). Therefore, hypotheses H1 was supported.

System quality had a positive effect on customer satisfaction ( $\beta_2=0.42$ ,  $P<0.01$ ). Therefore, hypotheses H2 was supported.

Perceived playfulness had a positive effect on perceived ease of use ( $\beta_3=0.11$ ,  $P<0.01$ ). Therefore, hypotheses H3 was supported.

Perceived playfulness had a positive effect on perceived usefulness ( $\beta_4=0.18$ ,  $P<0.01$ ). Therefore, hypotheses H4 was supported.

Perceived ease of use had a positive effect on customer satisfaction ( $\beta_5=0.38$ ,  $P<0.01$ ). Therefore, hypotheses H5 was supported.

Perceived ease of use had a positive effect on perceived usefulness ( $\beta_6=0.58$ ,  $P<0.05$ ). Therefore, hypotheses H6 was supported.

Perceived ease of use had a positive effect on behavioral intention ( $\beta_7=0.42$ ,  $P<0.05$ ). Therefore, hypotheses H7 was supported.

Perceived usefulness had a positive effect on behavioral intention ( $\beta_8=0.63$ ,  
The International Journal of Organizational Innovation Vol 5 Num 1 Summer 2012

$P < 0.05$ ). Therefore, hypotheses H8 was supported.

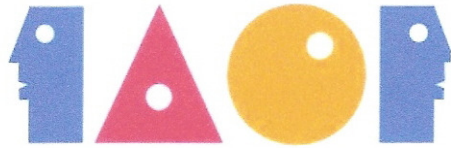
### Conclusion

Travel websites offer a variety of information sources and services including group tours, airfare for independent travel, hotel reservation, tickets, and package tours along with open discussion forums that entail useful tips for consumers, who benefit from convenient services and price discounts on the web. The study's findings hold that the perceived playfulness on travel website has positive impact on perceived ease of use and usefulness and that the perceived ease of use has a positive impact on the intention. It concludes that the information and system quality of travel websites have a positive impact on customer satisfaction. The findings of the study yield that those websites that emphasize customer satisfaction and the intention to use by virtue of the perceived ease of use and playfulness are capable of attracting more visitors and generating profits. This research proposed two future research directions: 1. there can be a further investigation to discuss if other research variables will impact customer satisfaction and behavioral intention. 2. This research model can be applied to other industries with further analysis on results.

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EXPLORING THE RELATIONSHIP BETWEEN PERCEIVED RISK  
AND CUSTOMER INVOLVEMENT, BRAND EQUITY  
AND CUSTOMER LOYALTY AS MEDIATORS

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Abstract

The main subjects for this research are to find out the relationship between brand equity, perceived risk, customer loyalty and customer involvement, and to test the mediating roles of brand equity and customer loyalty on this relationship. The population for this research was identified as the consumers having the shopping experience for digital cameras in Taiwan, resulting in 190 individual surveys for study. The findings indicated brand equity, perceived risk, and customer loyalty have significant and positive relationship to customer involvement. The findings also support the hypotheses that brand equity and customer loyalty partially mediate the relationship between perceived risk and customer involvement, while customer loyalty has slightly stronger mediating effect on customer involvement than brand equity. Finally, this research generated the suggestions for business strategies and suggested future scholar studies.

Key Words: Customer Involvement, Brand Equity, Perceived Risk, Customer Loyalty, Electrical Consumer Product



## Theoretical Foundation

Perceived risk and customer involvement have recognized as significant subject for consumer behavior research, and customer involvement has been regarded as the key indicator for customer retention. Yee and San (2011) claimed the perceived risk is the phenomenon when purchasing commercial goods in early stages by consumer's subjective evaluation. In other words, customer tends to avoid the risk for purchasing the goods which they are not familiar with. Santouridis and Trivellas (2010) suggested customer loyalty referred to the customer's attitude for re-purchasing intentions for buying same products. Knox and Walker (2003) indicated customer involvement will affect the final decision during purchasing procedure and the higher-involved customer will behave higher loyalty. Ailawadi and Keller (2004) defined brand equity is the profitability effect for leveraging asset and liability which related to product name, symbol, and brand. Simoes and Dibb (2001) also stated powerful brand image will raise consumers' faith for unseen value, give customers better product image or appreciate the intangible assets, and decrease consumers' perceived financial, social, or safety risk. And this behavioral intention will help to maintain the business relationship between customers and companies.

Hu (2011) conducted a research and supported the concept that customer involvement, brand equity, and perceived risk, have significant and positive relationship with customer loyalty. Based on the research by Olsen (2007), the customer involvement has acted a complete mediator role between customer satisfaction and repurchase loyalty. Knox and Walker (2003) claimed customer involvement played an important role when maintain loyalty relationship with customer. Previous studies have suggested there is a significant and positive relationship between customer loyalty, brand equity, perceived risk and customer involvement. This research

expanded these theories and ground studies, conducted more detailed analysis, and intended to examine the mediating effect of brand equity and customer loyalty on the relationship between perceived risk and customer involvement.

### *Research Hypotheses*

This research tried to investigate: (a) to examine the mediating role of brand equity and customer loyalty on the relationship between perceived risk and customer involvement, (b) to create the suggestions for business application for electrical consumer products, and (c) to find out areas for future scholarly inquiry.

**Hypothesis 1. There is significant mediating effect of brand equity between perceived risk and customer involvement.**

**Hypothesis 2. There is significant mediating effect of customer loyalty between perceived risk and customer involvement.**

### Methodology

#### *Instrumentation*

Four instruments have adopted in this study: The *Customer Loyalty Questionnaires* (6 items) were from the theory from Aydin and Ozer (2005) and encompasses four dimensions: repeated purchase (1 item), price toleration (2 items), recommendations (2 items) and cross purchase (1 item). The *Brand Equity Questionnaires* (7 items) are based on the definition by Kayaman and Arasli (2007)'s concept model, while this research adopted four dimensions: brand awareness (1 item), brand association (2 items), perceived quality (2 items) and brand loyalty (2 items) for examining the perception of brand equity by customers. The *Perceived Risk Questionnaires* (4 item) were modified from the concept by Cunningham et al (2005), which encompasses three dimensions: finance risk (1 item), function risk (1 item), and social risk (2

items). The *Consumer Involvement Questionnaires* (10 items) are based on the definition by Kapferer and Laurent (1993)'s CIP model (Consumer Involvement Profile), which encompasses five dimensions: interest (3 items), pleasure (2 items), sign value (2 items), perceived risk important (1 item), and perceived risk probability (2 items).

#### *Population and Data Collection*

The consumers who have had the shopping experience for digital camera have been selected as an acceptable population for this study. To ensure the response rate, this research applied convenience sampling method with anonymous survey. After contacting with available person agreeing to participate this research, the researcher distributed the hard copy of questionnaires to participants directly. A total of 220 consumers have had participated this study. After deducting 30 invalid response, the total number of valid responses was 190, providing an adjusted response rate of 86 %.

#### *Validity and Reliability*

The researcher examined the content and construct validity to discuss the validity issues. The instruments were based on the academy theory or existed instruments developing by scholars to improve the content validity. Factor Analysis results for all instruments indicated KMO test value ( $>.7$ ), Bartlett test ( $<.05$ ) and Factor Loading values ( $>.5$ ). The test results demonstrated the construct validity for the questionnaires are reasonable. The internal consistency as an estimate of reliability of the four instruments ranged from .734 to .898.

#### Results

##### *Hypothesis 1.*

Path analysis with regression models was applied to examine the H1 and results are summarized in Figure 1 and Table 1. Based on the mediator principles by Baron and Kenny

(1986), the results support the H1. Brand equity ( $\beta=.243$ ,  $p<.05$ ) presented partial mediator effect with indirect effect ( $\beta=.06$ ) on relationship between perceive risk and customer involvement. The results of Sobel test ( $z=2.62$ ,  $\alpha=.05$ ) presented the  $z > | 1.96 |$  and also supported H1.

Figure 1. Path Analysis Diagram for Mediator Effect of Brand Equity and Customer Loyalty on Perceived Risk and Customer Involvement

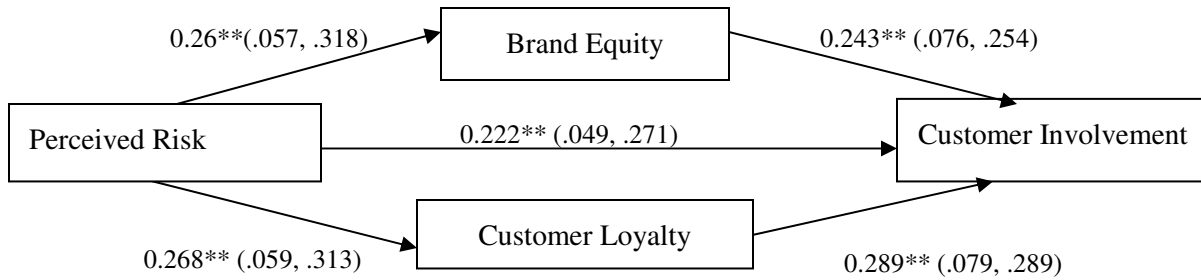


Table 1: Regression Models of Path Analysis for Brand Equity and Customer Loyalty Mediating Perceived Risk and Customer Involvement

|         |  | Unstd. B                      | SE                      | Std. B                        | t                       | R <sup>2</sup> |
|---------|--|-------------------------------|-------------------------|-------------------------------|-------------------------|----------------|
| Model 1 | Perceived Risk<br>DV: Brand Equity   | 0.260**                       | 0.057                   | 0.318**                       | 4.595                   | 0.101          |
| Model 2 | Perceived Risk<br>DV: Customer Loyalty   | 0.268**                       | 0.059                   | 0.313**                       | 4.514                   | 0.098          |
| Model 3 | Brand Equity<br>Perceived Risk<br>Customer Loyalty<br>DV: Customer Involvement | 0.243**<br>0.222**<br>0.289** | 0.076<br>0.049<br>0.079 | 0.254**<br>0.271**<br>0.289** | 3.213<br>4.562<br>3.649 | 0.419          |

\*\*p<.01(2-tailed), \*p<.05 level (2-tailed).

### Hypothesis 2.

Path analysis with regression models was applied to examine the H2 and results are summarized in Figure 1 and Table 1. Based on the mediator principles by Baron and Kenny

(1986), the results support the H2. Customer loyalty ( $\beta=.289$ ,  $p<.05$ ) presented partial mediator effect with indirect effect ( $\beta=.08$ ) on relationship between perceive risk and customer involvement. The results of Sobel test ( $z=2.85$ ,  $\alpha=.05$ ) presented the  $z > | 1.96 |$  and also supported H2.

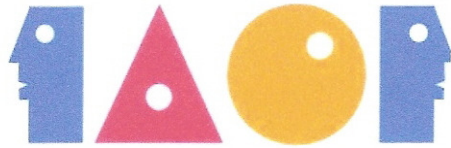
### Discussion and Recommendations

The results suggested customer loyalty, brand equity, and perceived risk have significant and positive relationship to customer involvement. Brand equity and customer loyalty also partially mediated the relationship between perceived risk and customer involvement. This means both brand equity and customer loyalty played the significant roles to effect customer's perception on customer involvement. In addition, the findings indicated customer loyalty has slightly stronger indirect effect on the relationship between perceived risk and customer involvement than brand equity. This fact revealed companies may not only focus on managing brand image, also should put more focus on building stronger customer loyalty. This fact also revealed the complexities of customer behaviors on purchasing on digital camera, such as these kinds of high price electrical consumer products. This study indicated the necessities for future study to identify more effective factors to influence the customer involvement.

This research suggested future research recommendations: 1).Due to time constraints and limited finances, this research utilized convenience sampling and only focused on limited number population. Future study may extend the research through larger random selection, 2).Moreover, the population may extend to analyze levels of price of digital cameras to understand the differences in perception of money value from consumers, and 3) Future studies may try to identify more significant factors to affect customer involvement, also to generate future scholar studies.

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STUDY ON INFLUENCE OF EMPLOYEE PROMOTION SYSTEM  
ON ORGANIZATIONAL PERFORMANCE

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Abstract

This study aims to probe into the influence of employee promotion system on organizational performance. The purposes are below: 1) to recognize the current situation of employee promotion system; 2) to probe into difference of the employees with different demographic variables on employee promotion system and organizational performance; 3) to probe into the correlation between employee promotion system and organizational performance. This study treated the management and employees of top five innovative enterprises in Taiwan in 2011 as the subjects. A total of 1000 questionnaires were distributed with 591 returns. After eliminating 67 questionnaires with incomplete responses, there were 524 valid samples, with a valid return rate of 52%. The conclusions are shown. The correlation between employee promotion system and organizational performance reveals significant difference because of some demographic variables. Suggestions are proposed for future studies.

Keywords: employee promotion system, organizational performance, demographic variables

## Introduction

From the perspective of the organizations, the purpose of promotion is to select appropriate manpower of different positions and cultivate the potential employees to enhance their capabilities and contribution. Thus, “outcome” and “validity” of promotion are the keys. In other words, in overall manpower use, promotion system should actively select the talents for the organizations and effectively enhance organizational efficacy and competitiveness.

Traditional human resource management emphasizes that “humans” are the important resources in the organizations and they should be effectively managed. Their potential should also be stimulated. After selecting the appropriate manpower, the organizations arrange the proper positions by promotion system in order to result in their contribution. Promotion system plays the role as the “catalyst” and it can effectively transform the “resources” into “outcomes”.

The perspective of human resource can be the criterion for the government and private firms. However, with the change of time and environment, it is not satisfying (Tsai, H. J., Shih, N. J., 2008). Human capital theory particularly emphasizes the concern and investment on core manpower in the organizations and it influences the functions of traditional promotion system and managerial system. Thus, when discussing human capital theory, it is necessary to probe into promotion system.



## Literature Review

### *Employee Promotion System*

Criteria of the employee promotion are critical in promotion system. According to (Chang, 2009), criteria of promotion are below: personality, seniority and job efficiency. Except for the factors above, personal talent and knowledge, health, age, gender, training, region and interpersonal relationship should also be considered. According to the attributes, the above factors can be abstract and concrete. Concrete factors include seniority, educational level, performance, reward & punishment, training, age, gender and figure. Abstract factors include personality, knowledge, experience, leadership, family background, interpersonal relationship, etc. However, in the promotion, not all the factors above are considered. It will depend on the requirements of the institutions or positions (Chiu, 2009). Four important factors are described as follows:

#### (1) Personality

Good employees should not only have the knowledge and skills required by the jobs, but also have superior personalities, including the attitude toward the jobs, responsibility, honesty, reliability, endurance and creativity. Personalities not only are related to job efficiency, but also directly and indirectly influence people and things. They are the important conditions of

promotion. Employees with superior personalities should be promoted or rewarded according to the regulations. Those with inferior personalities should be degraded as the punishment. The employees are the legal executors and their behaviors will influence the views in the society.

Without superior personalities, how can the employees be the models of people? The employees' personality should be concerned in order to develop positive image. The employees with positive personalities will follow the rules, be responsible and have prominent performance. Thus, respectable personality can be the criterion of promotion. Although personality is abstract and it is not easy to be specifically measured. In the examination, the supervisors can be influenced by their subjective judgment and become unfair.

## (2) Seniority

Employees who are employed for certain period of time and have prominent performance are promoted. It is the general basic condition of promotion nowadays. Although seniority promotion system is slow, it is stable. The employees usually will not compete with each other or have conflicts. People who support the system suggest that seniority is the most significant criterion to judge job competency. Although the senior employees gradually forget the knowledge and skills in the examination, they are assigned properly and effectively. New employees can easily deal with the questions in the examination; however, they are not as

experienced as the seniors in business. In addition, in seniority promotion system, other influences will be avoided and the authority will not promote the employees according to their personal preference.

However, there are still disadvantages in seniority promotion system. The first is that it cannot encourage the employees with capabilities. Regardless of the talent and efficiency, all employees who are employed for certain period of time can be promoted. The employees with special talents will not do their best. Their capabilities will not be totally demonstrated.

Therefore, in military organization, during the war, in particular, seniority promotion system is not adopted in order to encourage the talented members. The second disadvantage is that the prominent young employees do not have the opportunities of development. The seniors are usually conservative and resist the reform. It results in the low spirit in business.

### (3) Job efficiency

It is reasonable and proper to treat the employees' job efficiency as the criterion of promotion. However, how to precisely measure and record job efficiency? Lack of the concrete and reliable criteria, the promotion will not be fair. In the measurement of job performance, one or several kinds of objective criteria should be constructed in order to measure the job performance.

#### (4) Personal talent and knowledge

Personal talent and knowledge include leadership, knowledge, experience and interpersonal relationship. Leadership, interpersonal relationship and experience are particularly important when selecting the supervisors. The recognition of knowledge relies on training, classification, examination and jobs in personal affair institutions or educational institutions. The promotion of the positions is based on not only the superior personality, but also the prominent talent and knowledge; otherwise, the manpower needed will not be selected and the employees will not demonstrate their capabilities.

Based on the above, the dimensions of Chiu's (2009) employee promotion system adopted by this study are personality, seniority, job efficiency, personal talent and knowledge.

#### *Organizational Performance*

Kassem (2010) suggested that organizational performance is the managers' accomplishment of varied goals of jobs. The firms have the expected goals when implementing new strategies. Only the measurement upon organizational performance can suggest the effectiveness of business strategy. Dalton, Todor, Spendolin, Fielding and Porter (2010) proposed that organizational performance could be divided into soft performance and hard performance. Soft performance means the supervisors' evaluation, self-awareness and some

similar indicators. Hard performance is the sales volume, gross profit, production, commission and services. Brouthers (2008) argued that performance means the managers' accomplishment of the goals of jobs. The said research indicated that performance is the employees' accomplishment of the duties and it demonstrates that the employees' fulfillment of job requirements. Job performance means the net effect of the employees' efforts and it is influenced by the employees' capabilities and role awareness.

Regarding the measurement on organizational performance, Venkatraman and Ramanujam (2006) indicated that the conceptual framework should include financial performance, business performance and operational efficacy:

(1) Financial performance: it means the economic goals of business, such as growth of sales, profit rate and earnings per share, commonly used by traditional strategy research.

(2) Business performance: besides financial performance, it also includes business performance which means non-financial indicators such as market share, new products in the market, product quality and marketing efficacy.

(3) Operational efficacy: besides financial performance and business performance, it also includes the accomplishment of varied conflict goals and goal satisfaction of internal and external stakeholders.

Based on the literature above, dimensions of organizational performance of Venkatraman and Ramanujam (2006) adopted by this study are financial performance, business performance and operational efficacy.

### *Employee Promotion System and Organizational Performance*

Chung (2010) treated the police, medical and tax personnel in Kaohsiung City Government as the subjects and found the positive correlation among fair employee promotion system, fair distribution and organizational performance. Sun (2008) suggested that the employees' employee promotion system positively influenced organizational performance of Keelung City Government. Liu (2009) treated the employees of Taipower as the subjects, and found that employee promotion system, fair performance evaluation and fair distribution significantly influenced organizational performance and employee promotion system was more influential; Hsu (2009) treated on-the-job members as the subjects and found that employee promotion system and program fairness positively influenced organizational performance. Moreover, prediction of employee promotion system on organizational performance was higher than fairness. Cho (2000) probed into financial and auditing personnel and found that employee promotion system influenced job satisfaction and organizational performance. There was significant and positive correlation among employee promotion system, job satisfaction and

organizational performance.

According to the views suggested by domestic and foreign scholars above, this study develops the hypotheses below:

**H1: Employee promotion system significantly influences “financial performance” of organizational performance.**

**H2: Employee promotion system significantly influences “business performance” of organizational performance.**

**H3: Employee promotion system significantly influences “operational efficacy” of organizational performance.**

#### *Demographic Variables*

Research on employee promotion system suggests that younger dispatched personnel with higher educational levels and incomes tend to demonstrate higher job performance (Day & Landon, 1977; Zaichowsky & Liefeld (1977); Bearden & Mason (1984). The hypotheses are proposed below:

**H4: Correlation between employee promotion system and organizational performance reveals significant difference because of “different gender”.**

**H5: Correlation between employee promotion system and organizational performance reveals significant difference because of “different ages”.**

**H6: Correlation between employee promotion system and organizational performance reveals significant difference because of “different marital statuses”.**

**H7: Correlation between employee promotion system and organizational performance reveals significant difference because of “different educational levels”.**

**H8: Correlation between employee promotion system and organizational performance reveals significant difference because of “different monthly incomes”.**

## Research Method

### *Research Structure*

This study develops the research framework as follows: Three organizational performances are dependent variables, including financial performance, business performance and operational efficacy. Four items of employee promotion system are independent variables, including personality, seniority, job efficiency, personal talents and knowledge. Thus, the correlation between employee promotion system and organizational performance is studied.

Figure 1. displays the research framework.

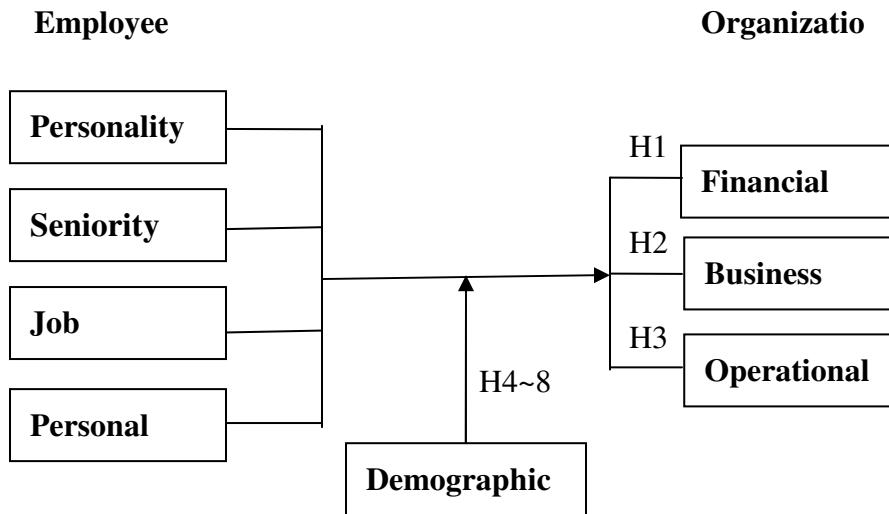


Figure 1. Research framework



## Research Subjects and Sampling Method

By random sampling, this study conducts field distribution and collects the questionnaires. Top five innovative enterprises in Taiwan in 2011 are the subjects. The ranking is HTC, ASUS, 7-11, TSMC and Luxgen of Yulon. Thus, this study treats the management and employees of top five innovative enterprises in Taiwan in 2011 as the subjects. 1000 questionnaires are distributed, with 591 returns. After eliminating 67 questionnaires with incomplete responses, the researcher obtains 524 valid ones. Return rate is 52%.

## Analysis and Discussion

### *Factor Analysis of Employee Promotion System*

The Scale of Employee Promotion System is based on dimensions and questionnaire proposed by Chiu (2009). After factor analysis, this study obtains four dimensions and Cronbach's  $\alpha$  of each is 0.88 (personality), 0.84 (seniority), 0.86 (job efficiency) and 0.90 (personal talents and knowledge). Principal component analysis is conducted according to the responses in questionnaires. After oblique rotation, explained variance is 75.196%. Table 1. displays these results.

### *Correlation analysis between employee promotion system and organizational performance*

(1) Correlation analysis between employee promotion system and financial performance of organizational performance. By Multiple Regression Analysis, H1 is validated. (Table 2.)

Analytical results are shown below: personality ( $t=3.159$ ,  $p<0.01$ ), seniority ( $t=2.453$ ,  $p<0.01$ ), job efficiency ( $t=2.042$ ,  $p<0.01$ ), personal talents and knowledge ( $t=1.723$ ,  $p<0.05$ ). They significantly influence financial performance of organizational performance. Therefore, H1 is supported.

Table 1. Factor analysis of employee promotion system

| Names of factors              | Items of variables | Eigenvalue | Factor loading | Explained variance (Accumulated value) | Reliability coefficient |
|-------------------------------|--------------------|------------|----------------|--|-------------------------|
| Personality                   | 01                 | 3.861      | 0.874          | 27.342<br>(27.342)                     | 0.88                    |
|                               | 02                 |            | 0.846          |  |                         |
|                               | 04                 |            | 0.832          |  |                         |
|                               | 06                 |            | 0.815          |  |                         |
|                               | 03                 |            | 0.809          |  |                         |
|                               | 05                 |            | 0.803          |  |                         |
| Seniority                     | 10                 | 2.529      | 0.886          | 20.691<br>(48.033)                     | 0.84                    |
|                               | 11                 |            | 0.863          |  |                         |
|                               | 09                 |            | 0.855          |  |                         |
|                               | 08                 |            | 0.841          |  |                         |
|                               | 07                 |            | 0.827          |  |                         |
|                               | 12                 |            | 0.812          |  |                         |
| Job efficiency                | 13                 | 1.937      | 0.844          | 15.394<br>(63.427)                     | 0.86                    |
|                               | 15                 |            | 0.827          |  |                         |
|                               | 16                 |            | 0.801          |  |                         |
|                               | 18                 |            | 0.784          |  |                         |
|                               | 14                 |            | 0.765          |  |                         |
|                               | 17                 |            | 0.737          |  |                         |
| Personal talent and knowledge | 20                 | 1.218      | 0.903          | 11.769<br>(75.196)                     | 0.90                    |
|                               | 23                 |            | 0.872          |  |                         |
|                               | 21                 |            | 0.846          |  |                         |
|                               | 19                 |            | 0.838          |  |                         |
|                               | 22                 |            | 0.815          |  |                         |
|                               | 24                 |            | 0.809          |  |                         |

personality (t=2.736, p<0.01), seniority (t=2.423, p<0.01), job efficiency (t=1.428, p<0.05), personal talents and knowledge (t=1.108, p<0.05). (Table 3.) They significantly influence business performance of organizational performance. Thus, H2 is supported.

Table 2. Multiple Regression Analysis of dimensions of employee promotion system on financial performance of organizational performance

| Predictor                     | Non-normalized coefficient |                    | Normalized coefficient | t value |
|-------------------------------|----------------------------|--------------------|------------------------|---------|
|                               | $\beta$ estimate           | Standard deviation | B distribution         |         |
| Intercept                     | 4.824                      | 0.534              | ---                    | 11.287  |
| Personality                   | 3.278                      | 0.351              | 0.316                  | 3.159** |
| Seniority                     | 2.813                      | 0.278              | 0.231                  | 2.453** |
| Job efficiency                | 2.381                      | 0.233              | 0.210                  | 2.042** |
| Personal talent and knowledge | 1.483                      | 0.196              | 0.173                  | 1.723*  |

Note: \*denotes p value<0.05, \*\*denotes p value<0.01.

Table 3. Multiple Regression Analysis of factors of employee promotion system on business performance of organizational performance

| Predictor                     | Non-normalized coefficient |                    | Normalized coefficient | t value |
|-------------------------------|----------------------------|--------------------|------------------------|---------|
|                               | $\beta$ estimate           | Standard deviation | B distribution         |         |
| Intercept                     | 3.914                      | 0.402              | ---                    | 12.881  |
| Personality                   | 2.627                      | 0.284              | 0.322                  | 2.736** |
| Seniority                     | 2.136                      | 0.237              | 0.248                  | 2.423** |
| Job efficiency                | 1.428                      | 0.128              | 0.175                  | 1.428*  |
| Personal talent and knowledge | 1.277                      | 0.105              | 0.129                  | 1.108*  |

Note: \*denotes p value <0.05, \*\*denotes p value<0.01.

*Correlation analysis between employee promotion system and operational efficacy of organizational performance*

By Multiple Regression Analysis, H3 is validated. (Table 4.) Analytical result is shown below: personality (t=3.043, p<0.01), seniority (t=2.157, p<0.01), job efficiency (t=1.695, p<0.05), personal talents and knowledge (t=1.278, p<0.05). They significantly influence operational efficacy of organizational performance. Thus, H3 is supported.

*Mediating effects of demographic variables*

(1) Influence of gender on relationship between employee promotion system and organizational performance. By variance analysis, according to empirical result, different gender reveals significant difference on personality (p<0.01), job efficiency (p<0.05), personal talent and knowledge (p<0.05) and financial performance. Different gender reveals significant difference on seniority (p<0.01), job efficiency (p<0.01) and business performance. Different gender reveals significant difference on personality (p<0.05), seniority (p<0.05) and operational efficacy. Thus, H4 is partially supported. (Table 5.)

Table 4. Multiple Regression Analysis of dimensions of employee promotion system on operational efficacy of organizational performance

| Predictor                     | Non-normalized coefficient |                    | Normalized coefficient | t value |
|-------------------------------|----------------------------|--------------------|------------------------|---------|
|                               | $\beta$ estimate           | Standard deviation | B distribution         |         |
| Intercept                     | 4.061                      | 0.512              | ---                    | 15.726  |
| Personality                   | 3.016                      | 0.314              | 0.291                  | 3.043** |
| Seniority                     | 2.517                      | 0.259              | 0.253                  | 2.157** |
| Job efficiency                | 1.882                      | 0.166              | 0.194                  | 1.695*  |
| Personal talent and knowledge | 1.237                      | 0.125              | 0.166                  | 1.278*  |

Note: \*denotes p value<0.05, \*\*denotes p value<0.01.

(2) Influence of age on relationship between employee promotion system and organizational performance. By variance analysis, according to empirical result, different ages reveal significant difference on personality ( $p < 0.01$ ), seniority ( $p < 0.01$ ) and financial performance. (Table 6.) Different ages reveal significant difference on personality ( $p < 0.01$ ), job efficiency ( $p < 0.05$ ), personal talents and knowledge ( $p < 0.05$ ) and business performance. Different ages reveal

Table 5. Influence of different gender on relationship between employee promotion system and organizational performance

| Experiential marketing factors | Financial performance     | Business performance | Operational efficacy |
|--------------------------------|---------------------------|----------------------|----------------------|
| Personality                    | $p < 0.01$                | $p > 0.05$           | $p < 0.05$           |
| Seniority                      | $p > 0.05$                | $p < 0.01$           | $p < 0.05$           |
| Job efficiency                 | $p < 0.05$                | $p < 0.01$           | $p > 0.05$           |
| Personal talents and knowledge | $p < 0.05$                | $p > 0.05$           | $p > 0.05$           |
| Validation of hypothesis       | H4 is partially supported |                      |                      |

significant difference on personality ( $p < 0.05$ ), job efficiency ( $p < 0.01$ ), personal talents and knowledge ( $p < 0.05$ ) and operational efficacy. Thus, H5 is partially supported.

(3) Influence of marital status on relationship between employee promotion system and organizational performance. By variance analysis, according to empirical result, different marital statuses reveal significant difference on personality ( $p < 0.01$ ), seniority ( $p < 0.01$ ), personal talents and knowledge ( $p < 0.01$ ) and financial performance. (Table 7.) Different marital statuses reveal significant difference on seniority ( $p < 0.01$ ), job efficiency ( $p < 0.05$ ) and business performance. Different marital statuses reveal significant difference on personality ( $p < 0.05$ ), seniority

Table 6. Influence of different ages on relationship between employee promotion system and organizational performance

| Experiential marketing factors | Financial performance     | Business performance | Operational efficacy |
|--------------------------------|---------------------------|----------------------|----------------------|
| Personality                    | p<0.01                    | p<0.01               | p<0.05               |
| Seniority                      | p<0.01                    | p>0.05               | p>0.05               |
| Job efficiency                 | p>0.05                    | p<0.05               | p<0.01               |
| Personal talent and knowledge  | p>0.05                    | p<0.05               | p<0.05               |
| Validation of hypothesis       | H5 is partially supported |                      |                      |

(p<0.01), personal talent and knowledge (p<0.05) and operational efficacy. Thus, H6 is partially supported.

Table 7. Influence of different marital statuses on relationship between employee promotion system and organizational performance

| Experiential marketing factors | Financial performance     | Business performance | Operational efficacy |
|--------------------------------|---------------------------|----------------------|----------------------|
| Personality                    | p<0.01                    | p>0.05               | p<0.05               |
| Seniority                      | p<0.01                    | p<0.01               | p<0.01               |
| Job efficiency                 | p>0.05                    | p<0.05               | p>0.05               |
| Personal talent and knowledge  | p<0.01                    | p>0.05               | p<0.05               |
| Validation of hypothesis       | H6 is partially supported |                      |                      |

(4) Influence of educational level on relationship between employee promotion system and organizational performance. By variance analysis, according to empirical result, different educational levels reveal significant difference on personality (p<0.05), seniority (p<0.01) and financial performance. (Table 8.) Different educational levels reveal significant difference on

personality ( $p < 0.05$ ), job efficiency ( $p < 0.01$ ), personal talent and knowledge ( $p < 0.01$ ) and business performance. Different educational levels reveal significant difference on personality ( $p < 0.01$ ), seniority ( $p < 0.05$ ), personal talent and knowledge ( $p < 0.01$ ) and operational efficacy. Thus, H7 is partially supported.

Table 8. Influence of different educational levels on relationship between employee promotion system and organizational performance

| Experiential marketing factors | Financial performance     | Business performance | Operational efficacy |
|--------------------------------|---------------------------|----------------------|----------------------|
| Personality                    | $p < 0.05$                | $p < 0.05$           | $p < 0.01$           |
| Seniority                      | $p < 0.01$                | $p > 0.05$           | $p < 0.05$           |
| Job efficiency                 | $p > 0.05$                | $p < 0.01$           | $p > 0.05$           |
| Personal talent and knowledge  | $p > 0.05$                | $p < 0.01$           | $p < 0.01$           |
| Validation of hypothesis       | H7 is partially supported |                      |                      |

(5) Influence of monthly income on relationship between employee promotion system and organizational performance. By variance analysis, according to empirical result, different monthly incomes reveal significant difference on personality ( $p < 0.01$ ), seniority ( $p < 0.05$ ), job efficiency ( $p < 0.01$ ), personal talent and knowledge ( $p < 0.01$ ) and financial performance. (Table 9.) Different monthly incomes reveal significant difference on personality ( $p < 0.05$ ), seniority ( $p < 0.01$ ), personal talent and knowledge ( $p < 0.01$ ) and business performance. Different monthly incomes reveal significant difference on personality ( $p < 0.01$ ), job efficiency ( $p < 0.05$ ), personal talent and knowledge ( $p < 0.05$ ) and operational efficacy. Thus, H8 is partially supported.

Table 9. Influence of different monthly incomes on relationship between employee promotion system and organizational performance

| Experiential marketing factors | financial performance     | Business performance | Operational efficacy |
|--------------------------------|---------------------------|----------------------|----------------------|
| Personality                    | p<0.01                    | p<0.05               | p<0.01               |
| Seniority                      | p<0.05                    | p<0.01               | p>0.05               |
| Job efficiency                 | p<0.01                    | p>0.05               | p<0.05               |
| Personal talent and knowledge  | p<0.01                    | p<0.01               | p<0.05               |
| Validation of hypothesis       | H8 is partially supported |                      |                      |

### Conclusions

This study proposes the suggestions to enhance organizational performance by constructing complete promotion system:

- 1) By thorough analysis on the promoted employees' personalities, the main measures are suggested. First, it can evaluate the personality of the personnel in the practice of the duties. It will depend on the personnel's talking and behavior. Secondly, it evaluates the employees' personality from the accomplishment of task. The focus is the employees' courage, quality of will and affection toward the public. In serious disasters and emergent incidents, will the employees react immediately and calmly? The third is to evaluate the employees' personality according to their attitude toward personal reputation and profits. The key is the employees' attitude toward the promotion. Do they accept the selection by diligence, positive personality,



calmness and consideration for the organization? Do they use improper measures? It will depend on the employees' view of honor and their sincerity and humbleness.

2) Promotion is capability-oriented: traditional promotion system is based on fairness. Thus, seniority is critical in promotion decision making. However, it neglects the more important core competency. Therefore, this study suggests that the requirement for the candidates' capabilities should be strict. Seniority should be second to the employees' personal abilities in order to ensure the quality of the promoted employees.

3) To construct performance-oriented reward system: Since good performance does not guarantee the increase of salaries and promotion, the employees should recognize the expectation from the organizations and the measurement of performance. Thus, they will certainly make the efforts and obtain the returns or promotion by prominent performance. Moreover, reward system can be provided for the employees' special skills in order to encourage the employees to cultivate personal talents and knowledge. By multiple learning, the employees will enhance their knowledge and experience.

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THE RECREATION OF THE CHINKLESS-TEACHING  
CONCEPT BY USING VALUE CHAIN ANALYSIS  
TO BRIDGE THE THEORY AND PRACTICE

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Abstract

This research proposes the “Chinkless-Teaching Concept (CTC)”, a conceptual framework for establishing an industry-academia collaboration system. The Chinkless-Teaching Concept offered several advantages. First, the industrial value chain was introduced in the design of the courses. The courses were designed according to the links in the industrial value chain, and the contents were discussed by the teachers in vocational and technological universities and by enterprise experts. Second, the order of the teaching materials was compiled by the operational process of the enterprises value chain. Third, the examples used for teaching materials were based on the experience and operations of the enterprises. Therefore, the Chinkless-Teaching

Concept provides students with a platform for practical application of theory and has an important role in the vocational and technological system.

Keywords: Chinkless-Teaching Concept, industry-academia collaboration system, value chain

## Introduction

University education systems throughout the world use a binary education system in which general universities coexist with vocational and technological universities. The teaching materials in general universities mainly focus on theory whereas those in vocational and technological universities emphasize practical skills. Despite their differences, the common objective is enhancing national competitiveness (Harman, 1991; Wolhuter, 2003).

The strategy used by most vocational and technological universities to train their students is to cooperate with enterprises. Although the sandwich teaching method that has been used for many years, it has many inadequacies, especially the teaching method is not direct helpful for increasing the possibility of being employed. Chen et al. (2006) developed the topping teaching method to enhance student learning during the last stage of their education. Compared to school-based curriculum development and the sandwich teaching method, the topping teaching method is superior for practical application of theory. However, for most students in vocational and technological universities, knowledge acquired in school is difficult to apply in the workplace. This research presents effective methods for direct application of knowledge in the

industrial value chain. The design of teaching materials and the roles of teachers in vocational and technological universities, and enterprise experts are also highlighted. The objective was to develop a conceptual framework for establishing an industry-academia collaboration system to solve this dilemma by optimizing textbook design and teaching methods.

## Literature Review

### *Technological and Vocational status in Taiwan*

With school-based curriculum taught in the classes, vocational students in Taiwan currently undergo practical training in summer vacation (sandwich teaching method) or in the fourth year of university (topping teaching method) to obtain work-related experience and skills. The universities provide students with theory and enterprises offer the workplace environment for learning and applying practical skills, both of which benefit students.

### *Sandwich teaching*

The sandwich-teaching method was the earliest industry-academia collaboration model. In practice, the sandwich-teaching method is applied over two semesters; students can choose to study in school for one semester and then participate in an internship during the following semester. The model is designed so that students can apply what they learn in school in their training position in the corporation to achieve the goal of on-the-job training. However, the closed interaction between academic learning and verification of learning through training is

practically also referred to as the rotation model (Yang and Li, 2000). By cooperating with schools, employers can enhance current employees' morale, skills and competence levels.

During the period of internship, employers may also cultivate potential employees' morals and then select those who have adapted to company culture. As for the academic sector, schools may fully integrate resources both on-campus and off-campus in order to increase the efficiency of education and reduce the burden on the education budget (Chen and Lee, 2006).

In addition to the advantages of sandwich-teaching method, the literature reveals several disadvantages of the method. Especially, interpersonal trust, which is formed over a long period and which results from the accumulated experiences of parties that gradually form a trust system, is difficult to develop (Dwyer, 1987). Students who complete their practical training too early cannot develop a work ethic. The poor work ethic may limit the cooperation between colleges and industries (Chen et al, 2006). Students in sandwich-teaching internships may be assigned to companies in which they are not interesting in working. The host company may also be uninterested in the interns (Chen et al, 2010). Hence, students who undertake practical training are often treated as a source of cheap labor (Chen et al , 2006).

### *Topping-teaching*

The topping-teaching method, a modification of the sandwich-teaching method, was first

introduced as the theme Program and course design of topping-teaching method in a course design seminar held by National Yun-lin University of Science and Technology in Taiwan (Chen, 2004). The term, “topping,” refers to ingredients on the dough of pizza. It is the last step to make a pizza, which makes “topping” different from the “stuffing” in a sandwich.

The method assists corporations in recruiting qualified staff with updated knowledge and skills. Additionally, the method is applied when students are in their final years/semesters of study, at which time they tend to be more mature and more serious about their training for their career (Chen et al, 2006).

The host company is usually willing to train final year students who will soon enter the workforce and is less likely to be criticized for exploiting students as a cheap labor force. Most importantly, students who show outstanding performance in a topping-teaching program are often hired immediately after graduation, which helps to improve the image of technical and vocational graduates and to eliminate the stigma of low performance classifications by universities. The literature agrees that the topping-teaching method helps to solve all of these problems. However, some differences still exist between in-class activities and real operations for students to take part in internships before graduation. Otherwise, the gap between learning and practice may be narrowed but would still remain (Woodcock and Chen, 2000).



Although topping teaching method has improved the disadvantage of Sandwich teaching method, the gap in the practical capability of graduating students must still be bridged before they start their careers. A clear drawback of the sandwich teaching method and topping teaching method is that students may be exploited as cheap labor by some enterprises. Although practical training has substantially improved, the following section shows that major improvements are still needed.

#### *School-based curriculum*

According to school-based curriculum theory, courses should reflect the expected distribution of workplaces when students graduate. The major decisions when designing a school-based curriculum are related to the design, content, organization, and presentation of the curriculum (Skilbeck, 1998). A program of selected content and learning experiences offered by a school should be capable of modification. The schools must fit their plans into the overall plans of the business sector (Skilbeck, 1998; Prideaux, 1993).

The learner should experience a change in behavior after completing a program. Ideally, behavioral changes should be consistent with those expected by the educators involved in the teaching-learning process. Eggleston (1980) argued that universities should use related resources during the process of developing a school-based curriculum and should find the courses that best

fit the needs of the students by collaboration, discussion, planning, implementation, and evaluation.

However, due to the rapid change in the world technology and the growth of national economy, the traditional curriculum design in vocational education system rarely reflects industrial demands.

An effective program requires a direct approach to transferring essential knowledge. The value chain should be considered during textbook design and when planning an industry-academia collaboration system.

#### *Value chain analysis*

A value chain is a chain of activities performed by a firm operating in a specific industry. The business unit rather than the divisional or corporate level is the appropriate level for constructing a value chain. According to Porter (1998), the value chain consists of specific activities that are consistent from one business to the next. These activities may add value to company products and services and may enhance the competitive advantage of the organization. Shank (1989) viewed the value chain as a mechanism for coordinating inter-firm relationships and defined it as “the linked set of value-creating activities all the way from basic raw material sources for component suppliers through the ultimate end-use product delivered into the final customers’ hands”.

Products acquire value as they pass through a sequence of activities in the chain.

Notably, the value added by the chain of activities exceeds the sum of values realized by independent activities.

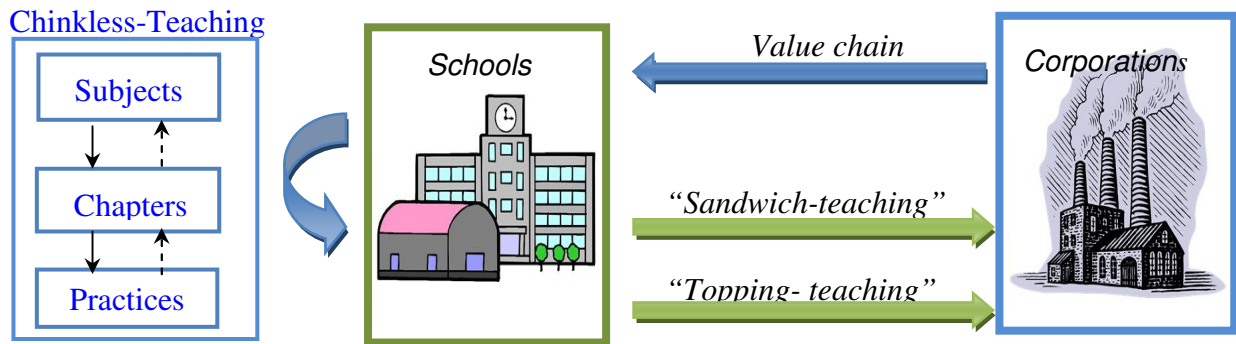


Figure 1: Chinkless - Teaching Concept applied in Taiwan technological and vocational education institutions

## Methodology

Even when the sandwich-teaching method and topping-teaching method are applied, gaps between academic knowledge and the skills actually needed in the industry still occur. On the other hand, gaps may actually exist between the knowledge acquired by students and the knowledge required by enterprises. Moreover, knowledge learned in the classroom is often difficult for students to apply in the workplace.

Therefore, this study proposes a reform procedure known as the “Chinkless-Teaching

Concept (CTC)” procedure. The managerial authority of the Taiwan technological and Vocational education can implement CTC by simply following the procedure shown in Figure 1 below.

First, the concept of the industrial value chain was included in the course designs. The links of the value chain were the subjects of the courses, and the chapters discussed the processing value chains. For example, the main sectors of a company includes marketing management, financial management, human resources management, production and operations management and information management, each sector we called “subject”. For each subject, such as marketing management, its contents often covers market selection, market positioning, marketing strategy, etc. Each content will be called "chapter". The entire industrial value chain was considered when constructing the teaching programs. In other word, the curriculum design was seamlessly integrated by the teachers in vocational and technological university and the experts in the enterprises. They designed the learning content and the activities according to actual operations and processes. University teachers delivered the practical courses to their students. The problems and the links were continuously discussed by the teachers in the vocational and technological universities and by enterprise experts. The teaching methods are designed as follows. The students learn the underlying theory and then apply the knowledge in

the practical classrooms at university. The university classroom environment resembles an enterprise workplace.

Finally, the students received practical training in the enterprises during summer vacation (sandwich teaching method) or in the fourth year of university (topping teaching method) to obtain work-related experience and skills. During their internships, knowledge learned in school could be applied in the workplace. Therefore, design of the CTC curriculum is intended to reflect the spirit of school-based curriculum to an actual business operation. Course delivery was designed to be consistent with the industrial value chain. The application and integration of school and enterprise resources are crucial issues.

### Discussion

Under the school-based curriculum development, the designs focus on the activities and the culture of participation, cooperation, and sharing. Curriculum development enables the school to emphasize its unique style and to provide the best environment for student learning. The CTC of the school-based curriculum is based on the current school-based curriculum system. This research maximizes its advantages and minimizes its disadvantages. Table 1. shows the problems and the solutions for the school-based curriculum. (See Table 1.at the end of this article).

## Conclusions

This study proposed a Chinkless-Teaching Concept (CTC) model. The objective of this model is to supply the communication media for teachers, students and employers to reform Taiwan technological and vocational education. Technological and vocational teachers apply value chain concepts by rewriting the chapters of textbooks to make them effective for reading, learning and practice.

The significant contributions of this study are textbook reform by applying the concept of Value Chain in the optimization of courses, chapters, and sections.

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Table 1 The problems and the solutions for the school-based curriculum

| <b>Issues</b>                       | <b>Problems</b><br>(Current school- based curriculum system)   | <b>Solutions</b><br>(Chinkless-Teaching Concept)   |
|-------------------------------------|--|--|
| Course subjects                     | School-based curriculum courses were selected by a curriculum committee consisting of the teachers in vocational and technological university and the experts in the enterprises. They discussed the subjects of the courses and applied the rules set by the Ministry of education. | The teachers selected the subjects for teaching by the industrial value chain. That is, the links of the industrial value chain were the subjects.   |
| Chapters of the teaching materials  | The teaching material in technological universities usually resembles that in a general university. The materials are not designed according to actual operation and processes in the enterprises. That is, the materials are designed to be complementary.                          | The teachers compiled the chapters of the materials by the industrial value chain. Restated, the process of execution was used as a reference for ordering the chapters  |
| Content of teaching materials       | The concept of the teaching material usually focuses on theory, and examples are rarely linked to actual operations.   | The content of the material and examples should be consistent with the participating enterprise.   |
| Teachers who are enterprise experts | University teachers usually focus on theory, and enterprise experts tend to teach the process and work experience. They seldom integrate resources and the abilities.  | Chinkless-Teaching Concept remains the same, but the teaching materials and the contents should fit the industrial value chain and school expectations   |
| Content of practice                 | Practical courses are implemented in the university classroom. The content of the practice depends on the textbook.  | The practical course content is also implemented in the practical classroom at university. However, the content of the practice is from the example of the specific cooperation enterprises. The content should be localized according to the characteristics of the school. |



## OBSTACLES IMPEDING TAIWAN'S CONSTRUCTION QUALITY EXCELLENCE

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### Abstract

Since Taiwan entered the World Trade Organization (WTO), domestic construction firms are facing a vicious challenge from international firms which hold the competitive edges in technology and quality management. Many domestic firms have experienced the sense of emergency to elevate to next level in order to stay competitive. However, as construction technology keeps improving in Taiwan, the overall quality on the other hand has not progressed at a satisfactory pace. After two sessions of expert panel study, the authors discovered that the industry lacks a thrust in pursuing quality excellence due to insufficient dedication from site personnel and top management, ambiguous quality management system, and reluctant compliance to innovative quality procedures. Such passive attitude has result in the incapability of competing with superior enterprises from Japan, USA and other western countries. To better comprehend the problems, the authors conducted questionnaire surveys to clarify the status quo of current quality management practices in Taiwan and so forth to identify the obstacles impeding construction quality excellence, and finally came up with the strategies to eliminate these obstacles.

Key words: Total Quality Management (TQM), Quality practices, Construction Industry

## Introduction

The quality of public construction projects has long been a malignant denunciation in Taiwan. Many capital projects encounter quality issues during and/or after construction resulting in great public critics. To uplift construction quality and ensure projects conform to design standards, the Public Construction Commission of Executive Yuan has promulgated “Guidelines for Public Construction Quality Management” in 1996 and “Guidelines for Public Constructions Quality Assessment” in 1997 to lead public construction quality management into a new era with systematic and strict enforcement. The Commission adopted ISO 9000 Quality Management and Assurance Standards as the basic foundation for every quality-related operation. However, Taiwan public construction in general has experienced difficulties in developing and implementing effective management systems to genuinely improve its quality and is still characterized as poor quality (Lee and Chen 2011).

Upon Taiwan’s entering the World Trade Organization in 2002, Taiwan construction market has been flooded with foreign enterprises which harshly compete with domestic ones. In capital projects such as Taiwan High Speed Rail and Kaohsiung Rapid Transit, approximately 50% of the construction projects were accounted for by foreign contractors, among which Japanese companies are the majority. Working efficiency, persevere and conscientious working attitudes and contractor management ability of Japanese construction companies outshine many others; and their competitiveness in the worldwide construction industry is well-reputed (Wang 2005).

Facing Public Construction Council requirements and growing competition, many Taiwanese companies have incorporated ISO system to ameliorate company structure to improve company performance. ISO standards mainly adopt embedded procedures and forms to ensure

that construction outcome is restricted to norms. Ever since construction businesses conducted ISO system, Successfully ISO adoption has improved some companies' performance, especially in the "Integrated Management System", "Construction quality improvement" and "Lucid work responsibilities" aspects (Lee, 1999). Nonetheless, due to lack of employee commitment on ISO, many other businesses encountered obstacles while conducting ISO procedures, some even gave up ISO certificate after acquirement (Chiu, 1996).

Many studies have credited Total Quality Management (TQM) with leading Japan to global economic prominence in the postwar years (Davis and Fisher, 1994; Grandzol and Traaen, 1995; Grayson and O'Dell, 1988; Imai, 1986; Milakovich, 1991; Muchinsky, 2003; Schay, 1993; Tamimi and Gershon, 1995). TQM is an integrative management philosophy aiming at continuous quality improvement of both final products and production processes (Ahire 1997). TQM functions on the premise that the quality of products and production processes is the responsibility of everyone who is involved with the creation or consumption of the products or services offered by an organization. TQM capitalizes on the involvement of management, workforce, suppliers, and even customers, in order to meet or exceed customer expectations. Successful and effective TQM implementation necessitates the cooperation of all workers in all areas of activities to be engaged to do things right within their responsibilities, and secure their performance up to a certain level.

Although there are many success stories of TQM implementation and its benefits, a number of failures have also been reported (Eskildson, 1994). Internal matters such as leadership, training, and employee participation are always mentioned as the keys for success implementation (Crosby, 1979; Juran, 1993; Kanji 1996). Mehanty et al (1996) also emphasized external matters such as competition, market, and government requirements as important factors

impacting TQM success. If these internal and external matters are not properly investigated thoroughly, various difficulties can be encountered.

Looking at the current construction quality in Taiwan, it is obvious that the quality remains a distance away from those in Western and Japanese countries. Not surprisingly, the competitiveness of construction industry is also falling way behind (Hu, 2000). If TQM can be successfully implemented into the domestic construction industry, many quality issues will be resolved. This paper is an attempt to determine if Taiwan construction industry are not yet ready to accept the TQM concept by examining current quality management status in Taiwan from internal and external points of view.

### Research Methodology

The research methodology of this paper consisted of the following three steps:

1. Expert panel study -- to determine key internal and external factors effecting TQM success in Taiwan
2. Questionnaire survey -- to elicit information about quality management status in Taiwan.
3. Statistical analysis – to assess feedback from questionnaire survey to identify key obstacles for successful TQM implementation in Taiwan.

The authors organized an expert panel to overview the general quality management problems on Taiwan's construction jobsites, and so forth to identify key internal and external factors effecting TQM success in Taiwan. The expert panel consisted of ten construction and management professionals, including four college professors specialized in civil engineering or industrial engineering, two government officers from Public Construction Council, and four industrial representatives with at least 20 years of construction field experience.

After two study sessions, the expert panel has come to a conclusion that the industry suffers a lack of thrust in pursuing quality excellence due to insufficient dedication from jobsite management and top management as well, ambiguous quality management system, and reluctant compliance to innovative quality procedures. Such passive attitude has result in the incapability of competing with superior enterprises from Japan, USA and other western countries.

The expert panel has identified that the primary factors affecting industry-wise pursuit of quality excellence come from the following five categories: market condition (external), corporate vision (internal), quality management practice (external and internal), training of employee (internal), and subcontracting strategy (internal). The first four categories comply with the suggestions from previous studies, but the fifth category (subcontract strategies) is especially emphasized by the expert panel, indicating the particular importance of subcontracting in construction industry.

Based on expert panel study results, the authors designed a questionnaire specifically to investigate in how the five categories can impose impacts on the implementation of innovative quality management systems (as shown in Appendix). The questionnaire consisted of 26 questions laid out in the five key categories:

|                                    |              |
|------------------------------------|--------------|
| Market condition                   | 2 questions  |
| Corporate vision                   | 6 questions  |
| Quality management practice        | 11 questions |
| Training of employee               | 3 questions  |
| Subcontracting strategy (internal) | 4 questions  |

Finally, the authors collected the questionnaire and analyzed the results by using descriptive statistics, correlation and variance analysis.

The target population of this questionnaire covers mainly field engineers who have worked for construction of THSR (Taiwan High Speed Rail), KRT (Kaohsiung Rapid Transit) and National Highway No.3 Southern Section. These engineers have been working with international quality experts, and have been exposed to innovative quality systems, and are qualified to provide professional opinions. The authors have distributed 200 questionnaires, and retrieved 81 copies, resulting with a valid retrieval rate of 40.5%. Among the valid questionnaires, 12 copies were recalled from THSR, 50 from KRT and 19 from National Highway No. 3 Constructions. Besides, the target group is consisted of 16 high-ranked managers, and 55 senior on-site engineers. The content of the questionnaire comprises four additional questions on personal details and a scale which involves the five categories influential factors. By using a 5-Point Likert scale, the questionnaire evaluates the tendency of target group with the following levels: 5=Strongly agree; 4=Agree; 3=No comment; 2=Disagree; 1=Strongly disagree. In some negatively worded items, the level values are reversed.

## Research Analysis and Findings

### *Descriptive Statistics Analysis*

#### *Obstacles impeding Quality Excellency.*

Four out of the five categories involved in the scale: Market condition, Corporate vision, Training of employee, and Subcontracting strategies were pointed out to be negatively influencing the current ascension of quality in the Taiwanese market. The target group commonly denotes that the chronic economic depression has formed an abominable construction market, causing malignant competition to arise among businesses which results in an average of

1.95 (Agree to Strongly Agree); Std. Dev. 0.61. Business strategies are mainly profit-oriented, disregarding quality (Av. 2.41; Std. Dev. 1.05) Due to bad subcontracting conditions; levels for subcontractors are unequal and not standardized (Av. 2.54; Std. Dev. 1.06). Level of subcontracting price is also a crucial factor influencing the accuracy of quality implementation (Av. 2.12; Std.Dev.1.08). Engineers reckon construction knowledge and expertise are mainly built upon self-study, not via job training (Av. 2.69; Std. Dev. 1.0). As for quality concept, the target group overall admits that they possess complete and satisfactory quality concept (Av. 3.90; Std. Dev. 0.71). This paper will provide a more in-depth explanation in the Correlation Analysis section.

#### *Positive Factors fostering Quality Excellency.*

Apart from the above mentioned obstacles, descriptive statistics analysis has on the other hand indicated a few positive results towards quality management. Although businesses usually take profit as their prioritized consideration, engineers are surprisingly unwilling to sacrifice construction quality to meet company policy (Av. 3.83; Std. Dev. 0.87). Actively participating in implementing company quality concept, engineers tend to be optimistic with such implementation (Av. 3.95; Std. Dev. 0.57). Construction quality issues are being proactively solved and evaluated by engineers (Av. 4.02; Std. Dev. 0.54). In the decision making process, the target group overall accepts licensing as a rather important issue in the industry. (Av. 3.75; Std. Dev. 0.78).

#### *Correlation Analysis*

##### *Key Factors.*

The questions proposed in each category were analyzed by correlation analysis which denotes the key factors which most impact construction quality being: Market depression, Profit-

orientation and bad level of subcontractors. The significance of the three factors is shown in Table 1; the numbers explained that the long depressed construction market in Taiwan forced companies to treat profit as priority as their last resort of survival. Subcontracts are usually won by the lowest bid, which is rather normal in a healthy construction market; however, in a malignantly competitive market, such norm causes a deterioration of subcontractor standards. The bid price is usually profitless for contractors, resulting in bad subcontractor quality and even construction quality is sacrificed.

Table 1. Correlation Analysis of Market Depression, Profit-orientation and Bad level of subcontractors

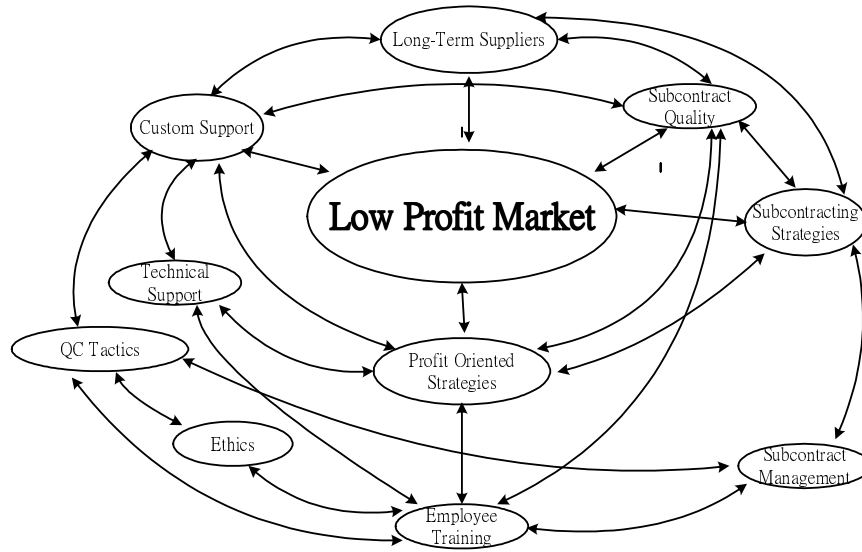
|                                    |                                     | <b>Market Depression</b> | <b>Profit-orientation</b> | <b>Bad level of subcontractors</b> |
|------------------------------------|-------------------------------------|--------------------------|---------------------------|------------------------------------|
| <b>Market Depression</b>           | Pearson Correlation Sig. (2-tailed) | 1.000<br>.               | 0.547**<br>.000           | 0.283*<br>0.030                    |
| <b>Profit-orientation</b>          | Pearson Correlation Sig. (2-tailed) | 0.547**<br>.000          | 1.000<br>.                | 0.296*<br>.023                     |
| <b>Bad level of subcontractors</b> | Pearson Correlation Sig. (2-tailed) | 0.283*<br>0.030          | 0.296*<br>0.023           | 1.000<br>.                         |

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Market depression not only directly leads companies to profit-orientation and bad level of subcontractors, but also directly or indirectly causes staff concept and value to deteriorate and other job training issues. Graph 1 indicates the inter-relationship of factors in correlation analysis; and accredits the huge impact of market depression on the overall quality environment in Taiwan.





Graph 1: Influence diagram of Market Depression

*Relationship between Cost and Quality*

Dr. Edward Deming, Master of Quality Management, has long been introducing the concept of a better managed quality can effectively become cost-saving; which is why the concept is a major causer for TQM implementation (Wong, 1993). This study’s target group is rather supportive to this concept (Av. 3.71; Std. Dev. 1.13). There is a significantly negative correlation between two factors: Cost-saving concept and Profit-oriented concept (Pearson Correlation -0.263\*, Sig. 0.044). This finding shows that field engineers not only believe the concept of better quality can lower cost; but also trust in companies’ ability to put proper attention to both quality and profit. The result is rather encouraging and positive. Nevertheless, after conducting a correlation analysis between target background information and the same factors, a significantly negative correlation finding is been discovered between target seniority and Cost-saving concept (Pearson Correlation -0.308\*, Sig. 0.018). The finding shows senior engineers with longer experiences in the field tend to be against the concept. Besides, agreeing self-possession of enough quality knowledge and the cost-saving

concept are not significantly correlated; which implies the relationship between quality and cost remains skeptical in the minds of field engineers.

### *Variance Analysis*

#### 1. Commitment from Field Engineers

Commitment from engineers may impact their attitude when they carry out QM works; therefore, this paper has made an Independent Samples T-Test between those who tend to be proud of being a civil engineer and those who have no comment of disagree with this statement. The significantly different results are listed as the followings:

- ⊙ Cognitive difference on Company Vision (Significance: 0.049): Engineers with more sense of mission tend to agree they serve in a company with vision and prospect; thus willing to work hard for it (Mean: 4.00). On the other hand, those with less sense of mission felt otherwise. It is possible that engineers loose their sense of mission due to unhealthy business model (Mean: 3.42).
- ⊙ Conceptual difference on Quality (Significance: 0.046): With stronger sense of mission, engineers feel more equipped with Quality concept and knowledge (Mean: 4.03). The contrary opposes (Mean: 3.63).
- ⊙ Interaction (Significance: 0.048): Engineers reflect whenever a construction meets obstacles and difficulties, their company is willing to provide support and solutions; thus forming a better interaction (Mean: 4.05). Otherwise, engineers complain on bad interaction and communication with their company (Mean: 3.74).
- ⊙ Difference on Quality Confidence (Significance: 0.029): With stronger sense of mission, engineers remain optimistic towards the overall quality improvement in the construction industry (Mean: 3.48). On the opposite, those who have weaker sense

remain pessimistic towards this statement (Mean: 3.26).

## 2. Business Model

Same as above, this paper adopts an Independent Samples T-Test to conduct on the healthy level of a business by investigating at its model and organization; thus further examines whether the model can influence their staff's attitudes on quality by providing them a social community. The significantly different results are listed as the followings:

- ⊙ Cognitive difference on business strategies (Significance: 0.004): Weak business models tend to sacrifice quality for profit's sake (Mean: 3.95). The opposite for healthy ones (Mean: 3.22).
- ⊙ Difference on customer service (Significance: 0.001): Unhealthy businesses tend to neglect customer service (Mean: 4.02); whereas on the contrary, a sound business model usually make emphasis on service (Mean: 3.22).
- ⊙ Difference on job training (Significance: 0.000): Improper or even no job training is being applied by unorganized businesses (Mean: 4.02). On the contrary, more focus is made on staff training (Mean: 3.17).
- ⊙ Interaction (Significance: 0.001): Unhealthy businesses cannot timely provided support when obstacles strike constructions (Mean: 4.02); the opposite for the counterpart (Mean: 3.17).

## 3. Engineers rank and status

The target group has been ranked as higher management and senior on-site engineers according to their job titles at their workplace. Independent Samples T-Test has proven the following differences:

- ⊙ Cognitive difference on Company Vision (Significance: 0.002): Higher ranked

managers tend to agree they serve in a healthy company with proper model; thus willing to work hard for it (Mean: 4.42); whereas senior engineers remain skeptical (Mean: 3.53).

- ⊙ Cognitive difference on the relationship of Quality and Cost (Significance: 0.018): Managers are more confident to place equal emphasis on quality and profit (Mean: 4.16); On the contrary, senior engineers reckon companies usually sacrifice quality for profit consideration (Mean: 3.53).
- ⊙ Difference on job training (Significance: 0.038): Top managers believe companies provide enough job training (Mean: 3.74); otherwise felt by the engineers (Mean: 3.18).
- ⊙ Interaction (Significance: 0.021): Senior engineers reckon a lack of timely support from companies when obstacles strike constructions (Mean: 3.58); whereas high-ranked managers identify a better support especially when construction meets difficulties (Mean: 4.16).

#### 4. Role of engineers

This paper's target group are scattered within the industry and play different roles in each construction projects (THSR, KRT and National Highway No.3 Southern Section); nonetheless, when conducting ONE WAY ANOVA on the difference caused by roles, there is no significant difference found between the projects THSR and KRT; a partial difference is found by the replies of engineers from National Highway No.3 Southern Section. Thus, results of THSR and KRT are combined as one and tested against the National Highway No.3 Southern Section project by Independent Samples T-Test with the following results:

- ⊙ Cognitive difference on business strategies (Significance: 0.018): Engineers from

THSR/KRT reckon company is seriously profit-oriented (Mean: 1.85); As for the National Highway project, the same statement is even strongly shared as it is proved by subcontracted engineers (Mean: 2.58).

- ⊙ Difference on job training (Significance: 0.030): THSR/KRT are proven of lack of job training (Mean: 3.22); National Highway project is said to provide better job training (Mean: 3.92) probably due to expertise-oriented subcontractors.
- ⊙ Cognitive difference on subcontractors levels (Significance: 0.001): THSR/KRT overall admit bad level of subcontractors and reflect difficulty in managing them (Mean: 2.73); Subcontractors of National Highway are the hired parties; therefore, would not acknowledge their inabilities (Mean: 3.75).
- ⊙ Cognitive difference on the contractors long-term relationship (Significance: 0.040): THSR/KRT strongly express the necessity of building long-term relationship with subcontractors to promote quality (Mean: 4.07). Subcontractors do not strongly respond to this statement (Mean: 4.58).

#### Conclusion and Recommendations

To perfectly implement innovative QM systems, such as TQM, the support of the whole construction market, business management level, project execution level, on-site management team and contractor management team is needed. Looking at the current depressed construction industry in Taiwan and malignant market competition, it is extremely difficult to retain a positive quality promotion at the market level. Nonetheless, in a traditional bidding market, construction companies usually win the bid, and proceed with construction with the pre-drawn graph and pre-set standards. Under such circumstances, companies can only participate in the construction process and ensure quality by satisfying the pre-set standards. Besides, public construction

projects are still adopting the policy of “Lowest bid wins”; price has always been the only decisive consideration. It is nearly impossible to increase the chance of winning a bid even if a company is of good quality level; therefore such norm has drawn businesses back from quality implementation. The abovementioned findings have been proved by this paper’s descriptive statistics and correlation analysis; therefore, TQM implementation is truly arduous for the traditional bidding market in Taiwan.

Recently, new trends have shaken the existing construction industry model. Build Operate Transfer (BOT), Design-Build and Turnkey are new modes that the THSRC and KRTC used for new governmental construction projects. These modes may bring upon unexpected variables in the Taiwanese construction market and also in future business operational modes. If the government policy can be tailored and meet the concept of quality promotion and further provide incentive on construction projects, TQM implementation is then moving a huge step forward to excellence and further stimulate the overall industry competitiveness. (Graph 2.)



Graph 2: Market trend and TQM Feasibility

If possible, market trend can gradually awaken business managers for more attention on quality and proceed with TQM implementation within their companies. In accordance with the results of correlation and difference analysis, key factors affecting TQM success are as follow.

### *Senior Engineers' Sense of Mission*

Results indicate that senior on-site engineers have less interaction with the company and have more doubts on the company strategies. However, sense of mission can make and motivate engineers working attitudes, interaction with others and better quality concept. Thus, when implementing TQM, it is crucial to observe and evaluate senior engineers' sense of mission in order to avoid possible interaction issues to effectively initiate implementation.

### *Quality Concept of High-ranked Managers*

Under the current market trend, it is totally understandable that partial experienced managers see confrontations between quality and cost. Nevertheless, at the TQM promotion stage, if they cannot be convinced by the cost-saving concept, they may make biased QM executing or licensing decision; further causing irreversible results. Therefore, top managers' quality concept should be enhanced to ensure the right path is being followed by their staff and engineers.

### *Company Vision and Strategies*

A profit-oriented business strategy decreases the willingness of engineers to work hard for the company and would also neglect customer service and job training. These are considered as the worst and most serious flaws impeding TQM implementation and promotion. With a foreseeing vision, a company can bring about sense of community and mission to its staff; thus enhance customer service and interactive relationship with subcontractors. Such strategic planning can be helpful in terms of quality, cost and project goals and would be advantageous to promote company competitiveness.

### *Interaction With Contractors*

Research shows contractors avow that they have sufficient professional training; however in the eyes of managers and engineers, contractors are still lack of expertise and training. Such inconsistent perception indicates that contractors training are limited to skills only but inadequate in the level of QM. Consequently, at the TQM promotion stage, construction companies should administer complete TQM concept training to contractors and build up a long-term relationship to create a harmonious interaction between each party so that the whole TQM implementation can be fulfilled in every aspect.

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### Appendix. TQM Obstacles Survey

Dear experts,

Thank you for taking the time filling in this questionnaire. The purpose of this study is to identify the obstacles when conducting TQM (Total Quality Management) in the construction industry in Taiwan. All the data is for research purpose only, and you will remain anonymous. Thanks again for your contribution!

**A. Personal Details:**

Business Division:  Owner  Architect/Engineer  General Contractor  Subcontractor

Position: \_\_\_\_\_

Current Project Name: \_\_\_\_\_

Work experience in construction and/or engineering: \_\_\_\_\_ years

**B. State your opinion**

| Item  | Strongly Agree           | Agree                    | Neither Agree nor Disagree | Disagree                 | Strongly Disagree        |
|---|--------------------------|--------------------------|----------------------------|--------------------------|--------------------------|
| 1. I am proud of being a construction engineer  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. My company is institutionalized with clear operational goals, and I am willing to work hard with the company | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. I believe that good quality management is able to reduce the cost  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. I think I have sufficient knowledge about quality management.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. I think the subcontracting price will affect the implementation of quality control system.                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. I believe that quality is highly correlated to the subcontracting price.                                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. I will achieve company's profit objectives at the expense of quality.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. My company's policy is profit first and quality second.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> |

|   |                          |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 9. If the lowest price subcontracting policy is adopted, construction quality will be decreased.                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. The doldrums in current market makes it difficult to improve quality.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. I participate in the process of formulating company's quality policy and promoting the quality act.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. I will totally accept the quality standards proposed by my clients.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13. Our company has a well-constructed customer complaint resolution mechanism.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. I believe that on-site safety and health training can effectively improve site management.                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15. We carefully deliver our safety and health training on the jobsite.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16. I will inform workers about safety guidelines before construction.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17. Facing the quality issues, I will personally evaluate the problems and improve management process.                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. I empower my subordinates in the decision making process.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 19. My company has provided me with enough training.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 20. Most of my working skills come from self learning, not on company's training.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 21. My company always provides in-time technical support when problem occurs.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 22. The quality of present subcontractors is poor; even when I spend at lot of efforts in supervision.                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23. Subcontractors usually cannot deliver the required quality.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24. I believe the quality of subcontractors can improve if given good training.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. I believe building a long-term relationship with subcontractors is helpful in meeting quality, cost, and schedule objectives. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 26. I expect the construction market to boom in the near future   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

## CHOICE BETWEEN DEBT AND EQUITY AND ITS IMPACT ON BUSINESS PERFORMANCE

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### Abstract

This article analyzes how the firms choose between debt and equity while making a financing decision and how this choice affects the performance of their business. Maple Leaf Cement Company Ltd, a company within the cement industry of Pakistan has been chosen ratio analysis has been performed to examine the effects of debt and equity. Results show that equity financing has more positive effect on business performance for the particular sample.

Keywords - Debt-equity choice, Ratios and Business performance

### Introduction and Literature Review

The financing decision is one of the decisions which are vital for the financial health of any company; how the firm chooses between debt and equity depends upon many factors. Martin and Scott (1974) did multiple discriminate analyses and found that firms choose to issue either equity or debt based on established policy which is a function of certain financial characteristics. That is at any point in time the firm's decision to issue equity or debt depending upon the future financing flexibility. The financial condition areas which they considered in their study are

leverage, liquidity, profitability, dividends, market price, firm size, and sales growth and variability. According to Hovakimian, Opler, and Titman (2001) the choice of issuing equity or debt is also affected by the market conditions and share prices of a firm i.e. if a firm's share prices are bullish then it will benefit from this market condition and will prefer to issue equity and use it as a source of financing. It is also favorable for a firm to raise funds through equity and avoid debt in cases when a firm faces profit shortfalls because acquiring debt and paying it back in these situations will be difficult. Gatchev, *et al.* (2009) proved that equity is the predominant source of finance in situations, such as profit shortfalls, investment in intangible assets, and internally generated growth opportunities, where informational asymmetries and debt agency costs are likely to be high. Equity financing also has positive effect on the business performance in a manner that R&D is an important department for a firm to progress. Similarly advertisements, which are being allocated a particular budget because of their importance in sales, are also the determinant of a firm's financial performance. According to Gatchev, *et al.* (2009) firms issue equity to fund investments in intangible assets such as R&D and advertising campaigns and in funding internally developed investment opportunities. Since the work of Hall (2002, p 43) it is assumed that "debt itself (without consideration of leadership and incentive problems) has a negative correlation with innovativeness. First, R&D cannot be used as collateral in credit negotiations with banks. In contrast to an investment in physical assets that is capitalized in the firm's balance sheet, R&D is an expense and thus recognized as sunk cost at the time it is spent. Second, due to the uncertainty with respect to the outcome of an R&D project, an asymmetric information problem between borrower and lender emerges. As a result, banks and other possible investors are reluctant to finance such investments." The equity financing is also important for the business performance in a way that it is easy to raise equity for

firms having good corporate social performance which in turn affect the business performance in a positive manner.

Hypotheses

**H<sub>0</sub>: More equity in financing mix does not affect the business performance in a positive manner.**

**H<sub>1</sub>: More equity in financing mix affects the business performance in a positive manner.**

### Methodology

The primary analysis of this study focuses on the choice between debt and equity while making a financing decision and its impact on business performance. This is examined by performing a ratio analysis on Maple Leaf Cement Factory Ltd. The ratios chosen for this are leverage, liquidity, profitability, dividend payout ratio and price per earning ratio.

#### *Leverage*

$X_1 = \text{Total debt} / \text{total assets}$

$X_2 = \text{Earnings before interest and expenses} / \text{interest expense}$

$X_3 = \text{Cash flow} / \text{interest expense}$

#### *Liquidity*

$Y_1 = \text{Current assets} / \text{current liabilities}$

$Y_2 = \text{Current assets} / \text{total assets}$

#### *Profitability*

$Z_1 = \text{Cash flow} / \text{net worth}$

$Z_2 = \text{Net income} / \text{total assets}$

$Z_3 = \text{Cash flow} / \text{total assets}$

### *Dividend Payout Ratio*

= Dividends per share/earnings per share

### *Price per Earning Ratio*

= Price per share/earnings per share

### Theoretical Framework

#### *A. Leverage*

The financial leverage of a company is calculated to get an idea of the company's methods of financing or to measure its ability to meet financial obligations. Several different ratios can be calculated for it, but the main ratios focused include debt, assets and interest expenses. According to Martin and Scott (1974) a firm whose financial leverage is lower than that of a set target or industrial benchmark will issue debt as compared to equity.

#### *B. Liquidity*

Liquidity ratio is a measure of a firm's ability to meet its current obligations. If the entity cannot pay its short-term debt, it will not be able to maintain a long term debt-paying ability and thus it will not be able to satisfy its lenders. Even a very profitable firm will get bankrupt if it fails to meet its obligations to short-term creditors. The current debt paying ability is also related to the cash-generating ability of the firm so the ratios chosen for analysis include ratios that measure the cash generating ability, efficiency of the use of current assets and current liabilities. Martin and Scott (1974) proposed that if the liquidity of a firm will be higher i.e. greater the cash generating ability of the firm, greater will be the debt paying ability and so the higher will be the chances that firm will issue debt rather than the equity.

### *C. Profitability*

Profitability is described as the ability of the firm to generate earnings. Analysis of profit is important because of its vital concern to stockholders since they derive revenue in the form of dividends. Further, if the profits are increasing, they can cause a rise in market price, leading to capital gains. Profits are also important to creditors as they are one source of funds for debt coverage. The profitability ratios taken into account for the analysis include the following ones. Return on assets is a measure of the firm's ability to utilize its assets for creating profits by comparing profits with the assets that generate the profits. The profitability of a firm is also reflected by the cash generating ability of a firm so as per Martin and Scott (1974) higher profitability of a firm favors issuance of debt rather than equity but firms which are already under pressure of heavy debt expenses will prefer equity issue because of the possible effects of financial leverage on earnings.

### *D. Dividend Payout Ratio*

Dividend payout ratio is the percentage of earnings paid to shareholders in the form of dividends. It provides an idea of how well earnings support the dividend payments. According to Martin and Scott (1974) there is no clear cut relationship between dividend policy and financing decision but still firms which pay smaller or no dividends and try to retain their earnings are already heavy users of debt so they will most likely issue equity. Though it can be said in a bookish language that an increase in payout ratio can lead to an increased use of debt financing but practically it is unlikely that it would alter the firm's capitalization.

### *E. Price per Earning Ratio*

It is a valuation ratio of a company's current share price compared to its per-share earnings. Generally, a high P/E suggests that investors are expecting higher earnings growth in



the future and are thus ready to buy shares at a higher price, compared to companies with a lower P/E. Martin and Scott (1974) maintained that market conditions have a great influence at the time of issuance of equity or debt. If the market prices of shares of a firm are increasing then firm will prefer to issue equity instead of debt.

#### Data

In order to analyze that how the choice of debt and equity affects the business performance, selection was made based on the company's listing on the KSE-100 Index. All the values for the calculation of above ratios are extracted through annual reports with the exception of dividends amounts, market prices of the shares and industry averages which were taken from the authentic website of business recorder of Pakistan. All that data is annexed in the appendix. The ratios were calculated using MS- Excel 2007 and the results are given below:

TABLE I. RATIOS OF MAPLE LEAF CEMENT FACTORY

| Ratios             | Formulas     | 2000        | 2001        | 2002   | 2003         | 2004   | 2005          | 2006       | 2007        | 2008       | 2009          | 2010            |
|--------------------|--------------|-------------|-------------|--------|--------------|--------|---------------|------------|-------------|------------|---------------|-----------------|
| Leverage           | T.D/<br>T.A  | 0.60        | 0.58        | 0.54   | 0.56         | 0.48   | 0.40          | 0.61       | 0.62        | 0.68       | 0.74          | 0.80            |
|                    | EBI<br>T/I.E | 0.8496<br>9 | 0.4423<br>1 | 1.0914 | 0.7828<br>37 | 3.4222 | 5.99466<br>64 | 5.794<br>5 | 0.5863      | 0.247<br>4 | 0.7301<br>218 | -<br>0.24<br>77 |
|                    | C.F/I<br>.E  | 0.3489<br>7 | 0.1743<br>5 | 0.2759 | 0.3060<br>44 | 0.7193 | 1.79797<br>45 | 0.296      | 0.3644<br>8 | 0.057<br>4 | 0.0293<br>897 | 0.03<br>56      |
| Liquidity          | C.A/<br>C.L  | 0.54        | 0.44        | 1.16   | 1.34         | 1.26   | 1.22          | 1.01       | 1.08        | 0.81       | 0.52          | 0.54            |
|                    | C.A/<br>T.A  | 0.1474<br>7 | 0.137       | 0.155  | 0.2118<br>9  | 0.2115 | 0.18619<br>7  | 0.141<br>8 | 0.1728<br>9 | 0.229<br>2 | 0.2032<br>232 | 0.19<br>17      |
| Profita-<br>bility | C.F/<br>N.W  | 0.0628<br>6 | 0.0289<br>9 | 0.0393 | 0.0407<br>92 | 0.0604 | 0.05887<br>73 | 0.013<br>8 | 0.0137<br>2 | 0.012<br>5 | 0.0148<br>757 | 0.01<br>43      |
|                    | N.I/<br>T.A  | 0.0002<br>5 | -0.041      | 0.0237 | 0.0205<br>02 | 0.0688 | 0.06980<br>83 | 0.056<br>4 | 0.0017<br>9 | -<br>0.026 | -<br>0.0383   | -<br>0.09       |

|                                 |                     |             |             |        |              |        |               |            |             |            |                   |                 |
|---------------------------------|---------------------|-------------|-------------|--------|--------------|--------|---------------|------------|-------------|------------|-------------------|-----------------|
|                                 |                     |             |             |        |              |        |               |            |             |            | 06                | 9               |
|                                 | C.F/<br>T.S         | 0.0249<br>6 | 0.0121<br>4 | 0.0181 | 0.0178<br>85 | 0.0315 | 0.03549<br>17 | 0.005<br>4 | 0.0052<br>6 | 0.004      | 0.0038<br>943     | 0.00<br>28      |
| <b>Dividend Payout</b>          | D.P.<br>S/E.<br>P.S | 0           | 0           | 0      | 0            | 0.5556 | 0             | 0          | 0           | 0          | 0                 | 0               |
| <b>Price per earnings ratio</b> | P.P.<br>S/E.<br>P.S | 667         | -<br>2.6266 | 8.4253 | 23.554<br>22 | 14.407 | 11.1407<br>94 | 17.23<br>6 | 82.125      | -<br>18.57 | -<br>3.7424<br>24 | -<br>0.88<br>66 |

TABLE II. BENCHMARK RATIOS OF THE CEMENT INDUSTRY

| Ratios                         | Formulas     | Cement Industry |
|--------------------------------|--------------|-----------------|
| <b>Leverage</b>                | T.D/T.A      | 3.01            |
|                                | EBIT/I.E     | 0.07            |
|                                | C.F/I.E      | 0.14            |
| <b>Liquidity</b>               | C.A/C.L      | 0.57            |
|                                | C.A/T.A      | 0.15            |
| <b>Profitability</b>           | C.F/N.W      | 1.03            |
|                                | N.I/T.A      | 2.08            |
|                                | C.F/T.A      | 1.09            |
| <b>Dividend payout ratio</b>   | D.P.S/ E.P.S | 13.06           |
| <b>Price per earning ratio</b> | P.P.S/ E.P.S | 10.69           |

### Analysis and Discussion

From the calculations done above, the following results can be inferred using the graphical representation. The changes in debt and equity are represented in the following figures (Fig. I and II) respectively.

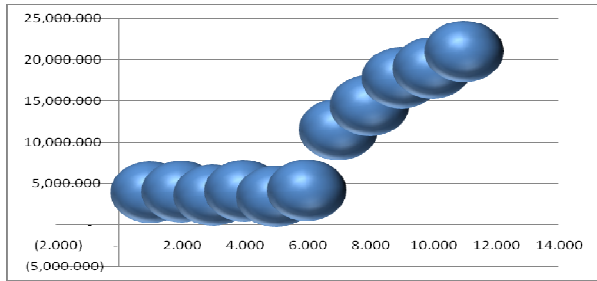


FIGURE I. TOTAL DEBT

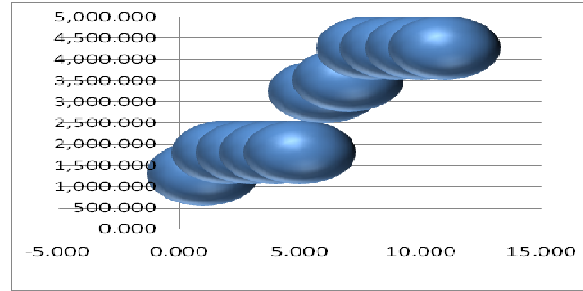


FIGURE II. TOTAL EQUITY

Analysis of the firm indicates that its leverage ratio ( $X_1$ ) remained lower than that of industrial benchmark during the period of eleven years as shown in Fig. III, so it kept on incurring more and more debt (Fig. I).

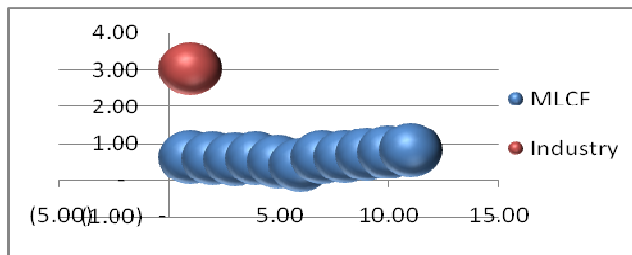


Figure III. LEVERAGE RATIO ( $x_1$ )

The coverage ratios ( $X_2$  and  $X_3$ ) of MLCF were also better than that of industrial benchmark as shown in figures II, so it also supported more use of debt (Fig. I).

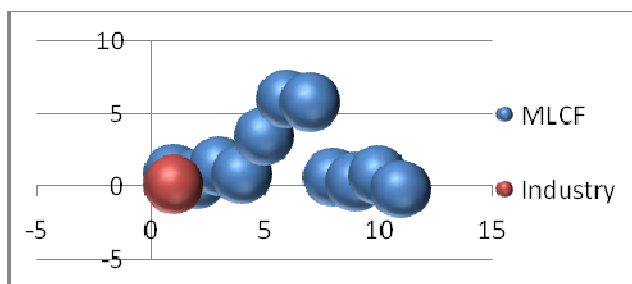


FIGURE IV. LEVERAGE RATIO ( $X_2$ )

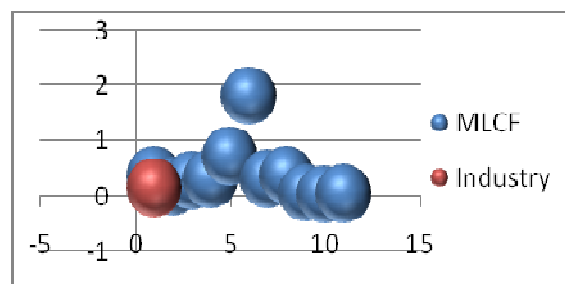


FIGURE V. LEVERAGE RATIO ( $X_3$ )

While observing the liquidity ratios it can be seen that as far as the short term debt paying ability ( $Y_1$ ) is concerned and its relation to the more debt incurrence, it seems to be having no

relationship as proposed because despite the fact that the ratio decreased over the period (shown in Fig. VI) but still the company kept on increasing its debt (Fig. I).

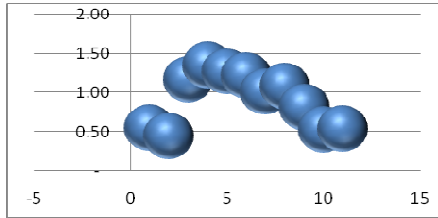


FIGURE VI. LIQUIDITY RATIO ( $Y_1$ )

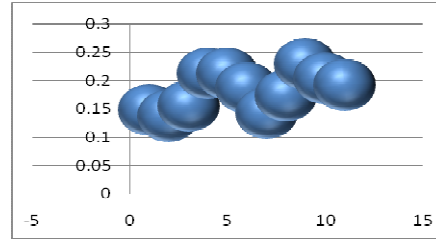


FIGURE VII. LIQUIDITY RATIO ( $Y_2$ )

But it becomes evident while looking at ( $Y_2$ ) that when the company issued equity in 2001 and 2006 (Fig. II), the ratio decreased (Fig. VII) indicating that when a firm has to invest in its fixed assets, it issues equity.

It is indicated by the profitability ratios that Maple leaf cement factory ltd. issued equity in 2001 (Fig. II) when it faced a loss to cover that profit shortfall and it increased its debt significantly in 2006 (Fig. I) as the profitability of a firm kept on increasing in previous years as depicted in Fig. VIII, IX and X.

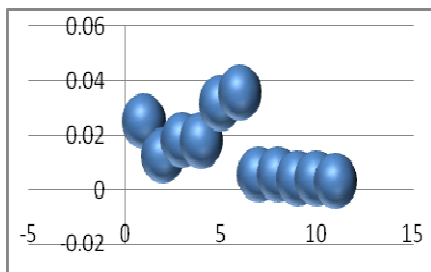


FIGURE VIII. PROFITABILITY RATIO ( $Z_1$ )

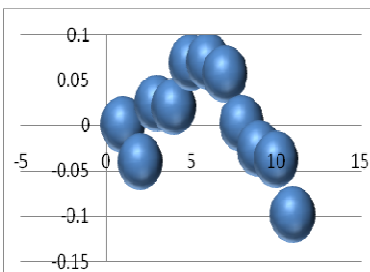


FIGURE IX. PROFITABILITY RATIO ( $Z_2$ )

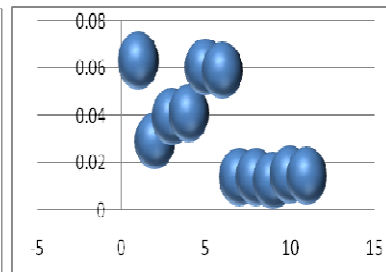


FIGURE X. PROFITABILITY RATIO ( $Z_3$ )

The dividend payout ratio (Fig. XI) is depicting that the company did not give dividends in 2000 so that is the reason it issued equity in 2001(Fig. II) but as it gave the dividends in 2004 it incurred a huge debt in 2006 (Fig. I) apart from the equity so somehow it confirms with what we formulated earlier but the issuance of equity along with debt clouds this relationship.

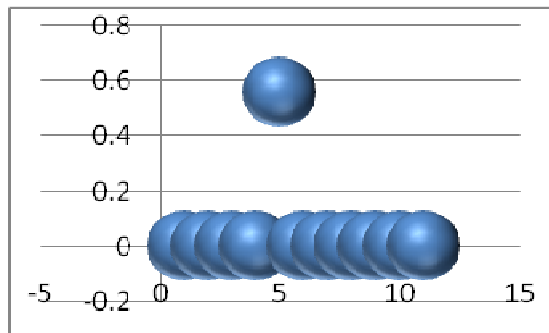


FIGURE XI. DIVIDEND PAYOUT RATIO

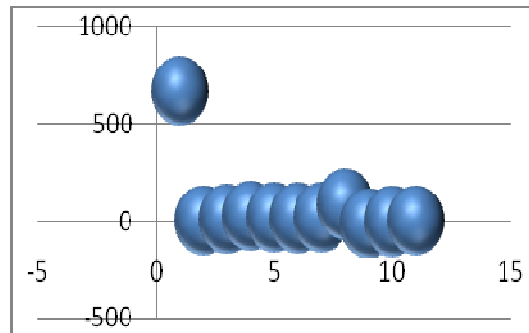


FIGURE XII. PRICE PER EARNINIG RATIO

It issued equity in 2001, 2006, 2007 and 2008 (Fig. II) when the market prices of its shares were expected to rise as indicated by the price per earning ratios of 2000, 2005, 2006 and 2007 that they were in increasing trend. (Fig. XII)

### Conclusion

From the above calculations and discussions it can be concluded that a firm chooses to issue debt among debt-equity choice when its leverage ratio is less than the set benchmark which was overall industry averages in this case. The relationship between current debt paying ability and issuance choice could not be proved by the sample but it did prove the relationship between investment in new assets and issuance of equity that means liquidity does effect the financing decision somehow. The relationship of profitability ratio with the financing decision is also proven when the firm relied on equity as it faced a loss and issued debt when its profitability was increasing but later on when it was facing losses it used both financing sources which clouds this relationship but other factors provide support to the issuance of debt so these can be taken as

clarification for this ambiguity. The linkage between dividend payout ratio and the choice between debt and equity is weak as well and again other factors can be taken responsible for making this linkage blur. The price per earning ratio proves its strong relationship with the financing choice as the sample statistics showed that when the price per earning ratio was going high, the firm decided to issue equity. Considering the effect of financing decision on the business performance, the firm chosen provide evidence in favor of what it is already formulated. As far as effect of debt- equity choice on R&D is concerned, the sample results showed that in 2001 firm issued more equity when it had to started trial production of oil well cement which got a positive feedback from potential customers later on. Similarly in 2005 it issued equity because it had to set on a new venture of converting its plant into coal firing plans in place of furnace oil plants. The effect of equity financing on Hence it can be concluded that equity financing has more positive effect on business performance.

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## *Appendix*

| <b>Year</b> | <b>Total Debt</b> | <b>Total Equity</b> | <b>Total Assets</b> | <b>Current Assets</b> | <b>EBIT</b> | <b>Interest Expense</b> | <b>Cash Flow</b> | <b>Current Liabilities</b> | <b>Net Worth</b> | <b>Net Income</b> | <b>EPS</b> | <b>Dividend per share</b> | <b>Share Price</b> |
|-------------|-------------------|---------------------|---------------------|-----------------------|-------------|-------------------------|------------------|----------------------------|------------------|-------------------|------------|---------------------------|--------------------|
| 2000        | 3938.1            | 1,302.293           | 6531.76             | 963.225               | 397         | 467.197                 | 163.04           | 1768.537                   | 2593.6           | 1.618             | 0.01       | 0                         | 6.67               |
| 2001        | 4031.4            | 1,804.913           | 6934.04             | 949.934               | 213         | 482.669                 | 84.155           | 1768.537                   | 2902.7           | -284.42           | 1.58       | 0                         | 4.15               |
| 2002        | 3583.5            | 1,804.913           | 6643.5              | 1029.88               | 607         | 435.978                 | 120.3            | 1768.537                   | 3060             | 157.293           | 0.87       | 0                         | 7.33               |
| 2003        | 4111.4            | 1,804.913           | 7321.43             | 1551.33               | 335         | 427.863                 | 130.95           | 1156.62                    | 3210.1           | 150.103           | 0.83       | 0                         | 19.55              |
| 2004        | 3390.1            | 1,804.913           | 7087.61             | 1499.27               | 1062        | 310.389                 | 223.27           | 1188.435                   | 3697.5           | 487.781           | 2.7        | 1.5                       | 38.9               |
| 2005        | 4138.5            | 3,248.844           | 10419.4             | 1940.06               | 1233        | 205.677                 | 369.8            | 1595.499                   | 6280.9           | 727.36            | 2.77       | 0                         | 30.86              |
| 2006        | 11494             | 3,519.581           | 18793.4             | 2664.46               | 1976        | 340.978                 | 100.94           | 2649.519                   | 7299.7           | 1059.24           | 2.12       | 0                         | 36.54              |
| 2007        | 14444             | 4,264.108           | 23437               | 4051.96               | 198         | 338.453                 | 123.36           | 3756.487                   | 8993             | 42.047            | 0.24       | 0                         | 19.71              |
| 2008        | 17791             | 4,264.108           | 26151.6             | 5994.9                | 449         | 1812.807                | 104.13           | 7382.464                   | 8360.9           | -676.14           | 0.91       | 0                         | 16.9               |
| 2009        | 18943             | 4,264.108           | 25660.8             | 5214.88               | 2483        | 3400.241                | 99.932           | 9962.884                   | 6717.8           | -982.97           | 1.32       | 0                         | 4.94               |
| 2010        | 20961             | 4,264.108           | 26094.9             | 5002.73               | -510        | 2059.476                | 73.265           | 9341.951                   | 5134.2           | -2584             | 4.32       | 0                         | 3.83               |

THE APPLICATION OF THE IPAD ON CHILDREN'S  
PLAY- BASED ON BRAIN SCIENCE THEORY

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Abstract

Play occupies a very significant position in children's learning. Through play, children come to know how to adapt themselves to the world and how to develop emotional, EQ and social intelligence. With the update of the education concepts and teaching methods, the wide application of iPad represents the symbol of the era progress and the cultural development. The usage of iPad carries out a gorgeous innovation for early childhood education teaching. The study starts from the popularity of iPad to the enlightenment and the application of iPad on children's play based on the brain science theory. Further issues including the characteristics of iPad, children's well-rounded whole development and the teaching strategies in children's play are discussed as well.

Keywords iPad; theory of brain science; children's play



## Introduction

With the entering into the whole new world of touchable PC and the cloud computing science, people's long-life learning and simple life style gain great progress and convenience. Further, the inter-relational interaction among people from all over the world resulted in the revolution change in children's creative learning. With the touchable PC and internet-based iPad learning and exercise, children's learning are substantially changing because of the multiple and various kinds of education content, the broadening teaching methods and skills, the elevation of education quality, and the efficiency in teaching and learning for different age learners. Apple applied stores and Android application meets everyone's needs; therefore, parents and teachers face the following question: with so many choices, in what way should parents and teachers find out the most appropriate application for their own kids in different age. Children are easy to get the access to any new knowledge, especially for their curiosity. With not god self-controlled time concept and choosing quality knowledge act, children are easy to be attracted in voice, colorful image or some exciting level satisfaction. With not enough judgment in selecting content appropriate for children's inner experience and recognition level, parents and teachers are not able to support this iPad style creative learning (Compeau, & Higgins, 2011; Dempsey, Lucassen, Haynes, & Casey, 2010). Therefore, with those cloud computing assessments and criteria which parents could gain from books or internet, the basic knowledge from early

childhood education staffs' professional ethics and morals needs to accompany in parents' guiding in choosing play and learning appropriate for children's learned experience. Regarding the revolution learning style for children's using iPad, the way in which children learn the worlds and the way how children interact with peers, parents, and teachers are totally different from the way in which the children did two years ago(Kleopatra, 2009). In Taiwan's pedagogical research, there was some emphasis on the influence of traditional computer game on children's learning. Tsun (2000) researched in the fourth grade elementary school and revealed that computer game had no significant influence on children's space development. While, Chuan (2002) mentioned that for the fifth and the sixth grade of elementary school students, computer game had some behavior significance in children's creativity, loneliness feeling and learning passion.

In terms of Brain Science theory, there were three advantages of the application of iPad on children's play: 1) respect children's original brain thinking and pay attention to interaction learning. 2) Teaching should be related with what children's mind getting interest and 3) further to assist children construct what their brain define as meaningful knowledge.

Hohmann( 1998) suggested that when the material is out of children's brain or mind, those material are lack of personal meaning, and then the opportunity in learning decreases.

Moreover, considering the key point period for children's development of brain science theory, early childhood education should offer more multiple education activity and model to motivate children's learning interest. Since the right and the left brain of children are totally controlling different area in learning, therefore, the fulfillment of colorfully preparing children's learning environment (software and hardware) do cause the good relationship between children's learning and future development and growth (Judy, 2008). With the whole and appropriate cultivating from the right and the left brain learning, early childhood activity will be in good progress and fulfillment (Gou, 2003).

The above statement brings us basic understanding of the brain science theory and the application of iPad on children's play and learning. For the further discussion, the following definition for children, children's play and iPad needs to be clarified.

- a. Children: Early childhood plays the key stage in children's future development and growth. Many researchers suggested that children under three are not appropriate in using computer (Hohmann, 1998). Therefore, in the study, with the more and more popularity of iPad application for Taiwan's children, the research defined that children are from 5 to 6 years old children, which are also the same as the children before entering elementary school.
- b. Children's play: the research referred Johnson et al., (2005), the play concept would be more modern applied. Combined with modern and post-modern Play theory, play is not only a

way, its characteristics consists self-development, pleasant, open, symbolic, creative and chaos etc. Considering play as content, play could be reached as consisting social, intellectual, physics, and socio-culture history framework (Huang, 2011)

c. "iPad", the research referred <http://www.apple.com/iPad/features/> (2012), the concept of iPad would be the touchable PC of I-phone OS, which is between intellectual cell phone and notebook computer. From each point of view, it could be a maximized iPad Touch. Its multiple usages in game, life style, social internet, education and entertainment could be downloading with your fingers. And with the most recent version you favor, the battery of 10 hours lasting, the 8.8 mm and 601 g, all those delicate design attracted children and adults. When you hold it, the cozy and comfortable feeling is out of words explanation, but the creative design offers so many flexible conveniences, including easy going internet, sending and receiving e-mails, seeing movies, listening to songs, reading e-books, or even searching knowledge or map all over the world.

With the popularity of iPad usage and the basis of the brain science theory, the questions in the research would be as follows.

...In what way does iPad change children's multiple brain learning?

...In what way does iPad influence children's intelligence, including emotional, recognition, social, moral and physical intelligence ?

...In what way do early childhood teachers combine family, school and community resource in appropriate guiding children's usage in playing iPad?

...In what way do early childhood teachers combine the brain science theory with the curriculum teaching within children's learning environment?

### iPad and Brain Science Theory

With the global village widespread, computer internet and cloud computing occupies more and more important role. With the teaching hardware involvement within schools, teaching equipment and teaching material make great progress from chalks and blackboard to internet and technology product. A child's learning material get great progress from traditional textbooks to electrical dictionary, CD ROM, iPad and social internet. Children's play within internet environment has so many gorgeous characteristics and advantages. 1. Crossing time and space: Play within iPad and social internet broke traditional teaching space and area limitation, which makes learners learn in fenceless environments. 2. Source sharing: Learners could co-operate with the best school, teachers and curriculum within different culture. 3. Interactive: iPad and social internet could support the intra-interaction among children, teachers, and parents at the same time, but not necessary at the same place. 4. Auto-directed: Play within iPad and social internet environment could offer learners self-controlled learning environment, which cultivate

learners automatic, active, and creative learning attitude. Learners could base on self real situation to arrange learning time and location, content and plan, questions and solutions.

To apply iPad play teaching for children's environment offers children the following advantages.

#### Creative learning environment

iPad and social internet create appropriate environment for each different individual with different learning style. The creative environment represents the social, the atmosphere, and the autonomy characteristics. With the construction of real situation, iPad offers social internet and multi-media access in assisting children straightly recognize the essential rules and development of learning itself.

#### Automatic learning and respect children's individualism

Play teaching within iPad environment focuses on child-centered teaching process; Therefore, in this cozy and flexible learning environment, children gradually build the habit in automatic learning self-organized and self-interest content. With self-choosing learning schedule, style, model, and form, children's freewill individual motivation in playing will be the real passion in learning.

#### Teachers as Helper, Guider, Consultant and Promoter

Contrary to traditional knowledge authority deliver, teachers play the role as assistants instead. Within children's iPad play, children can always get the help from teachers or from

automatic trying. Children would be able to construct self knowledge through repetition and decision making. And teachers play the role as guiding children how to use the multimedia equipment in the creative and original way. With confidence building and motivation elevating, children would be able to create the relationship between old and new knowledge and the reorganization of learned knowledge.

### Meeting Children's Individual Needs and Relative Development

Teaching material within iPad, to some extent, could satisfy children of different learning pace and learning style, which meet the requirement of multiple- intelligence learning theory by Gardner. With different question offered from iPad, it is not necessary for each individual to complete the goal at the same time. Since children can free decide the pace, the way, the model they are interested, the so called stage by stage learning could be corresponded with each unique individual.

The characteristic of easy to carry, to maintain, to renew, to represent

With the combination of children's daily life experience and high technology, children can adjust the way they carry, maintain, renew, design and represent the learning material.

### The Characteristics of Children's iPad

1. The design model of children's iPad

iPad could express educational teaching content, and could concrete objective matters through children's five senses. Take the play of learning dancing "Grasping grapes", children could be able to enjoy the music within the sound and the image from iPad application. Totally different from traditional repetition in dancing the postures, iPad offers children opportunities in freely and happily exercising children's imagination, creation, and appreciation ability. Teachers need to focus concept renewal, education process guiding, and adjust children's active learning process. Also, in the play of "Food traveling," children could easily comprehend the whole digestive process through the iPad application, which broaden children's learning and teachers' teaching message quantity.

## 2. The design of purpose and entirety

The purpose of play activity is to excite children's inner interest and then elevate children's learning efficiency. Hence, the purpose of play needs to be presenting the corresponding teaching goals. No matter in reviewing old knowledge or learning new knowledge, iPad play could be flexibly applied in any course. Take the "ABC songs," "ABC Zoo," "Alphabet tracing," "Lunch Box," and "Alphabet racing" for example, those play are of the same purpose, to help children get familiar with alphabet learning. And children are attracted by that play crazily and also present good learning efficiency. They play those activities out of their interest, not from finishing the homework.



### 3. Flexible dealing with material content and activities within iPad play

Concerning reading part, iPad combines picture book with play; while in physical children's play, iPad could combine image with sound and elevate the classroom learning atmosphere. Take children's learning the English vocabulary of "colors", teachers could design a colorful active wheel for children, and with the application of iPad, the interesting wheel shows the color, and iPad shows the sound or image. Further, with the combination of group or team competition, children's learning motivation and efficiency elevates finally.

### 4. Play offers multi-interaction among peers:

With the no limitation of age, children could share their excitement and joy with any other family members or friends. Out of curiosity, children get great access in strongly exploring how to play. Therefore, the parallel, harmonious, co-operative relationship naturally happened in children's activities. Take the play of "monkey hit tiger," teacher and children build equality and harmonious relationship during the play process. During the play, teachers and children could be friends, enemies, co-operator, or competitors...etc.

With different levels design, children choose the appropriate level by themselves iPad offers so many level challenges for children in any kind of play, which offers children confidence, safety, pleasant feeling, success, and fulfillment. Take "Angry bird" for example,

children could easily choose levels they want and they can also play by individual model or by group model. Some play focus on simple practice, while some emphasize on skillful practice.

#### Self-correcting Design with Colorful Sound and Images

Children are always lacking stable attention during learning, and then the learning efficiency is limited by children's changeable passion and emotion. During the iPad play, only when children are having strong interest, their brain is in the excitement situation, which brings children into active participation.

#### Conclusion

With the above advantage mentioned; however, there are some limitations parents and teachers should pay attention to. iPad play can't totally replace traditional teaching: iPad can't replace classroom interpersonal interactions among peers. Further, without parents and teachers assistance, children can't control themselves in time arrangement. And also the high technology emphasizes much on image and sound, which might overuse modern education media and contribute children's learning side effects.

During the application in iPad play teaching, the identity or subject role between teacher and children needs to be clarified. The appropriate teaching and learning point needs to be flexible. Sometimes, teacher serves as assistant, sometimes as competitors, or sometimes as

children's group workers. Teachers or parents still need to be guiders always in Taiwan's education learning system.

Adults should build correct and healthy recognition in social internet play: In order to guide children's healthy physical and psychological development, children need to understand the deeper meaning why children love to play iPad.

Appropriately arrange open classroom environment: From the motivation of play, children always play from free will and total volunteer. With certain rule but no closed limitation, children could self-decide what they want. They can change the play rules and hold strong interest in play and learning.

To merge real experience with new knowledge: Through the simple communication with peers, teachers, or family members, children would love to experience the satisfaction in real touching reality. Play is the real activity which is existed in children's daily life.

With children's knowing surrounding environment and constructing brain knowledge, play occupies a very significant role. Therefore, early childhood education should put more emphasis on combining teaching with playing to make children happily play and learn. Teachers and parents should open the mind in keeping in touch with high technology. With the professional early childhood ethics, teachers should put more multiple brain learning theory into the

classroom curriculum. Hopefully, children's learning interest, motivation and efficiency would be always with children.

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## BUSINESS PERFORMING SOCIAL RESPONSIBILITY ACTIVITIES AND CORPORATE SOCIAL RESPONSIBILITY ISSUES

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### Abstract

In this study, businesses performing social responsibility related activities are considered. This is followed by examples of corporate social responsibility issues: product line, product performance, packaging, marketing practice, customer complaints, adequate customers information, fair pricing, workforce education, support and training, extended personal comprehension, programs for allowing and encouraging workers in social projects, environmental monitoring, external relations, government relations, measure of employee comprehension, international, employee relations, work satisfaction, and benefit comparisons to competitions, comparisons of operating on promotion, hires, terminations against breakdowns, general working environment, fringe benefits as a percent of salary level; evaluation of workforce benefit preferences, industrial/union relation, employee health and safety, comparisons of safely and health performance with competition and industry. An extensive topical bibliography is also provided.

Keywords: Social Responsibility Activities, Corporate Social Responsibility Issues.

## Businesses Performing Social Responsibility Related Activities

Businesses should voluntarily perform social responsibility related activities, beyond those legally needed to perform. The purpose of this article is to inform organizations involved in performing social responsibility activities what these may consist of. Legislated social responsibilities concern the minimum standard of social responsibility that business must accomplish. They represent evaluation the negative and positive outcomes of performing social responsibility activities, in short and long run, that maximize management system success while making some contribution to improving or maintaining the welfare of society. Managers should communicate the businesses' degree of social responsibility involvement to their communities.

It is important for businesses to perform these social responsibility functions for a variety of reasons, including the following:

- Gaining consumers
- Increased long run profitability
- Ability to attract better managerial capacity
- Survival of the company
- Greater job satisfaction among workers, executives
- Strengthening of the social and economic system in which the corporation functions
- Enhanced goodwill and reputation

## *Corporate Social Responsibility Issues*

Businesses have a wide variety of opportunities to involve, to protect and improve the welfare of society, as follows:

### *Product line:*

- Standard for product
- Safety
- Design
- Quality
- Substitute products
- Competition

### *Product performance:*

- Utility
- Efficiency
- Service policy
- Guarantees
- Service pricing
- Service availability

### *Packaging:*

- Environmental impact

### *Marketing practice:*

- Advertising claims, government complaints
- Legal standards

### *Customer complaints:*

- Selling price
- Credit terms

*Adequate customer information:*

- Product misuse
- Product use, duration of use

*Fair pricing:*

- Between locations
- Between nations

*Workforce education, support and training:*

Leaves of absence for

- Training during working hours
- Full-time Education
- Vocational training
- Spent on training
- Percent workforce still with enterprise
- Upgrading and career development programs
- Number trained per year

*Extend personnel comprehension:*

- Incentive system available
- Jobs
- Skills needed later
- Specific promotion

*Programs for allowing and encouraging workers in social projects:*

- Use of enterprise facilities and equipment



- After hours only
- On company time

*Environmental monitoring:*

- Transportation of intermediate and finished goods
- Products
- Production processes
- Acquisition of raw materials
- Programs to keep workers alert to pollution-related accidents.
- Procedures for environmental impact of new packages goods.

*External relations:*

- Community Development Support of minority and community company through :
- Identifying opportunities to serve community through business expansion
- Subcontracting
- Purchasing

*Government relations:*

- Development and participation of business/ government programs
- Specific input to public through research

*Measure of employee comprehension:*

- Equal opportunity
- Benefit and Pay

*International:*

- Comparisons of policy between nations and local standards

*Employee relations, work satisfaction and benefits comparisons to competitions*

- Participation in ownership of company by stock purchases
- Health, Insurance programs
- Transportation
- Day maternity and care
- Profit sharing
- Retention and Turnover
- Retirement plans
- Wage and Salary levels

*Comparisons of operating on promotion, hires, terminations against breakdowns by:*

- Education level
- Race
- Sex
- Age

*General working environment:*

- Noise
- Air conditioning
- Lighting
- Space/ person
- Ventilation
- Heat

*Fringe benefits as a percent of salary levels: Evaluation of workforce benefit preferences*

*Industrial/Union Relation :*

- Strikes

*Security and Confidentiality human resource data*

- Grievances

*Employee health and safety:*

- Fatalities
- Accident frequency
- Extent of compliance, and working conditions, as well as Safety performance

*Comparisons of safety and health performance with competitions and industry*

- Food facilities
- Employee health measures
- Developments/innovations in safety and health

### Conclusions

It is a social obligation for businesses to have a number of economic and societal goals.

One important reason is in order to anticipate potential social issues and to work actively to prevent them from occurring. They should try to measure the cost of social programs and the return on social program investments. They should try different approaches for measuring social performance. They should show reports to the board of directors, stockholders and organization members on social responsibility progress. They should compare themselves to industry norms for social programs.

All enterprises ought to take social responsibility as follows : The quality of life area : To improve the general quality of life in society by producing high-quality goods, fairly with workforce and consumers, as well as making an effort to preserve the natural environment. For example cigarette enterprises produce goods that actually harm the health of society are socially irresponsible. The social investment area : To invest human resources and money to solve community social issues. The problem-solving area : The organization deals with social issues, participating in long-term community planning. The economic function area : To produce goods and services that social need, pay fair wages, create job for society, and ensure workforce safety. It is economic contribution of the organization for society. A social audit is the process of evaluating the social responsibility activities of an organization. It measures, controls, and evaluates social responsibility performance.

Social responsibility enforces the obligation of managers to protect or serve the interests of groups other than themselves, and encourage managers to become more ethical. Although stakeholders affect the corporation, managers may not acknowledge responsibility to all of them. The social contract has assumptions and rules about acceptable interrelationships among the numerous elements of society. The social contract deals with relationships with individuals, other organizations, government, and society in general. Various associations and groups business leaders encourage companies and managers to involve in socially responsible activities. In the

long term, those who do not utilize power in a manner society considers responsible will tend to lose it. Therefore, if businesses want to retain their social role and power, they must be responsive to society's needs. Closely related to social responsibility is corporate ethics. Corporate ethics concerns what is bad and good, or wrong and right, or with moral obligation and duty.

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